WOMEN’S EMPOWERMENT AND HOUSEHOLD HEALTH IN SUB-SAHARAN AFRICA: EXAMINING THE IMPORTANCE OF SOCIAL NORMS

A Thesis Submitted to The University of Manchester for the Degree of Doctor of Philosophy in the Faculty of Humanities

2013

GORDON ABEKAH-NKRUMAH

Institute for Development Policy and Management (IDPM)
School of Environment and Development

TABLE OF CONTENT

WORD COUNT: 81,109

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

CED	Chronic Energy Deficiency
CWEI	Composite Women's Empowerment Index
FAO	Food and Agricultural Organisation
GDP	Gross Domestic Product
GNI	Gross National Income
GNP	Gross National Product
HAZ	Height for Age Z-scores
HDI	Human Development Index
IMF	International Monetary Fund
ILO	International Labour Office
LAC	Latin America and the Caribbean
MENA	Middle East and North Africa
MDG	Millennium Development Goals
MGRS	Multi-Growth Reference Study
MMR	Maternal Mortality Rate
NCHS	National Centre for Health Statistics
SSA	Sub-Saharan Africa
UNICEF	United Nations Children Fund
UNDP	United Nations Development Programme
U5MR	Under-Five Mortality Rate
WDI	World Development Indicators
WEIGO	Women in Informal Employment: Globalising and Organising
WHO	World Health Organisation
WHZ	Weight for Height Z-scores

ABSTRACT

Empowerment-based approaches to social development has attracted substantial attention in the last two decades. At the core of this debate is the preposition that empowering marginalised groups can improve their agency, with possible favourable implications for their life outcomes. The household bargaining literature has examined the effect of women's empowerment/bargaining power on development outcomes (e.g. health, education, agriculture and household expenditure). A core issue in this literature is the measurement of what constitute women's empowerment. The literature in economics and human development has tended to rely on the use of proxies that capture women's access to resources and or capabilities/functioning. This approach tends to ignore or deemphasise the importance of social norms/informal institutions (norms, values, traditions, beliefs etc), which via patriarchal gender stereotypes, restrict women's voice and access to resources. Although some researchers in demography have used proxies that capture social norms, they have been used alone, thus telling a single sided story as in the case of the economics and human development literature. Secondly, the discussion on the instrumental importance of women's empowerment in this literature seem to have focused mainly on mean development outcomes compared to the distributions of such outcomes in the population (inequality).

Thus, the current study, using Demographic and Health Survey (DHS) data from 20 Sub-Saharan African (SSA) countries, computes a composite women's empowerment Index (CWEI), together with two sub-indices (social norms and access to resources) representing two dimensions of CWEI. The study further examines the comparative effect of social norms and women's access to resources on household health (i.e. mean health outcomes for women and children and poor child health inequality). Results suggest that in general, women from Southern Africa have a higher score on CWEI compared to their counterparts from East and Central Africa and West Africa. In addition, Southern African women are more able to negotiate social norms that constrain their voice and agency, whiles women from West Africa perform better on the access to resources index. Information from the DHS data and other external data sources (World Development Indicators database, International Labour Office and WEIGO), together with the SSA literature on the politics of liberation struggles and the formal/informal dichotomy of SSA economies, suggest that the sub-regional differences may be due to the unique history of liberation struggles in Southern Africa and the relatively large size of the informal sector in West Africa. Multivariate results also confirm the long held view that women's empowerment positively influences household health (mean health outcomes and inequality), with social norms having a much higher effect on household health compared to women's access to resources.

In addition, the results suggest that other factors such as women's education, household wealth, access to and availability of health services, rural/urban and provincial differences have a higher effect on household health compared to the two dimensions of women's empowerment. The study concludes, advocating that interventions aimed at improving women's empowerment and bargaining emphasise issues of social norms, since they are likely to constrain women's voice, access to resources and consequently implications on household outcomes. This emphasis must however take into consideration the importance of other equally important factors (women's education, household wealth, access to and availability of health services etc), given that women's empowerment (especially informal institutions such as social norms) could take a long time to change and their effect realized in the long-term.

DECLARATION

I, GORDON ABEKAH-NKRUMAH, hereby declare that no portion of the work referred to in this thesis has been submitted in support of an application for another degree or qualification of this or any other University or other institute of learning.

GORDON ABEKAH-NKRUMAH

Date: 24th June 2013

Degree: PhD, The Faculty of Humanities, The University of Manchester

COPYRIGHT STATEMENT

DEDICATION

To my wife, Odile Anukware Nkrumah. Your prayer, love and encouragement has been a source of strength especially in this journey. I am very grateful.

ACKNOWLEDGEMENT

The time spent researching and writing my PhD thesis has been challenging and enjoyable as well. I must admit though, that there were moments especially in the early and mid stages of the process, where I questioned my capacity to go through what I saw as a very demanding process. Notwithstanding the challenges, I was inspired each and everyday by people and entities I believe God sent my way to give me a helping hand. I am therefore thankful and grateful.

First and foremost, I am forever thankful to God for sending these individuals and entities my way. Secondly, I am grateful to my Supervisor, Dr. David Lawson for his immense help and guidance through this process. I have benefited immensely from David's quest for theoretical and statistical rigour and attention to detail. I am also grateful for his encouragement, inspiration and concern about the welfare of my family and myself during this process. I am also grateful to Dr. Sussan Steiner, based at DIW-Berlin for her comments on my work as well as the opportunity to present my work at DIW-Berlin. My PhD work has also benefited immensely from comments by seminar participants from the Development Economics Seminar Series at the University of Manchester and the Department of Development and Security Seminar Series at DIW-Berlin.

I am also very grateful to the IDPM, University of Manchester, for making funds available for my tuition and the University of Ghana Business School that supported me with funds for my upkeep in the United Kingdom. I also want to acknowledge the University of Ghana Graduate School and the African Economic Research Consortium (AERC) for supporting my thesis with a thesis research grant. I am indeed very grateful for your help.

I am equally grateful to my colleagues at IDPM whose support and friendship has made this journey a lot better that it would have been without them.

Finally I would want to thank my family in Manchester and back in Ghana for all the support and prayers. I am very grateful.

CHAPTER ONE

THE STUDY

1.0 Introduction

This chapter articulates in clear terms the motivation and objectives of the study. The chapter begins with a background to the study, followed by the research problem and motivation. From the motivation, the objectives of the study are outlined, followed by the structure of the final report. For the purpose of this study, women's empowerment and bargaining power are treated as being synonymous.[1]

1.2 Background

The welfare of women and children has been the subject of much research and policy discussions both in developed and developing countries. This is partly due to the fact that women's role both within and outside the household is critical to a society's development. For example, women are predominantly responsible for providing childcare in most societies (Friedemann-Sanchez, 2006). In many countries, women together with children account for a larger share of the population and labour supply for household production compared to men. Notwithstanding the crucial role women play in the socioeconomic development of their societies, their ability to have access to welfare inputs such as capital, health, education etc, is severely constrained (World Bank, 2007; King et al., 2009; FAO, 2011). For example, gender statistics from the World Development Indicators (WDI) database suggest that in 2010, the labour force participation rate for women globally was 40%. For the same period, the percentage of women in national parliaments or having a ministerial position was 19% and 16% respectively. The same database suggests that the ratio of female to male labour force participation rate in 2010 was 69% (World Bank, 2012). It is therefore not surprising that women account for as much as 70% of the world's poor people and about two-thirds of the world's illiterate population (Moghadam, 2005).

This situation may even be worse in regions such as Sub-Saharan Africa (SSA), where patriarchal kinship and economic systems constrain women's autonomy (Caldwell, 1986; Kabeer, 1999; Sen and Batliwala, 2000). For example, not only do women in SSA spend more time than their counterparts in Eastern Europe, Asia and Latin America and the Caribbean (LAC) in collecting water, they also have one of the lowest percentage of women in paid non-agricultural employment (United Nations, 2010a;

[1] Theoretically, empowerment and bargaining power may not be the same. However, given that the study draws on the economics literature where the term bargaining power is common and the demography literature where the term empowerment is common, we have decided to use the two synonymously to refer to the same underlying concept of women's empowerment.

2011). The World's Women's report- 2010 suggest that Africa added 32 million people to its illiterate population, with 72% of that figure estimated to be women (United Nations, 2010b). In addition, the labour force participation rate in 2010 was 62% for women compared to 80% for men. Data from the World's Women's report 2010, equally suggest that between 1999 and 2005, the proportion of women who justified wife beating for different reasons is higher in countries from SSA than other developing regions such as LAC or South Asia.

In the context of health, women in SSA suffer from some of the worse health status outcomes in the world. For instance, SSA has the highest Maternal Mortality Rate (MMR) – 640/100,000 live births and adult lifetime risk of maternal death (1 in 31) among developing regions of the world.[2] Besides, SSA alone had 6 of the 11 countries contributing 65% of global maternal deaths in 2008 (WHO, 2010). Not surprisingly, well known interventions for reducing maternal deaths such as skilled birth attendance, antenatal visits and use of modern contraceptives have a lower prevalence in SSA than any other region (World Bank, 2012). The poor health status of women in SSA has adverse implications for the health of children. With only one-fifth of global births, SSA accounts for about 45% of global deaths, with under-five deaths reaching 4.8 million each year (Chopra and Darnton-Hill, 2006). In addition, SSA has the highest prevalence in under-five stunting, with all but 6 of the countries in SSA unlikely to meet the MDG 4 target (Chopra and Darnton-Hill, 2006).[3]

The risk associated with such high levels of gender-based inequality is possible adverse effect on a country's development.[4] To deal with the negative consequences of gender-based inequality, policy makers have sought to implement interventions that seek to empower women, with the view that their welfare and that of their children will be impacted positively. Such interventions are premised on the assumption that empowered

---

[2] The MMR for other regions include South Asia (280), Oceania (230), South Eastern Asia (160), North Africa (92), Latin America and the Caribbean (85), Western Asia (68) and Eastern Asia (41).

[3] MDG 4 is a target by the United Nations to reduce child mortality by two-thirds between 1990 and 2015 whiles the 6 countries referred to above, includes Cape Verde, Eritrea, Mauritius, Seychelles, Botswana and Malawi.

[4] The link between gender-based inequities and a country's development may work through (1) shortage of human capital arising from the gender gap in education, especially at the secondary and tertiary levels (2) Reduced output and productivity arising from gender-based misallocation of resources (e.g. skewed investments in favour of male dominated activities to the detriment of women). (3) A higher share of women's time spent on household work may mean limited time for market-based activities, with potential negative consequences for productivity. (4) Reduced employment opportunities for women may reduce their capacity to bargain for household resources, especially in critical areas such as education and the health of household members (Blackden et al., 2006).

women are likely to have the capacity to either bargain for household resources or reflect their preferences in household resource allocation (Lundberg and Pollak, 1993; 1997; Thomas et al., 1997; Sen and Batliwala, 2000). Considering that in many societies, childcare is the responsibility of women, researchers have argued that extra resources accruing to women from increased empowerment or bargaining, will be used to improve the lives of women and their children (Caldwell and Caldwell, 1993; Engle et al., 1999; 2000; Smith et al., 2003; Friedemann-Sanchez, 2006).

Not surprisingly, the discourse on the link between women's empowerment and household welfare has attracted substantial academic research from different disciplines. Findings commonly confirm that empowering women has implications for household resource allocation and consequently women and children's welfare. A section of this literature suggests that compared to men, resources accruing to women are more likely to be expended on priority items such as food, health and clothing needs of household members.[5] In Cote d' Ivoire for example, analysis of the determinants of household expenditure revealed that female income share, significantly increased household budget shares for food but reduces the budget shares of alcohol and tobacco (Hoddinott and Haddad, 1995). Data from Brazil also suggest that an increase in non-labour income controlled by women, is linked with greater increases in household budget shares devoted to human capital and leisure, greater nutrients intake and better child health (Thomas, 1990; 1994; Thomas et al., 1997).

Evidence from Ghana also reveals that household expenditure patterns are explained to a significant extent by percentage asset holdings by women (Doss, 2006). In a cross-country study, Quisumbing and Maluccio, (2003) investigated the effect of women's assets at marriage on the expenditure share of education, food, alcohol/tobacco use, health, children's clothing and child schooling, using data from South Africa, Bangladesh, Indonesia and Ethiopia. Findings of the study suggest that women's control of resources leads to differential expenditure increase in education for boys and girls across the countries studied. Aside household expenditure, a substantial portion of this literature (especially from Economics and Demography) has investigated the link between women's empowerment and children and women's health (Malhotra et al.,

[5] Aside the studies mentioned above, there are other relevant studies on women's empowerment and bargaining in developing countries. (see for example Thomas, 1990; 1994; Thomas et al., 1997; Rubalcava and Thomas, 2000; Quisumbing and Maluccio, 2003).

2002).[6] The findings from these studies provide evidence, suggesting that empowering women may likely transmit improvements in children and women's health (Hoddinott and Haddad, 1995; Thomas et al., 1997; Duflo, 2003; Quisumbing and Maluccio, 2003; Hindin, 2005a; 2005b; Kishor and Johnson, 2006; Allendorf, 2007b; Fafchamps et al., 2009; Rico et al., 2011).

1.3 Research Problem and Motivation

Notwithstanding the growing evidence supporting a correlation between women's empowerment and development outcomes such as women and children's health, an unresolved issue in the women's empowerment/bargaining literature relates to the measurement of women's empowerment. Measurement has tended to follow the orientation of academic disciplines. For example, in the economics literature, a resource-based approach seems to be dominant. This is evidenced by the use of economic related proxies such as public transfers and welfare receipts, income shares of women, unearned income, assets brought into marriage or current assets, education or couple education differences, employment, yield by gender from farm plots etc, as indicators of women's empowerment.[7] Another important source of reference for women's empowerment; the human development literature, has tended to focus on gender differences in what Sen refers to as capabilities/functionings – health, education and income (Sen, 1999).

A review of the components of several gender inequality indices (Gender Inequality Index- GII, Gender Related Development Index- GDI, Gender Empowerment Measure- GEM and the Gender Equity Index- GEI) suggest the predominant use of education, health, income etc as measures of women's empowerment.[8] Whiles not disagreeing with the predominant approach in the economics and human development literature, it is

---

[6] See (Malhotra et al., 2002) for an extensive review and classification of this literature. Findings show that different measures of women's empowerment are associated with child health and well-being for all six papers reviewed. In the area of reproductive health, results show that measures of women's empowerment are associated with reproductive health of women for all three papers reviewed. For investment and development, the only paper reviewed gives evidence that measures of women's empowerment are associated with investment in rural infrastructure (i.e. water, fuel, roads health etc).

[7] A detailed discussion of some of these proxies discussed above are available in Chapter 3.

[8] The GII is measured along three dimensions; Labour Market (i.e. labour market participation), Empowerment (i.e. educational attainment at the secondary level and above and parliamentary representations) and finally Reproductive Health (i.e. adolescent fertility and maternal mortality). The GDI uses Life expectancy, Education and Income, whiles the GEM is measured using proportion of seats held by women in national parliaments, percentage of women in economic decision making positions (including administrative, managerial, professional and technical occupations) and female share of income (earned incomes of males vs. females).

also the case that it tells only one side of the women's empowerment story. That is, women's empowerment is mainly gender-based differences in access to resources and or capabilities/functionings. Secondly, these measures are based mainly on outcomes, thereby ignoring the process and environments within which these outcomes are attained.

However, it is possible that gender-based disparities in access to resources and capabilities may be a reflection of the gendered nature of social institutions (social norms), which prescribes gender roles and privileges. The importance of social norms in the empowerment process is emphasised by Narayan, (2005). He argues that the agency of poor people (i.e. their assets and capabilities) is influenced by societal opportunity structures, defined to include the broader institutional, social and political context of formal and informal rules and norms within which actors pursue their interest. Thus women's empowerment or ability to bargain may not only be determined by access to resources or capabilities/functionings, but also the gendered nature of social institutions within which women pursue their interest. That is to say that it is important not only to look at outcomes but also the circumstances under which women achieve these outcomes, since that to a large extent influence what can be achieved or not.

Recent studies using resource-based proxies as indicators of women's empowerment have pointed to the important role of social institutions (social norms) in the women's empowerment discourse. For example, Goldstein and Udry, (2008) argue that the inability of female plot owners in Southern Ghana to fallow their plots is as a result of their constrained ability to defend their right in such plots. They further argue that constraints faced by such women are rooted in power relations of social groupings and the position they hold in such hierarchies. A related study in Burkina Faso concludes that gender differences in resource allocation in the household, can be explained without resorting to any assumptions of innate differences in preferences or power between men and women, but rather, by differences in positions created by social norms (Wahhaj and Kanzianga, 2010).

In addition, Morrison and Jutting, (2004) and Jutting and Morrison, (2005) examine the effect of social institutions alongside access to resources and level of development on women's economic role in developing countries.[9] They find social institutions has the single most important effect on women's economic role. Mabsout and Staveren (2010) used ethnicity variables as proxies for gendered institutions. Their findings suggest that unequal gender norms mediate the effect of individual and household empowerment variables. Besides, some empirical studies have suggested that access to resources is not a sufficient condition for empowerment (Lokshin and Ravallion, 2005), They argue that access to resources (material or human) has a lower impact on agency compared to variables that denote social norms, caste, area of residence etc (see Roy and Niranjan, 2004; Kamal and Zunaid, 2006; Allendorf, 2007b). The foregoing discussion suggests that social norms could constitute an important dimension of women's empowerment.

Although in the demography literature, some authors have used variables (decision-making, violence perception, women's autonomy) that can be argued as capturing some form of social norms, nonetheless, their conceptualization mainly emphasise women's exercise of agency and not social institutions. Secondly, authors using these variables have often used them alone without comparing them to variables on access to resources (see for example:Hindin, 2000b; 2005a; 2011; Mullany et al., 2005; Allendorf, 2007b; 2007a; Kishor and Johnson, 2006). Thus, creating a single-sided impression as in the economics and human development literature. Hence, in addition to emphasizing social norms as an important dimension (intrinsic and instrumental) of women's empowerment, it is essential to examine the comparative importance of social norms and access to resources as dimensions of women's empowerment. This will be examined by comparing the statistical significance of the proxies for social norms and access to resources. Given that this has received less attention in the literature, the value of such a comparative exercise may lie not only in improving the literature but also expanding options available to policy makers.

Secondly, the empirical literature on women's empowerment has concentrated on examining the effect of women's empowerment on mean outcomes. For example, studies examining the effect of women's empowerment/bargaining on outcomes such as agricultural production (Udry, 1996; Goldstein and Udry, 2008), education (Zhan and Sherraden, 2003) and health (Haddad and Hoddinott, 1994; Hoddinott and Haddad, 1995; Quisumbing and Maluccio, 2003; Duflo, 2003; Fafchamps et al., 2009) have used

[9] The following variables were used to measure social institutions: right to inherit, freedom of movement and dressing, right to ownership and access to property, female genital mutilation, marriage before the age of 20, polygamy and authority over children.

models that rely on the mean of the outcome variable. There is however little research, especially in the SSA literature that examines the influence of women's empowerment on inequality in any socioeconomic variable. This is against the background that policy makers may not only be interested in mean outcomes but also the distribution of the outcome variable in the population (inequality). Perhaps the little attention given to issues of women's empowerment and inequality may be due to the fact that it is not directly apparent. However, considering that existing evidence suggest that women's empowerment is associated with access to resources and access to resources also associated with outcome indicators, women's empowerment may indirectly affect the distribution of outcomes in the population. Indeed, such an extension of the women's empowerment- development outcome nexus can be said to be unique and perhaps novel in the SSA literature.

1.4 Objectives

Based on the above discussion, the current study uses Demographic and Health Surveys (DHS) data from 20 SSA countries to examine whether social norms as a dimension of women's empowerment is as important as women's access to resources in determining outcomes in women and children's health. Specifically, the the study

1. Examines the effect of women's empowerment on children's health and whether social norms are equally as important as access to resources in determining children's health status.
2. Examines the effect of women's empowerment on women's health and whether social norms are equally as important as access to resources in determining women's health status.
3. Determine the levels of socioeconomic inequality in child health in SSA and the comparative contribution of social norms and women's access to resources to such levels of socioeconomic inequality.

To address the three objectives stated above, we first ask the most critical and important question of what constitute women's empowerment? how it can be measured? and channels by which it transmits improvement in women and children's health? These questions are addressed in Chapter 3 through a theoretical framework that seeks to explain what women's empowerment is, how it could be measured and finally how the relationship between women's empowerment and women and children's health is modeled. Based on the theoretical model in Chapter 3, the objectives of the study are addressed using regression analysis, which is explained in detail in each empirical chapter. Each objective constitutes the subject matter of a separate empirical chapter- Chapters 4, 5 and 6 respectively. As already indicated, the study uses data from DHS surveys in 20 SSA countries and is discussed in detail in Chapter 4.[10] The empirical results in Chapter 4 and 5 are based on pooled cross-sectional data for 20 countries and on sub-regional basis (i.e. West Africa, East and Central Africa and Southern Africa). In Chapter 6 however, the analysis is based on both pooled and individual country data.

The rest of the study is organised as follows. Chapter 2 discusses background issues related to women's empowerment and women and children health in SSA. The focus of Chapter 3 is a framework that explains and measure women's empowerment, and also models the relationship between women's empowerment and children and women's health status. In Chapter 4 and 5, we examine the effect of women's empowerment on children and women's health respectively. In each of these chapters, we further investigate whether social norms are equally as important as access to resources in determining the health status of children and women respectively. In Chapter 6, we discuss the level of socioeconomic inequality in poor child health in SSA and the comparative contributions of social norms and access to resources to such levels of socioeconomic inequality. Finally we summarise and conclude the study in Chapter 7.

[10] The countries selected for this study and the year of data collection are as follows: Burkina Faso (2003), Cameroon (2004), Democratic Republic of Congo (2007), Ethiopia (2005), Guinea (2005), Malawi (2010), Mali (2006), Mozambique (2003), Namibia (2006), Niger (2006), Nigeria (2008), Sierra Leone (2008), Rwanda (2005), Senegal (2005), Swaziland (2007), Tanzania (2005), Uganda (2006), Zambia (2007) and Zimbabwe (2006). Note that the year of the survey is in brackets.

CHAPTER TWO

WOMEN'S EMPOWERMENT AND WOMEN AND CHILDREN'S HEALTH STATUS IN SUB-SAHARAN AFRICA: A BACKGROUND ANALYSIS

2.0 Introduction

This chapter discusses background socioeconomic and health related information of the study context – Sub-Saharan Africa (SSA). The rest of the chapter is set out as follows. In Section 2.1, we discuss briefly the geography, climate and historical antecedents of SSA's development. In Section 2.2, we discuss SSA's economic growth patterns in the context of other developing regions. This is followed by a discussion on gender inequality and women's empowerment in Section 2.3. In Section 2.4, we discuss the state of women and children's health using selected women and children's health status indicators. In this section, we also discuss the effect of SSA's high level of gender inequality on women and children's health status and find that gender inequality is positively correlated with poor child health. The chapter concludes in Section 2.5, observing that SSA lags behind other developing regions in terms of economic growth, gender inequality and women's empowerment and women and children's health status. Based on the evidence discussed, the chapter ends by asking whether the high levels of gender-based inequality and low incomes in SSA are partly responsible for its poor human development indicators such as the health of women and children.

2.1 Geography, Climate and History

Sub-Saharan Africa as a geographical term refers to that part of the African continent, which lies south of the Sahara. Until the addition of South Sudan in 2011, SSA was made up of 42 countries in the mainland and 8 Islands as in the map in Figure 2.1 below. Sub-Saharan Africa covers an area of 24, 242, 000 sq. km with a population and population density of 819 million and 35 people/Sq km respectively (World Bank, 2010).[11] However, population densities in individual countries may differ. For example, the population densities of Mali (10) and Mauritania (3) are lower than the average SSA population density, whiles Burundi (314), Rwanda (394) and Mauritius (625) are respectively higher.

From the least populated (Seychelles) to the most populous (Nigeria), SSA exhibits great diversity in ethnicity, climatic and topographic conditions. In Ghana for example, there are over 60 ethnic groups, speaking 52 major languages in hundreds of dialects. South Africa alone has 11 official languages. In terms of climate and topography, variants of Mediterranean, tropical, semi-tropical, deserts, rainforest, savannah,

[11] The statistics on geography above is obtained from: World Bank (2010) World Development Indicators – Table 1.1: Size of the economy. pp.34. The populations and land area estimates are as at 2008.

mountains and plains can all be found in different countries in SSA. Historically, one major event that influenced the past, the present and possibly the future of SSA is colonisation. With the exception of Ethiopia that was never colonized, and Liberia, colonized by the United States of America, every other country within SSA was colonised by one European country or the other. It was only in 1957 that Ghana became the first country in SSA to attain independence.

Figure 2.1: A Map of the Nations of Sub-Saharan Africa

Sources: World Map- Mission Atlas Project: www. Worldmap.org

Increasingly, there have been debates in the economic growth literature linking the difficult climatic conditions and the diverse ethno-linguistic and historical background of SSA to its development trajectory. For example, it is argued that tropical conditions and poor soil quality, emanating from the arid and semi-arid nature of some parts of SSA, predisposes its population not only to diseases but also hostile conditions for livestock and agricultural production, thereby slowing economic growth (Bloom et al., 1998; Collier and Gunning, 1999). The effect of SSA's ethno-linguistic diversity on its development has also been emphasised by Easterly and Levine, (1997). Other authors have attributed SSA's underdevelopment to weak institutions (Adamolekun, 1990; Stein, 2000; Birdsall, 2007), argued to be a negative by-product of colonial rule

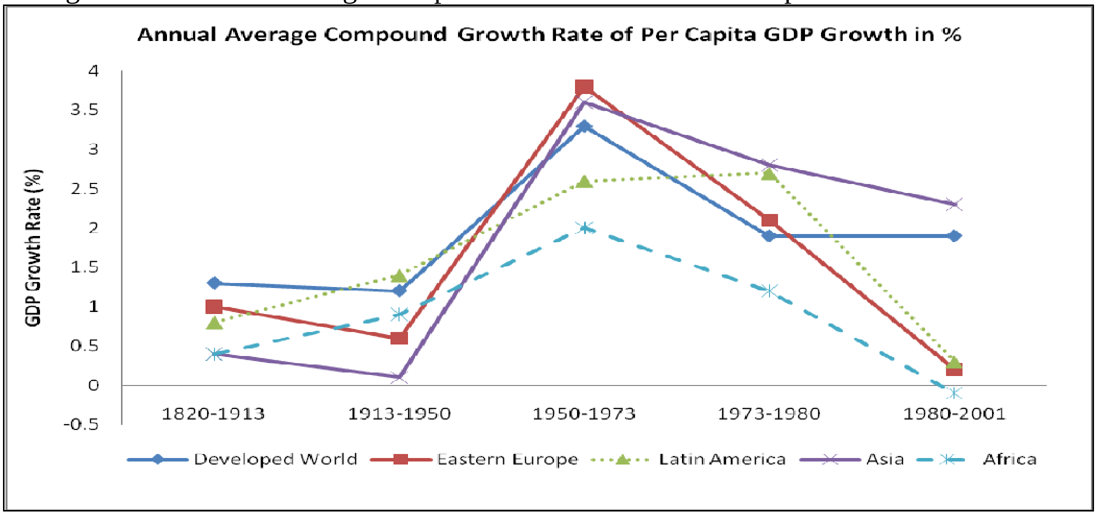
(Crawford, 1994; Stein, 2000). The thrust of this argument is that colonial rulers had little incentive in developing Africa's institutions.

Their focus however, was mainly on developing institutions that helped them to extract Africa's resources (Crawford, 1994; Stein, 2000). Thus, many SSA countries inherited extremely weak and in some cases non-existent state institutions. Unfortunately, efforts at building or rebuilding such institutions after independence were also hampered by the geopolitics of the Cold War era (Herbst, 2000) and rampant military takeovers. Just as many other SSA countries, Ghana for example, witnessed as many as 6 military takeovers from 1966 to 1982, with Nigeria having 7 between 1966 to 1993. Within this period, Ghana and Nigeria had only 2 and 1 democratically elected governments respectively. What is even worse is the fact that the democratically elected governments of both countries were not allowed by the military to complete their full term in each case.

2.2 Economic Development

Africa's slow growth rate in the last 4 decades comes as a surprise since in the 1960s, it was richer than most of its Asian counterparts (Easterly and Levine, 1997; Collier and Gunning, 1999). Unfortunately, the adverse effect of the region's geography, climate, history, politics and leadership, have together affected the growth prospect of the region negatively. Available evidence indicates that over the last 4 decades, 28 countries from SSA have had their median Gross Domestic Product (GDP) growth rate, decline persistently, with 11 countries having income levels lower than it was at the time of their independence (World Bank, 2005). Available GDP statistics from the 1800s to the early 2000s, show deteriorating performance for the African region as in Figure 2.2 below.

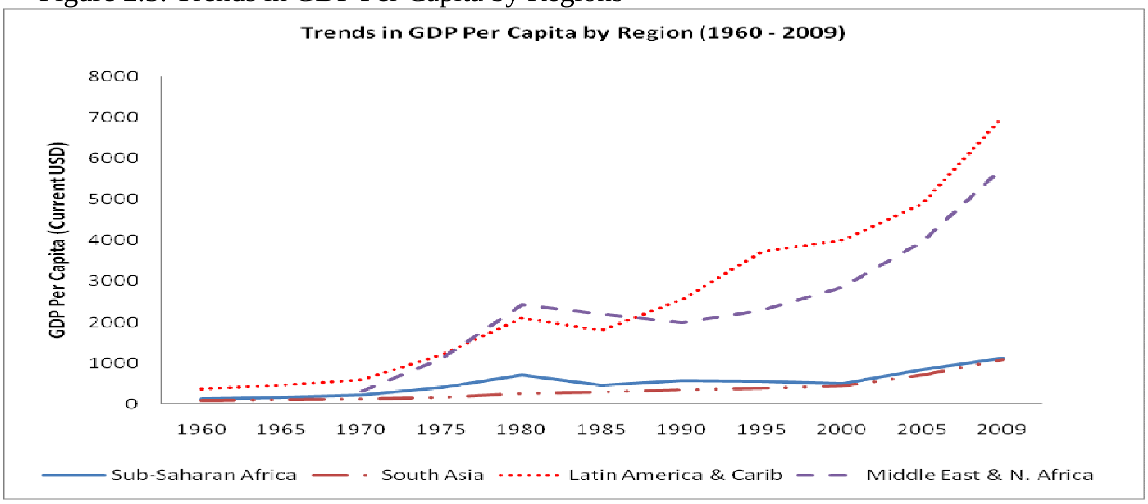
Figure 2.2: Annual Average Compound Growth Rate of Per Capita GDP Growth



Source: Constructed by author with data from the World Economic and Social Surveys – Table 1.1

Figure 2.2 shows that from the 1820s to the 1950s, Africa exhibited a better growth rate than Asia. However, things changed for the worse with its growth rate lagging behind all the other major regions. In terms of GDP per capita, SSA appears to perform better than South Asia but lags behind Latin America and the Caribbean (LAC) as well as the Middle East and North Africa (MENA) as evident in Figure 2.3 below.

Figure 2.3: Trends in GDP Per Capita by Regions

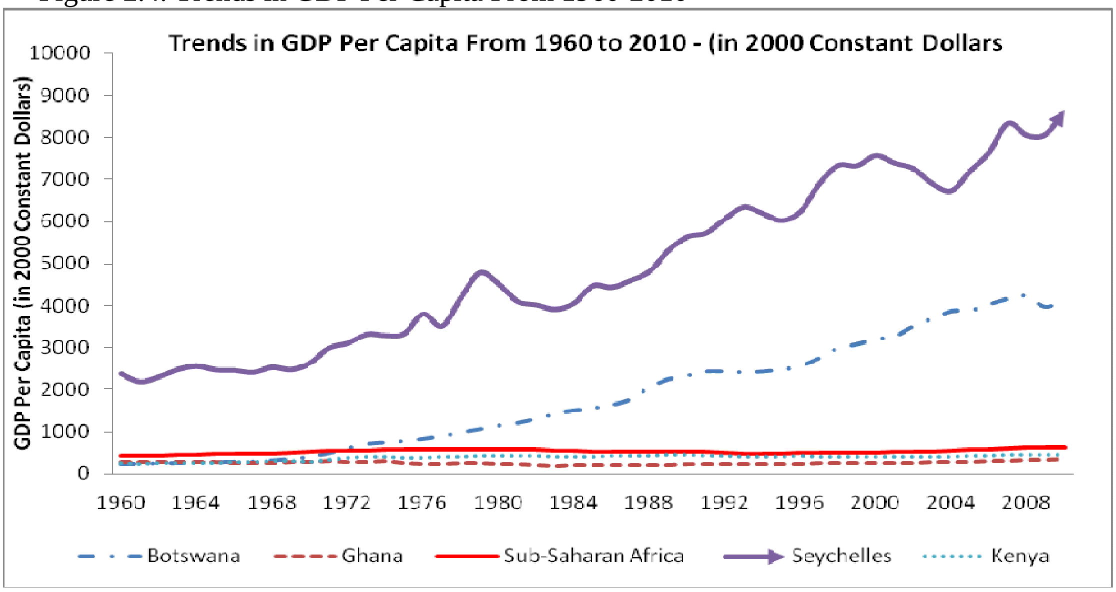


Source: Constructed by author with data from World Development indicators (World Bank Database)

Notwithstanding the low GDP per capita figures for SSA as a whole, there are individual countries that seem to be doing well in terms of GDP per capita. For example, countries like Botswana and Seychelles that are non-oil producing, have recorded GDP per capita comparable to the average of MENA and LAC. From Figure 2.4, the GDP per capita of Botswana in the 1960's was below the SSA average, but the same as that of Ghana and Kenya. However, the period from 1970 through the 1980s to the 2000s witnessed dramatic improvements in Botswana's GDP per capita, increasing from USD 237.5 in 1960 to USD 4,188 in 2010. In the case of Seychelles, Figure 2.4 suggests consistent progress over the years, with GDP per capita (in 2000 constant Dollars) reaching USD 8,661 in 2010.

In West Africa, the rebasing of Ghana's GDP in 2010 to correct for structural undercounting of the services sector, increased Ghana's GDP by 69% and consequently the GDP per capita from under USD$ 800 to USD$ 1,363 (Moss and Majerowicz, 2012). This is an indication that the economic story of SSA is not entirely negative and that there are examples of success that can spur other countries on to greater levels of achievement. The positive SSA economic story is also emphasized by an article in the Economist, which suggest that for the period 10 years to 2010, 6 of the world's fastest growing economies were found in SSA, with available forecast suggesting that Africa will have 7 of the top 10 growing economies in the next 5 years (The Economist, 2011).

Figure 2.4: Trends in GDP Per Capita From 1960-2010



Source: Constructed by author with data from World Development indicators, 2012

2.3 Women's Empowerment and Gender Inequality

It is generally agreed that the promotion of gender equality and women's empowerment is critical to the achievement of all the Millennium Development Goals (MDGs) and most importantly, goal 4 and 5 (UNDP, 2005).[12] In the context of Africa, gender equality and women's empowerment is seen as being central to achieving poverty reduction and economic growth (African Development Forum, 2008). Thus, African governments have taken various steps both at the regional and national levels to promote gender equality and women's empowerment (African Development Forum, 2008). At the regional level, the African Union (AU) has enshrined in its founding legal instrument, the principle of equality and non-discrimination between men and women. Additionally, the Solemn Declaration on Gender Equity in Africa (SDGEA) adopted by AU Heads of State Summit in Addis Ababa in July 2004, demands that member states respect existing normative protocols on women and human rights.

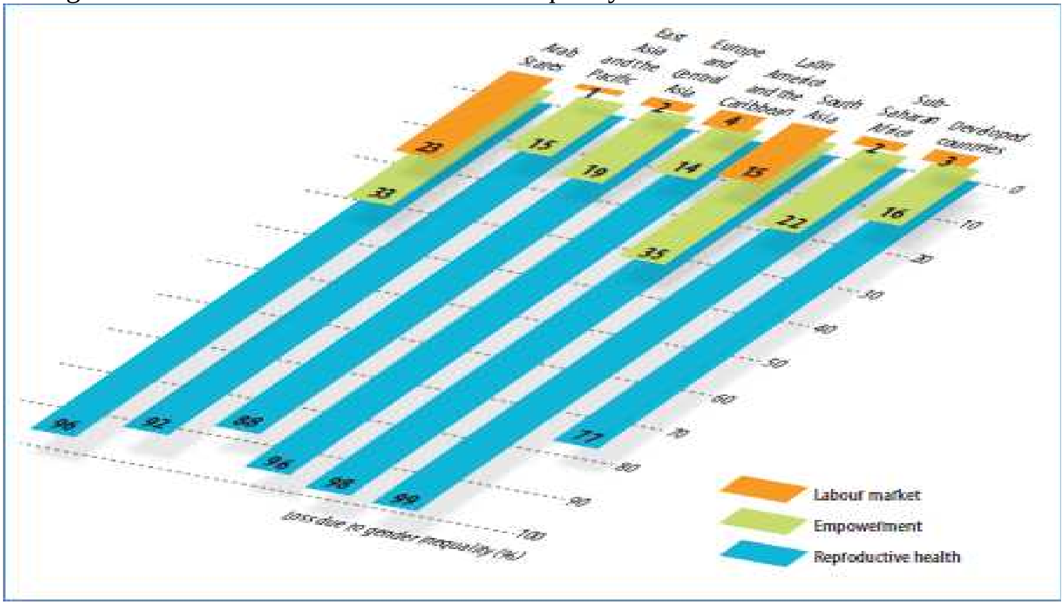
The 2008 African Development Forum (ADF) Report, suggest that about 51 out 53 African countries have ratified the convention on the Elimination of all forms of Discrimination against Women (CEDAW). In the case of the African Women's Protocol, the report suggests that 5 countries have not done anything at all towards its ratification. However, 23 countries have signed it whiles 25 have fully ratified it.[13] In addition to the above, the report suggests that some countries have included in their constitutions (Benin, 1990; Ghana, 1992; Ethiopia, 1994; Malawi, 2006; Uganda, 1995), provisions on human rights and gender equality. From a policy perspective, individual countries in SSA are also putting in place policies that promote gender equality and women's empowerment. In Sierra Leone, gender mainstreaming is a central part of Poverty Reduction Strategy Papers (PRSPs) (Government of Sierra Leone, 2004). Comprehensive gender budgeting initiatives have also been implemented in countries such as Ghana, Tanzania, South Africa, Uganda, Rwanda, Mauritius and Senegal (African Development Forum, 2008).

[12] MDG 4 is a target by the United Nations to reduce child mortality by two-thirds between 1990 and 2015. MDG 5 on the other hand targets reducing maternal mortality by three quarters and achieving universal access to reproductive health between 1990 and 2015.

[13] The 5 countries that have not taken any steps to ratifying the African Women's Protocol include: Botswana, Egypt, Eritrea Sao Tome and Principe and Tunisia. Those who have just signed the Protocol include; Algeria, Burundi, Cameroon, Central African Republic, Chad, Cote d' Ivoire, Congo, Democratic Republic of Congo, Equatorial Guinea, Ethiopia, Gabon, Guinea Bissau, Guinea, Kenya, Madagascar, Mauritius, Niger, Sierra Leone, Somalia, Sudan, Swaziland and Uganda. The 25 countries who have fully ratified the African Women's protocol includes: Angola, Benin, Burkina Faso, Cape Verde, Comoros, Djibouti, Gambia, Ghana, Libya, Lesotho, Seychelles, Tanzania, Togo, Zambia and Zimbabwe.

Notwithstanding the collective and individual effort by SSA governments, the region exhibits the highest level of gender-based inequities. For example, the 2010 United Nation's Human Development Report suggest that, SSA recorded the highest loss in human development arising from gender inequality (i.e. the Gender Inequality Index – GII) as in Figure 2.5 below. [14] In addition, 7 out of the 10 bottom ranked countries on the GII are SSA countries. Compared to South Asia, LAC, Arab States, East Asia and the Pacific, Europe and Central Asia and developed countries, SSA countries are the least performing on the GII. On the contrary, SSA seems to have the least gender-based inequality with respect to labour market participation beside East Asia and the Pacific.

Figure 2.5: Loss in HDI due to Gender Inequality



Source: Human Development Report, (2010) pp.103 Figure 5.5 (UNDP, 2010)

Beside the GII, other major gender-related indices such as the Social Institutions and Gender Index (SIGI), Gender Equity Index (GEI) and the Global Gender Gap Index (GGGI) confirms SSA's poor performance on issues relating to gender equality and

[14] The Gender Inequality Index measures human development losses as a result of inequality by gender, measured along three dimensions; Labour market (i.e. labour market participation), Empowerment (i.e. educational attainment at the secondary level and above and parliamentary representations) and finally Reproductive health (i.e. Adolescent fertility and maternal mortality).

women's empowerment.[15] Using the SIGI, only 5 SSA countries; Mauritius (11th), Namibia (47th), Botswana (48th), South Africa (49th) and Burundi (50th) made the list of top 50 countries with the least gender-based inequality. However, countries ranked from 51st to 102nd had as many as 31 SSA countries (Branisa et al., 2009).[16] The 2009 Gender Equity Index, which ranked 157 countries globally, shows that only 4 SSA countries; South Africa (20th), Namibia (30th), Uganda (61st) and Botswana (66th) made the first 70, but as many as 14 in the last 30 (Social Watch, 2009). The 2010 GGGI also shows that out of 134 countries ranked globally, only Lesotho (8th), South Africa (12th), Mozambique (22nd), Namibia (25th), Uganda (33rd) made the list of top 50 countries, with 10 in the last 30 (World Economic Forum, 2010). The position of SSA countries on these indices is evident of the poor performance of SSA on issues of gender equality and women's empowerment.

In addition to the evidence from the above indices, progress report on Millennium Development Goal (MDG) 3 and its accompanying targets, suggest that SSA lags behind other developing regions on the issue of gender equality and women's empowerment (United Nations, 2011). MDG 3 seeks to promote Gender Equality and Women's Empowerment. Under this goal, countries have a target to eliminate gender-based disparities regarding (1) The ratio of girls to boys in primary, secondary and tertiary education (2) Share of women in wage employment in the non-agricultural sector (3) Proportion of seats held by women in national parliament no later than 2015. The data in Table 2.1 suggest 8.2% improvement in the girl to boy ratio for primary school enrolment. Notwithstanding this improvement, SSA continues to lag behind other developing regions at all levels of education as the data in Table 2.1 indicates. What is even worrying is the fact that the ratio of girls to boys at the secondary and tertiary levels deteriorated between 1999 and 2009. Additionally, SSA's ratio of girls to

---

[15] The Global Gender Gap Index assesses 134 countries on gender-based distribution of resources and opportunities irrespective of the overall levels of these resources. The index measures the size of the gender inequality gap in four areas: (1) Economic participation and opportunity (2) Educational attainment (3) Health and survival (4) Political empowerment. Social Watch introduced the Gender Equity Index (GEI) in 2004. The index measure inequities in different dimensions of women's and men's everyday lives globally. The GEI is based on comparable existing and obtainable information that makes it possible to categorize countries and rank them in accordance with a selection of gender inequity indicators in three areas: education, economic participation and empowerment. The Social Institutions and Gender Index (SIGI) is a new composite measure of gender equality, based on the OECD's Gender, Institutions and Development Database. It complements and improves existing measures in several ways. While conventional indicators of gender equality capture inequality outcomes, the SIGI focuses on the root causes behind these inequalities

[16] Note that only developing countries were used for constructing the Social Institutions and Gender Index. The total number of countries used and ranked is 102.

boys in 1999 was better than that of Southern Asia at all levels of education, yet in 2009 the results were the direct opposite of the 1999 situation.

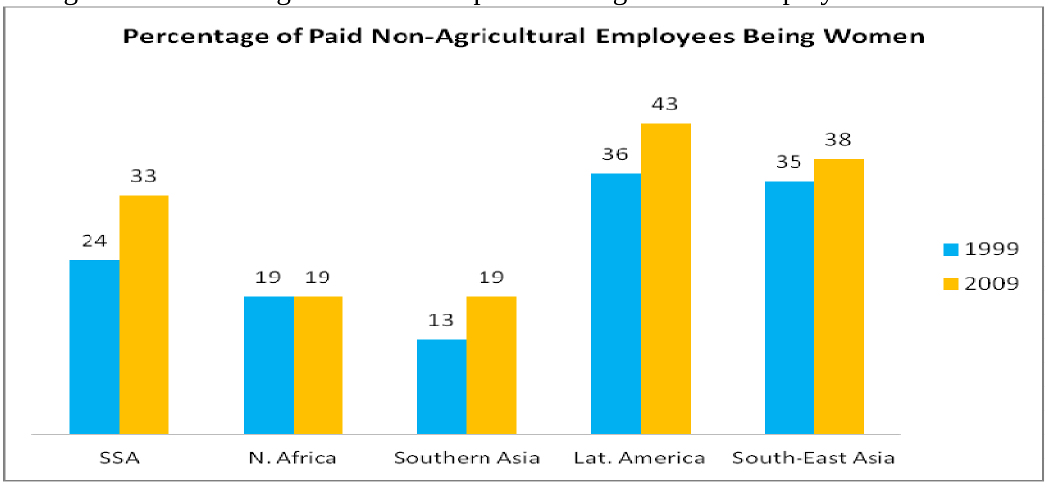
Table 2.1: Progress on Ratio of Girls to Boys in Primary, Secondary and Tertiary Education for Every 100 boys

Regions	Primary Education		Secondary Education		Tertiary Education		All
	1999	2009	1999	2009	1999	2009	Target
S. Saharan Africa	85	92	82	79	67	63	100
N. Africa	90	95	93	98	74	98	100
Southern Asia	83	95	75	89	65	74	100
Lat. America	97	97	107	108	117	128	100
South-East Asia	96	97	95	103	96	109	100

Source: Based on Millennium Development Goals Report, 2011 (United Nations, 2011)

On percentage of women in paid non-agricultural employment, available statistics suggest (see Figure 2.6) that SSA made the highest level of progress between 1999 and 2009 (i.e. 9 percentage points). This constitutes the highest level of improvement after Latin America. However, SSA's overall percentage of women in non-agricultural paid employment in 2009 is below that of South-East Asia and Latin America. It is further argued that SSA's improvement in the percentage of women in paid non-agricultural employment may be undermined by the fact that wage employment represents only a minor share of employment for both men and women, who in most instances work in jobs that lack financial security and social benefits (United Nations, 2011).

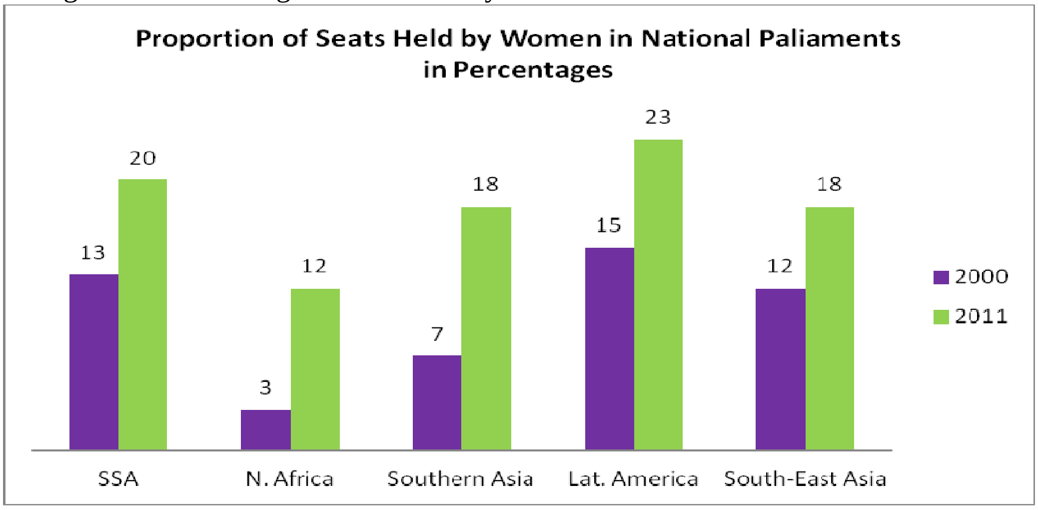
Figure 2.6: Percentage of Women in paid Non-Agricultural Employment



Source: Based on Millennium Development Goals Report, 2011 (United Nations, 2011)

The proportion of women in national parliaments seems to have increased across most regions of the world. From Figure 2.7, the increase between 2000 and 2011 is estimated at 7 percentage points for SSA, 9 percentage points for North Africa, 11 percentage points for Southern Asia, 8 percentage points for Latin America and 6 percentage points for East Aisa. Although SSA's proportion of women in parliament in 2000 is about the highest after Latin America, the level of progress between 2000 and 2011 compares unfavourably to North Africa, Southern Asia and Latin America.

Figure 2.7: Percentage of Seats held by Women in National Parliaments

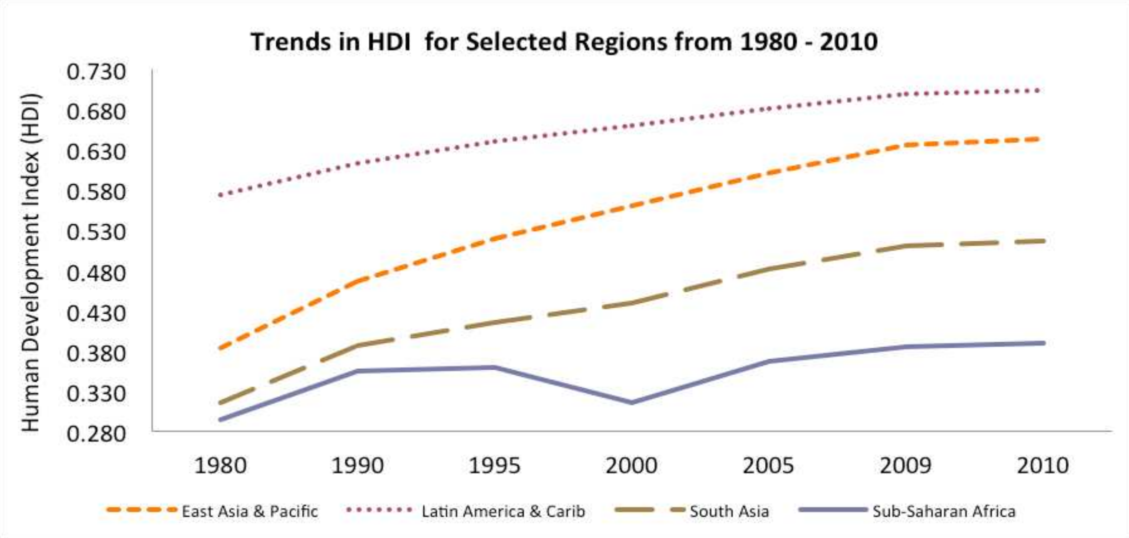


Source: Based on Millennium Development Goals Report, 2011 (United Nations, 2011)

2.4 Human Development

Notwithstanding the strong economic performance of some SSA countries in recent times (The Economist, 2011), the preceding discussion suggest that in general, SSA's performance on economic growth and gender inequality is below that of other developing regions of the world. Perhaps the low levels of growth in many SSA countries over the years, coupled with the relatively high levels of gender inequality, partly accounts for the reason SSA has consistently lagged behind other regions in human development. This assumption is on the basis that gender equality and income growth are positively correlated with human development (Preston, 1975; Easterly, 1999; UNDP, 2005; United Nations, 2010a). It is therefore not surprising that SSA has consistently lagged behind other developing regions on human development over the last three decades. Using the United Nations's Human Development Index (HDI) in 2010 for example, no SSA country was among those countries classified as having either a very high or high HDI.[17] Whereas only two SSA countries were among those classified as having a medium HDI, as many as 34 of the 42 countries classified as having low HDIs came from SSA. In Addition, HDI statistics from 1980 to 2010 as in Figure 2.8 below, shows that SSA has consistently lagged behind other regions like East Asia and the Pacific, LAC and South Asia.

Figure 2.8: Trends in HDI for Selected Regions From 1980-2010



Source: Constructed by Author via data from United Nations Human Development Report 2010. Note that the definition of HDI has changed occasionally, thus its values cannot be strictly compared over time. However, the values can be compared across regions in the same year.

However, considering that HDI is a composite indicator, it tells an aggregate level story of the human development situation in SSA, which could be misleading. Perhaps a discussion of the components of HDI (health, education and living standards) may be helpful. While HDI uses life expectancy as a proxy for health, the current study uses micro-level household data and focuses on the health of women and children, which may not be captured by HDI. Thus, the next section compares the performance of SSA in respect of key women and children's health status indicators to other developing regions.

2.4.1 Indicators of Children's Health Status

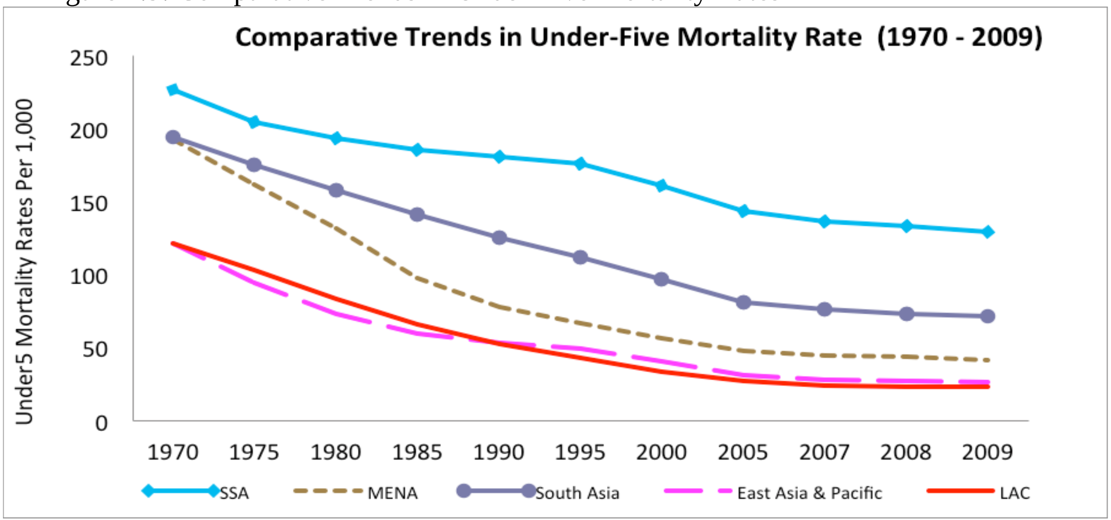
A very important global development challenge is the issue of child health and more importantly child survival. With only one-fifth of global births, SSA accounts for about

[17] HDI is a summary composite index that measures a country's average achievements in three basic aspects of human development: longevity, knowledge, and a decent standard of living and first introduced in the 1990 Human Development Report. Longevity is measured by life expectancy at birth; knowledge is measured by educational attainment; and standard of living is measured by GDP per capita (UNDP, 2010)

45% of global deaths. It is also estimated that in every year, about 4.8 million children in SSA die before their fifth birthday (Chopra and Darnton-Hill, 2006). It is reported that 10 out of 45 countries in the region have reported worsening child death statistics since the 1990s. There are however, 19 SSA countries recording some improvements, albeit so slow that they are likely to miss the MDG's target on child mortality by 35 years (Chopra and Darnton-Hill, 2006). In addition, it is believed that with the exception of Cape Verde, Eritrea, Mauritius, Seychelles, Botswana and Malawi, the rest of the countries in SSA are unlikely to achieve the MDG target for under-five deaths (Kinney et al., 2010).

Generally, data on under-five mortality (U5MR) from the 1970s to 2009 as shown in Figure 2.9 suggest an improving trend for all the regions captured. Nonetheless, SSA continues to lag behind, with 226 and 129 under-five deaths per 1000 live births in 1970 and 2009 respectively. For example, the U5MR gap between SSA and MENA in 1970 was 34 child deaths. However, the gap increased to 88 in 2009. The gap between SSA and South Asia also increased from 34 to 58 for the same period. This trend is not totally different for East Asia and the Pacific and LAC. This trend suggests that other regions were able to reduce U5MR faster than SSA.

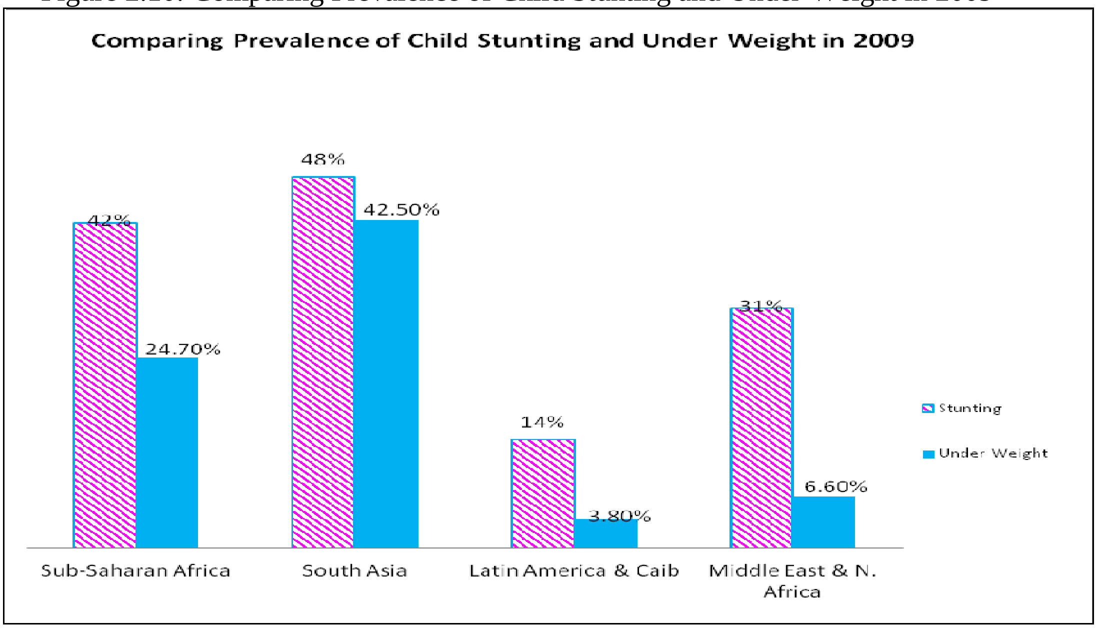
Figure 2.9: Comparative Trends in Under-Five Mortality Rates



Source: Constructed by Author via data from United Nations Human Development Report 2010

Related to under-five deaths is the issue of malnutrition. Globally, malnutrition is claimed to be responsible for over half of all deaths in children and some 28% of all deaths in Africa (Black et al., 2003; Ezzati et al., 2002). This is due to the fact that under-nutrition exposes children to a range of physical and cognitive challenges not encountered by their peers who are not malnourished. Out of 178 million children with stunted growth in developing countries in 2005, Eastern and Middle Africa's estimated prevalence of 50% and 42% respectively, were said to be the highest.[18] For the same year, 23 of the 40 countries with a stunting prevalence of 40% came from Africa as against 16 from Asia and 1 from LAC. On the contrary, only 2 African countries were included in the list of 52 countries with stunting prevalence of less than 20% (Black et al., 2008). It has been argued that a modest reduction in malnutrition for the period 1975 – 1995 in SSA countries, would have triggered reductions in U5MR, 28% better than what is currently being achieved by SSA countries (Pelletier and Frongillo, 2003). Available statistics in 2009 (see Figure 2.12), shows SSA exhibiting a relatively better performance than South Asia but trailing MENA and LAC.

Figure 2.10: Comparing Prevalence of Child Stunting and Under-Weight in 2009



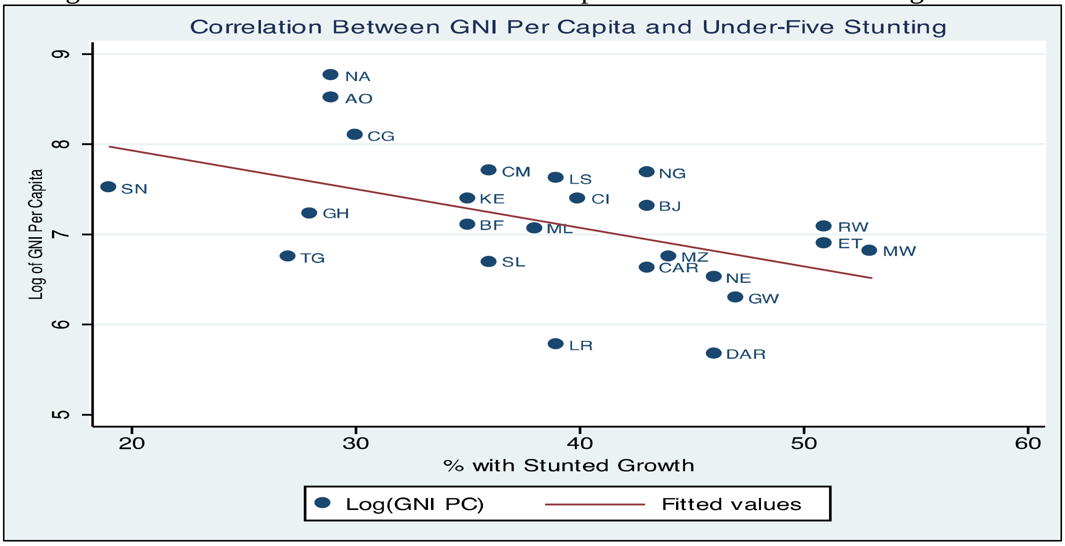
Source: Constructed by Author via data from UNICEF State of the World Children's Report 2011

Perhaps, low income and high levels of gender inequality may be resposible for the poor child health status in SSA. Thus we check for possible correlation between indicators of income and gender inequality and some slected indicators of children's health status. First we look at the correlation between Gross National Income (GNI) per capita and

[18] See Who Multi-Growth Centre Reference Study and de Onis (2006).

under-five stunting, using selected SSA countries. The results in Figure 2.11 sugest a negative correlation between GNI per capita and under-five staunting. The results also suggest that out of the 24 countries used, Senegal, Ghana and Togo are the countries with the least percentage of children under-five who have stunted growth. What is surprising, is the fact that Nigeria, Angola, Namibia, Congo, Cameroon and Lesotho with relatively higher GNI per capita have a higher percentage of children with stunted growth compared to Senegal, Ghana and Togo with a relatively lower GNI per capita.[19]

Figure 2.11: Correlation Between GNI Per Capita and Under-Five Stunting

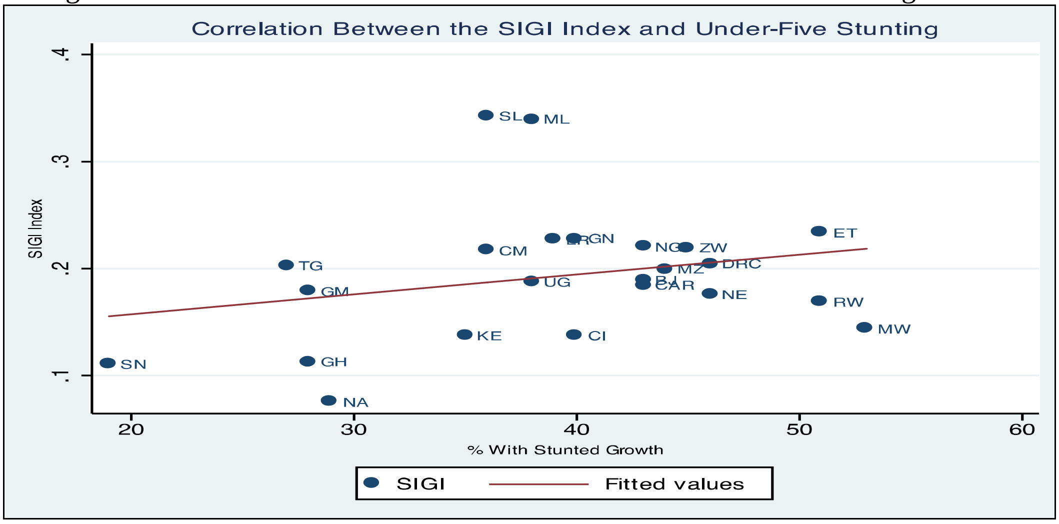


Source: Constructed by Author via data from Human Development Report, 2010

In Table 2.12, we explore the relationship between a gender inequality index (i.e. SIGI Index) and the percentage of children under-five with stunted growth. Lower values of the SIGI suggest lower levels of gender-based inequalities. The results show a positive correlation between the SIGI and under-five stunting. From Figure 2.12, Senegal, Ghana and Namibia are the countries with the lowest gender-based inequality and percentage of children with stunted growth. On the contary, countries like Malawi and Rwanda have relatively lower levels of gender inequality but a higher percentage of stunted children. The results in Figures 2.11 and 2.12, though not robust, support the assetion that income and gender-based inequality are partly responsible for the poor health status of women and children in SSA

[19] Countries in Figure 2.11 and 2.12 are in their abbreviation codes as follows: SN- Senegal, TG- Togo, GH- Ghana, CG- Congo, AO- Angola, NA- Namibia, LR- Liberia, SL- Sierra Leone, BF- Burkina Faso, KE- Kenya, CM- Cameroon, LS- Lesotho, CI- Cote de' Ivoire, ML- Mali, NG- Nigeria, BJ- Benin, MZ- Mozambique, CAR- Central African Republic, NE- Niger, GE- Guinea Bissau, DRC- Democratic Republic of Congo, RW- Rwanda, ET- Ethiopia, MW- Malawi, GN- Guinea, GM- Gambia, TZ- Tanzania, UG- Uganda, ZW- Zimbabwe, ZWB- Zambia, SWZ- Swaziland.

Figure 2.12: Correlation Between the SIGI Index and Under-Five Stunting



Source: Constructed by Author via data from Human Development Report, 2010

2.4.2 Indicators of Women's Health Status

An important women's health issue in SSA is maternal mortality. Although the direct causes of maternal morbidity and mortality are known and interventions for its improvement well documented, SSA seem to be decades behind the rest of the world (Parkhurst et al., 2005; Khan et al., 2006; Ronsmans and Graham, 2006; Rosato et al., 2008; WHO, 2010). It is argued that deprived living conditions in most SSA countries, poor levels of nutrition and healthcare, poverty and growing fertility levels expose women of all ages to high risk of pregnancy-related illness and death (Graham, 1991). It is therefore not surprising that available statistics from WHO put SSA as having the highest maternal mortality rate (MMR) – 640/100,000 live births and adult life time risk of maternal death (1 in 31) among developing regions.[20] Besides, SSA had six of the eleven countries contributing 65% of global maternal deaths in 2008 (WHO, 2010). Data available from 1990 to 2008 suggest a decline in MMR in all regions including SSA as in Table 2.2 below. Nonetheless, SSA lags behind other developing regions of the world with the highest MMR of 870 and 640 per 100,000 live births in 1990 and 2008 respectively. In addition, SSA had the lowest rate of change between 1990 and 2008. For example, SSA's 26% reduction is twice as low as the rate of change for South East Asia and North Africa and 1.5 times lower than South Asia.

[20] The MMR for other regions include South Asia (280), Oceania (230), South Eastern Asia (160), North Africa (92), Latin America and the Caribbean (85), Western Asia (68) and Eastern Asia (41).

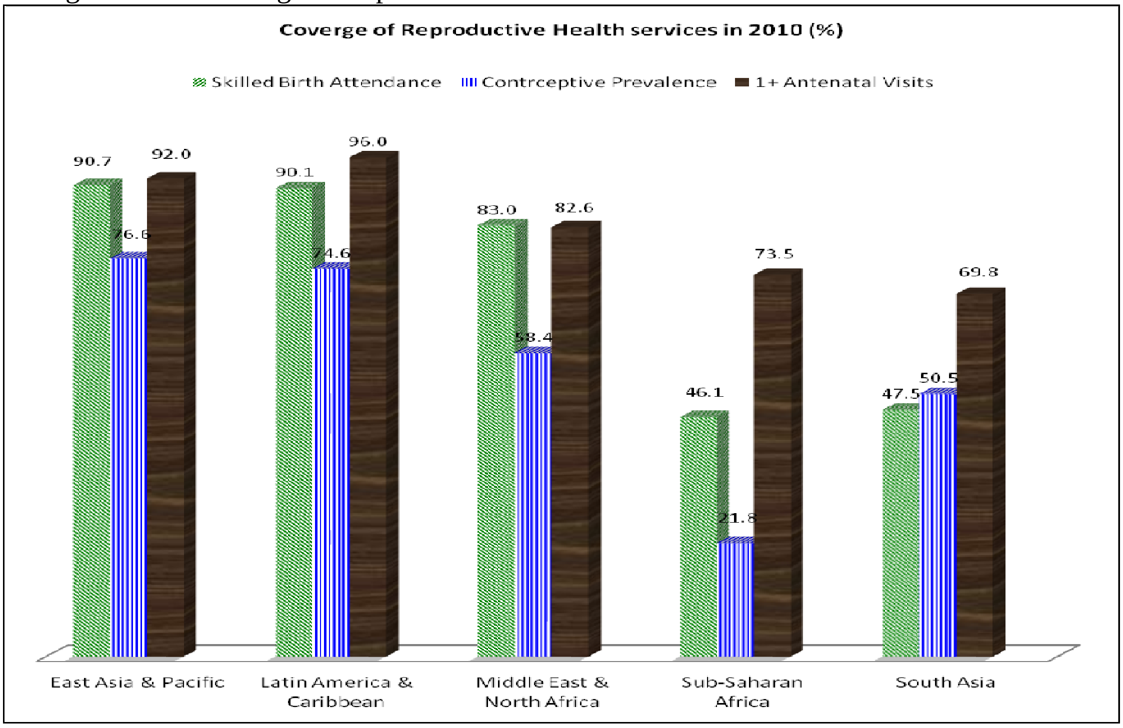
Table 2.2 Maternal Mortality Statistics for Selected Regions (1990 – 2000)

Location	**MMR per 100,000 live Births[a]**			**Maternal Deaths in 000s**		
	1990	**2008**	**% Change**	**1990[b]**	**19995[b]**	**2000[a]**
World Totals	400	260	35	585	529	358
Developed Regions	16	14	12.5	4	2.5	1.7
North Africa	230	92	60	16	4.6	3.4
Sub-Saharan Africa	870	640	26.44	219	247	204
South Asia	590	280	52.54			109
South East Aisa	380	160	57.89	56	25	18
Latin America & Carib	140	85.1	39.21	23	22	9.2
Oceania	290	230	20.69	1.4	0.5	0.55

Source: Extracts from [b]AbouZahr and Tessa, (2001; 2003) and [a]WHO (2010)

The general reduction in MMR globally and especially in developing countries such as SSA has been attributed to improvement in health systems and female education (WHO, 2010). This argument is based on the assumption that improvements in health systems and female education, leads to improved availability and accessibility of health services and consequently increased use of maternal and child health services. Thus interventions to reduce the high levels of MMR have focused on improving women's access to and use of reproductive health services such as antenatal care, institutional deliveries/skilled birth attendance and use of modern contraception. The use of these services is to help reduce unwanted pregnancies. In the case of pregnant women, it helps in the early detection and management of pregnancy related complications and improvement in childbirth outcomes (Alexander and Korenbrot, 1995; Magadi et al., 2001; Goldani et al., 2004; Cleland et al., 2006; Stover and Ross, 2010). Thus we examine trends in the coverage of reproductive health services (% of births attended by skilled health personnel, At least one antenatal visit and contraceptive prevalence) in SSA as in Figure 2.13.

Figure 2.13: Coverage of Reproductive Health Services in 2010



Source: Constructed by Author via data from World Development Indicators – WorldBank (2012)

From Figure 2.13, SSA has the lowest percentage of births attended by skilled health personnel together with contraceptive prevalence. Although SSA's percentage antenatal visits is higher than South Asia and closer to MENA, LAC and East Asia and the Pacific, a sole reliance on this number could be misleading, considering that the indicator used is one visit or more. Where the standard WHO criteria of a minimum of 4 antenatal visits (4+) is used, SSA's percentage drops to 46, the same as the figure for South Asia and below the 87% for LAC (see Human Development Indicators, World Bank, 2012). In addition to Figure 2.13, we compare country level performance on contraceptive prevalence, birth attended by skilled personnel and antenatal coverage for selected developing countries in Table 2.3. Generally, the antenatal coverage for SSA countries is comparable to the eight countries from Europe, Asia and the LAC (see countries below the line in Table 2.3). On the contrary, SSA countries lag behind their counterparts in Europe, Asia and LAC with respect to contraceptive prevalence and skilled birth attendance.

Table 2.3: Use of Selected Maternal Health Services in Developing Countries, Including Countries from SSA

Countries	Contraceptive Prevalence (%)	Birth Attended by Skilled Personnel (%)	Antenatal Coverage (%)
Botswana - 2007	53	95	97
Burkina Faso – 2006	17	54	85
Burundi – 2006	9	-	-
Cameroon – 2006	29	63	85
Central African Rep – 2006	19	44(2009)	69
Congo Dem. Rep – 2007	21	74(2007)	85
Cote de' Iviore - 2007	13	57	85
Ghana – 2008	24	57	95
Kenya – 2009	46	44	92
Lesotho - 2009	47	62	92
Madagascar – 2009	40	44	86
Malawi – 2006	41	54	92
Mali – 2006	8	49	70
Mozambique – 2008	16	55	89
Nigeria - 2008	15	39	58
Azerbaijan – 2006	51	88	77
Bangladesh – 2008	53	-	51
Berlerus – 2006	73	-	-
Bolivia – 2008	61	71	86
Cambodia – 2010	51	71	89
Chile – 2006	64	99(2008)	-
Costa Rica – 2008	80	99	90
Cuba - 2009	78	100	100

Source: Data from the World Bank's World Development Indicators, 2010. Note figures in bracket represent the year of data collection.

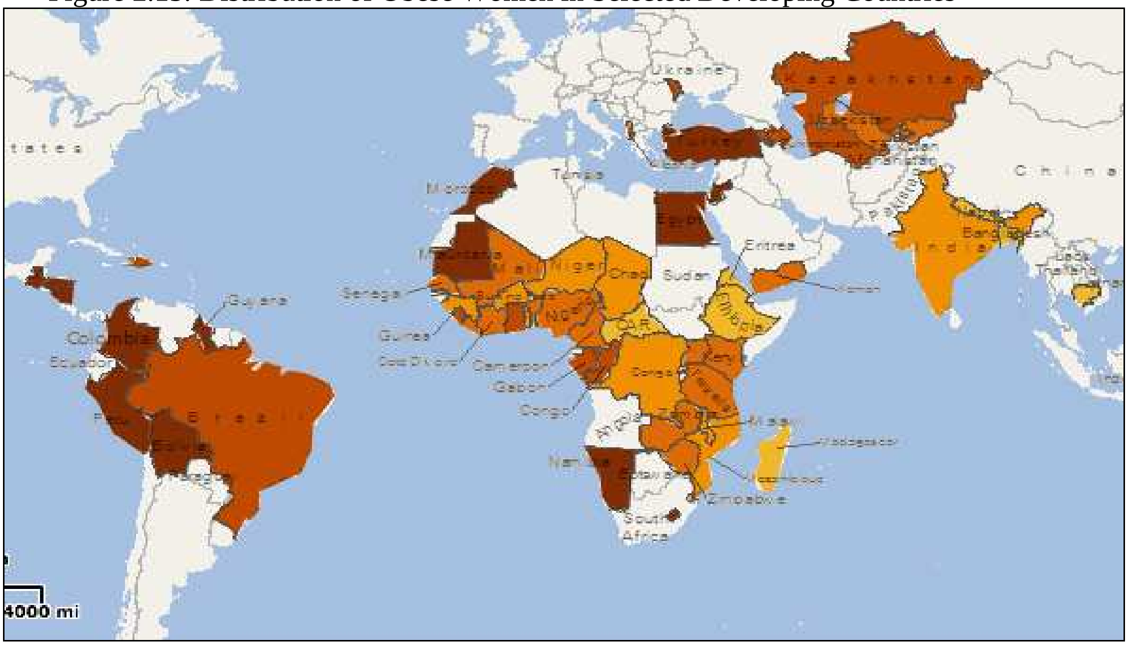
In addition to the use of reproductive health services, we also consider an indicator of women's nutritional status (Body Mass Index- BMI). The importance of women's nutrition is based on the idea that it influences birth outcomes through its effect on the nutrition of pregnant women. For example, malnourished expecting mothers are more likely to be anaemic. Episodes of anaemia may also affect the health of the foetus in the utero and consequently birth outcomes (Fowles, 2004; Lawn et al., 2005; Lartey, 2008). Using data from the latest rounds of DHS surveys, Figure 2.14 and 2.15 shows the distribution of women with severe Chronic Energy Deficiency (CED) (i.e. BMI: 12 – 15.9) and Obesity (i.e. BMI≥ 30). From Figure 2.14, Ghana and Zimbabwe have the lowest severe CED prevalence in SSA (≤ 0.3%), which is comparable to the prevalence rate of Brazil, Columbia, Nicaragua and Guatemala. On the contrary, Chad (2.1%), Ethiopia (1.8%) and Madagascar (3.3%) have the highest severe CED prevalence in SSA, although below India's 6.3%. In terms of Obesity, Namibia (11.6%) and Mauritania (19.2%) are suggested to have the highest prevalence in SSA.

Figure 2.14: Distribution of Percentage of Women with Severe CED in Selected Developing Countries

Source: IFC Macro(2011) Measure DHS STATcompiler

Legend:
Up to 0.3 | 0.4 to 0.6 | 0.7 to 1.0 | 1.1 to 1.7 | 1.8 and higher

Figure 2.15: Distribution of Obese Women in Selected Developing Countries



Source: IFC Macro(2011) Measure DHS STATCompiler

Legend:
Up to 1.3 | 1.4 to 3.4 | 3.5 to 7.0 | 7.1 to 11.2 | 11.3 and higher

In addition to the country level figures, regional aggregates based on DHS classifications suggest that the region with the highest percentage of CED is South and South East Asia (24%), followed by SSA (12%), Central Asia (9%), North Africa, West Asia and Europe (6%) and LAC (5%). In terms of Obesity, South and South East Asia has the lowest prevalence (3%), followed by SSA and Central Asia (6%), LAC (13%) and North Africa, West Asia and Europe (15%)[21]. Although SSA's performance on CED is better than South and South East Asia, the 12% CED prevalence can be considered high. Given that coverage of reproductive health services is low in SSA, increasing levels of malnutrition among women could slow the rate of progress in achieving the targets for MDGs 4 and 5 (women and children's health).

2.5 Conclusion

The foregoing discussion points out the difficult and challenging circumstance of the SSA region. The geography, climate, history and politics of the region as suggested, has impacted the development trajectory of the region adversely. The story emerging from the above analysis is that SSA's development indicators lag behind almost all the other regions of the world. It is rather astonishing to note that in the 1800s and even up to the mid 1900s, SSA's growth was higher than that of Asia and Eastern Europe, yet it is today behind almost every region in the world. Besides, its human development indicators are worse, compared to other regions. Apart from percentage of under-five stunting and percentage of women who are CED, SSA lags behind all the major regions of the world in areas such as infant mortality, maternal mortality and use of reproductive health services. The fact that SSA countries occupy the bottom positions of almost all the gender inequality and women's empowerment indices reviewed, suggest that the gender inequality gap may be wider in SSA than in many other regions. From the above discussion, a major question that needs further examination is the question of whether the high levels gender inequality and low levels of income in SSA are partly responsible for the region's poor human development indicators- especially the health of women and children? The rest of the thesis examines in detail using data from selected SSA countries, the assertion that gender-based inequalities – women's empowerment influences women and children's health status.

[21] The aggregate figures for the DHS regions were compiled using the Measure DHS STAT Complier – IFC Macro, (2012). The figures are based on the latest survey available for each country per Measure DHS regions.

CHAPTER THREE

WOMEN'S EMPOWERMENT AND WOMEN AND CHILDREN'S HEALTH: TOWARDS A CONCEPTUAL FRAMEWORK

3.1 Introduction

The chapter discusses the theoretical model that informs estimations in the empirical chapters. The chapter begins with a working definition of women's empowerment. The definition is discussed to identify the forms by which women's empowerment may manifest and for that matter, possible indicators to be used in measuring it. The next section discusses a theoretical model that is used to estimate the effect of women's empowerment on women and children's health. Granted that women's empowerment is the variable of interest, we discuss possible channels via which women's empowerment influences women and children's health status. In the rest of the chapter, we discuss the empirical literature on the effect of women's empowerment on women and children's health. Other determinants of women and children's health status aside women's empowerment are also discussed.

3.2 Defining Women's Empowerment

Within the women's empowerment literature, there is a lack of consensus on what constitutes women's empowerment (Kabeer, 1999; Sen and Batliwala, 2000; England, 2000; Malhotra et al., 2002). Different terminologies have been used, including women's autonomy, women's status, women's empowerment, gender equality, gender inequality, bargaining power etc. The lack of consensus has meant that each time any of the above-mentioned terminologies is used, authors have had to define exactly what they mean, leading to several definitions in the literature. In this study, we use the term women's empowerment and construct a working definition based on the definitions of Kabeer, (1999) and England, (2000). Although we use the term women's empowerment, there are instances where bargaining power is used. In the context of the current study, bargaining power is synonymous with women's empowerment.

Among the several conceptualisations of women's empowerment found in the development literature, the definition used in Kabeer (1999) is perhaps one of the most extensive and comprehensive (Malhotra et al., 2002). Kabeer agues that the essence of empowerment is the exercise of agency. She defines empowerment as *"The expansion in people's ability to make strategic life choices in a context where this ability was previously denied to them"* (Kabeer, 1999:437). Kabeer suggest that strategic life choices boarders on decisions that are germane to the quality of women's everyday lives, such as where to live, whether and whom to marry, whether to have children, the number of children, freedom of movement and association etc (Kabeer, 2005). In the context of Kabeer's definition, the ability to exercise choice emanates from power gains (referred to as power to - from a state of disempowerment to a state of empowerment) (Kabeer, 1999; 2005). In the same vein, the inability to exercise choice emanates from power losses, referred to as power over. In other words, women's empowerment connotes the expansion in women's ability to make strategic life choices in a context where they were previously denied this ability.

Although this definition captures relative power gains, it does so only with respect to the same individual (i.e. vertical power gains) as evidenced in the statement "*in a context where this ability was previously denied to them*". In other words, power gains by a woman is determined by capturing her power status at two points. For example, point A, where the woman is denied the ability to make strategic life choices and point B, where she has now gained the ability to make strategic life choices. However, considering that power gains or losses by a woman is important not only for its intrinsic value, but also its instrumental effect, it may be important for the definition to be clear on the extent to which power gains may be helpful to women for the purposes of negotiation or bargaining for household resources. This dimension of power gains could be very important especially in a gendered system. Vertical power gains by a wife in a household may have some intrinsic value. Nonetheless, such power gains may be irrelevant for the purposes of bargaining or negotiation if it is negligible compared to that of the husband/partner.

Thus, we draw on the definition of England (2000) as captured in Williams (2005). He defines women's empowerment as *"women's relative position or exercise of power within the gender system"* (Williams, 2005: 7). The middle part of England's definition (i.e. exercise of power) is synonymous with what Kabeer refers to as ability to make strategic life choices. Juxtaposing England's definition on that of Kabeer, we define women's empowerment as *the expansion in women's ability to make strategic life choices within the gender system*. This definition is adopted as the working definition for the study.

The working definition can conveniently be broken down into two parts to make it easy for further analysis. The first part is "*expansion in women's ability to make strategic life choices"*. Kabeer refers to this part of the definition as power to or power over. Power to, connote women's ability to define their own goals and pursue them in the presence of opposition (Kabeer, 1999). This may be evidenced by participation in decision-making either unilaterally or in conjunction with others, for example, the husband/partner, through a process of bargaining or negotiations (Kabeer, 1999; Kishor, 2000a; Malhotra et al., 2002; Smith et al., 2003). On the contrary, power over, reflects negative agency, which can be seen in forms such as violence, deception, manipulation, coercion, threats and in some instances internalisation and eventually, acceptance of these vices as normal. For example, over a long period of time, women may internalise discriminatory gender-based norms that suppress their voice and regard them as given. In such a situation, women are likely to see any attempt to challenge such norms as beyond the realms of possibility and therefore accept the status quo (Kabeer, 1999; Kishor, 2000a; 2000b; Malhotra et al., 2002; 2005).

The existence of women's power or its expansion could also be evidenced in access to resources. This seems to be the predominant position in the economics and human development literature as evidenced by the use of resource-based indicators in the measurement of empowerment or bargaining power.[22] Narayan, (2005) refers to resources as individual and collective assets and capabilities. Assets are defined to capture material possessions (e.g. land, livestock, savings, jewellery etc). He contends that people who possess assets have better capacities to withstand shocks (e.g. ill health), expand their horizon on choices and consequently bargain for fairer deals. Unlike assets, capabilities are postulated to be inherent in individuals and thus responsible for the diverse ways within which individuals use their assets to enhance their wellbeing. Capabilities may include, human capabilities (e.g. education, productive or life enhancing skills) social capabilities (e.g. social belonging, leadership, relations of trust etc), psychological capabilities (e.g. self-esteem, self-confidence, ability to imagine and aspire for a better future etc). Besides Narayan, other authors have defined resources to include material resources (e.g land capital, income, assets and other economic resources), human resources (e.g skill sets and intelligence) and social resources (e.g social networks, organisational/group affiliation, closeness to parents etc) (Kabeer, 1999; Quisumbing and Maluccio, 2003; Sen and Batliwala, 2000).

[22] In the economics and human development literature, resource-based indicators such as assets brought into marriage, current assets, income, expenditure, unearned income, education, couple education differences have been used as measures of bargaining power or empowerment of women (Hoddinott and Haddad, 1995; Thomas et al., 1997; Quisumbing and Maluccio, 2003).

The second part of our working definition is “within the *gender system*”. The inclusion of the gender system in the definition implies that expansion in women’s power (i.e. ability to make strategic life choices) is relative to other members of the gender system, which in this study refers to men or husband/partners. Although the household has been at the centre of most women’s empowerment or bargaining discussions, it is important to emphasise that, the manifestation of the gender system at the household level may be influenced by the broader institutional context of norms and beliefs prevailing at the community or even the national level (Smith et al., 2003; Sen and Batliwala, 2000; Morrisson and Jütting, 2004; Jütting and Morrisson, 2005; Narayan, 2005; Mabsout and van Staveren, 2010). Besides, power manifestations at the different hierarchies in society may not be mutually exclusive. It is argued that power at a higher level (e.g. the community) may determine the opportunities and constraints at a lower level (e.g. the household), and thereby influence individual and or family decisions at the lower level (Sen and Batliwala, 2000; William G and Scott T, 2001; Axinn and Barber, 2001).

It has equally been argued within the sociological literature, that observed personality differences between males and females (i.e. the gender system) is not merely a function of biology but also the socialisation process, which in turn is influenced by societal values, customs, beliefs, traditions and norms (Ampofo, 2001; Mensch et al., 2003; Asiyanbola, 2005). Thus, society via these norms and long held beliefs, prescribe different gender roles, rights and privileges and what constitute acceptable behaviour within arenas such as the household, Community and by extension the national level (Mensch et al., 2003; Ampofo, 2001; Fortin, 2005; Smith et al., 2003; Kabeer, 2005; Asiyanbola, 2005; Sen and Batliwala, 2000).[23]

The importance of the broader institutional context of beliefs, traditions and norms in the context of the current discussion is the extent to which they influence what women can have access to and therefore their ability to make strategic life choices. For example, women and men could have differential employment opportunities and employment-based rewards not necessarily due to biological differences, but attitudes and behaviour informed by informal institutions such as values, norms and beliefs. This

[23] For example, Ampofo, (2001) in discussing hierarchical power structures in Akan traditional societies in Ghana, argues that girls are trained in domestic chores whiles boys are prepared for leadership positions. The accounts of Ampfo in Ghana may not be different from what exist in most part of the developing world and even in the developed world. See for example (Mensch et al., 2003) for Egypt, (Fortin, 2005) for OECD countries (Campa et al., 2010) for Italy and (Asiyanbola, 2005) for Nigeria.

argument is corroborated by a section of the employment literature, where it is argued that the gender gap in employment is partly due to gender role attitudes and behaviour (Vella, 1994; Antecol, 2003; Fortin, 2005; Contreras and Plaza, 2010). Even where women have employment, their ability to rely on that in pursuit of their defined goals could itself be a function of existing gender-based norms. For example, Nyanzi et al., (2005) uses Ugandan data and finds that, by engaging in market trading, women had access to cash. However, their access to cash did not mean they controlled it. In addition, their husbands were able to limit their spending decisions by secretly withdrawing finances germane to their needs and that of their children. The study argues that despite having access to cash resources, women could not negotiate for safe sex since that was in the domain of prescribed gender segregated roles (Nyanzi et al., 2005). Mason, (2005) also observe that women in Kumasi in Ghana, albeit their powerful economic status, have to socially and sexually submit to their husbands in the domestic arena due to the demands of local culture.

The importance of the broader institutional context of norms in the women's empowerment discourse has also been emphasised by other authors (Kabeer, 1999; 2005; Narayan, 2005; Morrisson and Jütting, 2004; Jütting and Morrisson, 2005; Mabsout and van Staveren, 2010). They argue that informal institutions such as social norms, in many instances determine women's options. These authors argue that the powerful in society (i.e. men) can mobilise societal norms to restrict and constrain women's access to resources such as education, income, employment and accumulation of assets, thereby perpetuating gender-based inequities. Secondly existing empirical studies have emphasized that proxies of social institutions (region, community of residence, religion etc) predict women's domestic empowerment better than their socioeconomic and demographic traits (Jejeebhoy and Sathar, 2001; Malhotra and Mather, 1997).

The foregoing discussion, stresses the importance of the broader institutional context of norms to women's ability to define their own goals and pursue them in a manner that positively influences their life outcomes and that of their children. Although this dimension of women's empowerment or bargaining has not received much attention in the literature, its importance cannot be over emphasised (Folbre, 1994; Agarwal, 1997). The importance of the broader institutional context of norms and beliefs in any empirical analysis is summed up in the words of one author: “Changing community norms and institutions will have an impact on household decisions, whether they are explicitly included in an empirical analysis or not. If they are not included in the analysis, the results may be incomplete or misleading" (Doss, 2011: 10).

The discussion resulting from the two components of our working definition of women's empowerment reveals three areas via which power gains by women may manifest. The three includes (1) access to resources including material resources (e.g. income, land, livestock, savings, jewellery, employment etc), human resources (e.g. education, skill sets etc) and social resources (e.g social networks, organisational/group affiliation, closeness to parents etc), (2) the nature of bargaining as evidenced in participation in decision-making, perpetuation of violence or perhaps the internalisation of such violence. (3) The broader institutional context of norms, beliefs and values. Considering that issues such as decision-making, perpetuation of violence and its internalisation may be a function of the broader institutional context, we assume for the purposes of this study, that women's empowerment has two major dimensions. This includes access to resources and the influence of the broader institutional context of norms, values, beliefs etc. For purposes of simplicity we will refer to the broader institutional context of norms as social norms. Thus the components of social norms as per the foregoing discussion will be participation in decision-making, perpetuation of violence against women, women's autonomy or mobility and other socio-cultural norms and values, which for the purposes of this study we will refer to as societal preferences. Thus, the women's empowerment variable will have two main dimensions; access to resources and social norms.

3.3 Theoretical Framework

Within the economics literature, different forms of bargaining models have been used to model the effect of women's empowerment or bargaining on development outcomes. The intuition behind these models is that the demand for household commodities (such as household health) is influenced by the relative decision-making power of the wife and husband/partner indirectly through a household resource distribution program. Decision-making power in the household is said to be a function of household members' fallback position (threat-point) outside of the marriage. A higher fallback position results in higher bargaining power and therefore control of household resources (e.g. time and income etc) (Manser and Brown, 1980; McElroy and Horney, 1981; Lundberg and Pollak, 1993).

Thus, where the provision of resources (time for care and health inputs) for household health is the responsibility of the wife, changes in household power (fallback position) in favour of the wife is likely to affect household health positively (Thomas, 1990; 1994; Haddad and Hoddinott, 1994; Thomas et al., 1997). This is so, because the wife will have access to more resources to provide care and purchase household health inputs. Different estimable reduced form models have been derived from these theoretical assumptions (Quisumbing and Brière, 2000; Rubalcava and Thomas, 2000; Beegle et al., 2001; Quisumbing and Maluccio, 2003; Ahmed, 2006; Goldstein and Udry, 2008; Fafchamps et al., 2009). Notwithstanding that bargaining models have widely been used in modeling the effect of women's empowerment on development outcomes such as health, agriculture production, education etc, its use in the current study could be problematic for two reasons. First, using a bargaining model may imply that the indicator used to capture empowerment is available for the wife and husband/partner at the individual level. This is not the case for the DHS datasets.

Secondly, a major assumption underlying bargaining models is the threat-point (fallback position) assumption and how household members may rely on utilities derived from such threat-point outside of marriage as a basis for bargaining. This assumption could be difficult to operationalise in a developing country context, such as our study setting. The reality is that, in a lot of marriages, divorce (as in the threat-point assumption) may not be used as the basis for resolving everyday conflicts and therefore bargaining. It is possible that traditional gender assigned roles may mediate such conflicts and evolve a natural solution (Lundberg and Pollak, 1993). In traditional societies where divorce is frowned upon, women may not rely on utility outside of marriage as the basis for bargaining. In such societies, marriage may not just be an issue between a husband and the wife, but more importantly, the lager external family. Thus, processes for dissolving marriages traditionally, may be more complex than assumed in the bargaining model and may discourage women from opting for this "window" assuming it were available.[24] In addition, the social sanctions proffered on women in some communities for abandoning their husbands, may be so hash that it may discourage women from opting for the so called fallback option even in abusive situations (Katz, 1997).

[24] The findings of Goody and Goody (1966) on cross cousin marriages in Northern Ghana suggest that conflicts may not lead to marriage dissolution, because an in-law may be a maternal uncle and can facilitate the resolution of marriage conflicts. Baden et al., (1994) also points out that in countries such as Ghana, marriage is not just between the potential husband and the wife but an affair between their respective families. They also reveal that under customary law, divorce is generally not approved with several provisions for reconciliation prior to divorce in both customary and ordinance marriage laws.

Granted that household members (in this case the woman) is prepared to utilise her fallback position, the critical question that arises is whether we are assuming that all women have equal capacity to recognise the powerful nature of their fallback positions and utilise it? Katz (1997) argues that if a woman's reference group and or family members are equally secluded as herself, it is most unlikely that the woman in question will be aware of all her fallback options, assuming that could enhance her bargaining power. Given the data and conceptual limitations identified above, we use an alternative theory (the theory of household production- Becker, 1981) to model the effect of women's empowerment on women and children's health status.

Becker's household production theory has been used extensively to model the determinants of health by integrating a biomedical health technology into an economic model (Rosenzweig and Schultz, 1983; Pitt and Rosenzweig, 1985; Behrman and Deolalikar, 1988; Alderman, 1990;Lavy et al., 1996; Thomas et al., 1996; Sahn, 1994; Lawson and Appleton, 2007). Following from this literature, we model the effect of women's empowerment on women and children's health status via a household health production function. In these models, the core argument is that individual health status is the outcome of health inputs, personal, household and community characteristics. In the current study, we extend the household production model by including women's empowerment as one of the arguments in the household and community that influences the health status of household members (see Allendorf, 2007b; Hindin, 2000b).

In a household health production framework, the household is said to maximize utility of the form expressed in Equation 3.1:

$$U = U(H, L, C; X_h, \vartheta) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(3.1)}$$

Where H is health status of household members (in this case the woman and the child), L is leisure, C is consumption of household goods and services, X_h is household characteristics including the relative power of the woman. The symbol ϑ, represents a stochastic term which is unobserved heterogeneity of preferences (Pitt and Rosenzweig, 1985). The health outcomes of the household members, in this instance women and children, are biologically determined via a health production function as in Equation 3.2.

$$H_i = g(N_i, X_p, X_h, E_s, X_c, \mu) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3.2)$$

Where N_i is a vector of individual level health inputs including nutrients intake, health care practices, time spent caring for household members etc. X_p is a vector of personal characteristics of household members such as age, gender etc, X_h is a vector of household characteristics such as couple's education, family size, household wealth and X_c is a vector of community level characteristics such as place of residence, the availability of health services etc, with μ being unobservable individual health endowment.[25] In Equation 3.2, the relative power of the woman is separated from household characteristics and is represented by E_s. This is because the manifestations of women's empowerment may not be limited to the household but also beyond the household as earlier discussed. The choice of health inputs is subject to a full income constraint Y, made up of prices of household consumption P_c, leisure W and health inputs P_Y.

$$Y = P_c C + WL + P_Y Y \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3.3)$$

To resolve simultaneity problems arising from health input choices and household income constraints, we extract a reduced form model as in Equation 3.4 to estimate the determinants of household health. The reduced form excludes N because it is endogenously determined. Admittedly, N is a very important vector in a production function. However, in addition to it being endogenous, our interest in this study is estimating the policy determinants of health rather than the health technology itself. Thus, consistent with earlier authors (Thomas et al., 1996; Sahn, 1994; Lawson and Appleton, 2007) we drop N but rather includes factors that exogenously determine N such as health services availability and prices.

$$H_i = \delta(E_s, X_p, X_h, X_c, Y, P_c, P_y, \Im) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3.4)$$

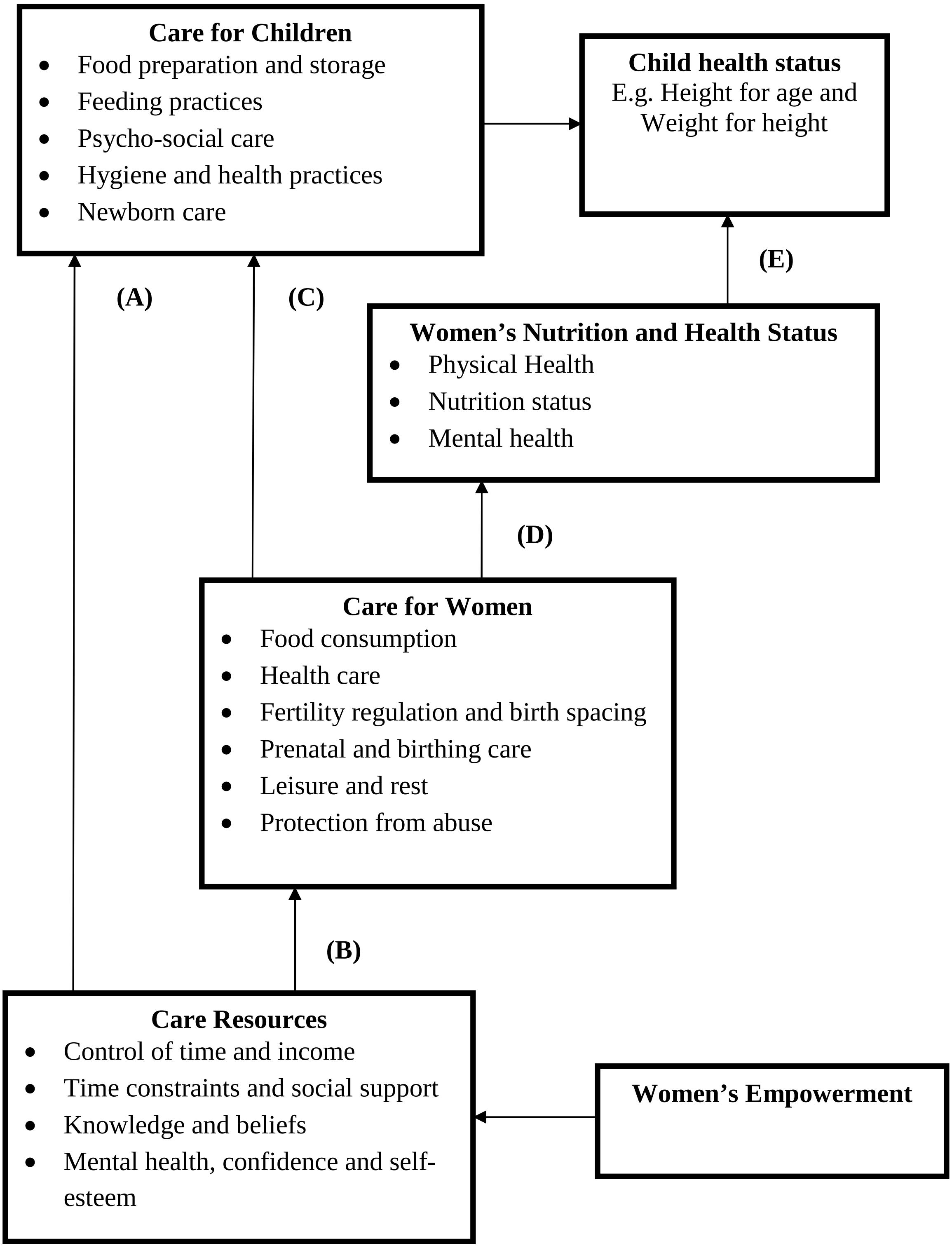
[25] The full set of variables constituting personal characteristics, household characteristics and community level characteristics for women and children's health status are discussed in Chapters 4 and 5. See Section 4.4.2 in Chapter 4 for child health and Section 5.3.2 in Chapter 5 for women's health.

3.4 Women's Empowerment and Health Status: Possible Transmission Channels.

The link between women's empowerment and the health status of women and children is based on the widely held view that, women play a major role in ensuring food availability (Quisumbing et al., 1995) and appropriate health promoting environment in the household (Haddad et al., 1997). This role is based on the fact that in many societies, women are the main agents providing care for themselves and their children. The effect of good care practices and behaviours on health status, especially the nutrition of women and children has been emphasised in the nutrition literature (Engle, 1999; Engle et al., 1999; Engle et al., 2000). It has equally been emphasised that in the mist of food insecurity and inadequate healthcare, improved care giving can help optimize the use of available resources to promote good health and nutrition among women and children (Engle, 1999).

Caring practices deemed to be important for child health and well-being includes food preparation and storage, feeding practices, psychosocial care, hygiene and home health practices and newborn care (Engle, 1999; Engle et al., 1999; 2000; Smith et al., 2003). In the case of women's health, identified care practices includes adequate quality and quantity of food, care to prevent and treat illnesses, support for sufficient fertility regulations and birth spacing, care during pregnancy and lactation, safe prenatal and birthing care, sufficient time for rest and leisure and protection from physical and emotional abuse (Engle, 1999; Engle et al., 2000; Smith et al., 2003). In carrying out these care giving practices, it is believed that caregivers require resources, normally classified into three broad areas as human, economic and organisational resources (Engle et al., 1999; 2000). Indicators measuring care giving resources (i.e. control of time and income, time constraints and social support, female-specific health service availability, knowledge and beliefs, maternal health, confidence and self-confidence) have been highlighted and used to explain the conceptual links between women's empowerment and women and children's health and nutrition (Smith et al., 2003). A modified version of the framework in Smith et al., (2003) (see Figure 3.1) is used to explain how women's empowerment influences women and children's health status through care giving.

Figure 3.1: Women's Empowerment, Care Practices and Women and Children's Health Status



Source: Adapted from Smith et al., (2003). Note this is a modified version.

From Figure 3.1, we can see that care giving resources, which can also be argued to be sources or forms of women's empowerment (see empowerment discussion in Section 3.2) affect the provision of good quality care for women and children. This in turn affects the health status of women and children via different channels. Arrows (A and B) depicts a direct channel via which the different sources or forms of women's empowerment affects quality of care for children and women respectively. In the second channel, the different forms or sources of women's empowerment affect the quality of childcare practices indirectly through care for woman (see arrow C). From arrows D, E and F, the care received by women does not only influence the health status of women directly, but also care for children and children's health status indirectly through the health status of women. The direct and indirect channels via which women's empowerment affect care practices and for that matter women and children's health status are discussed below.

3.4.1 Direct Transmission Channel

This refers to that part of Figure 3.1 labelled A and B. The main argument made in this section is that women who are empowered are more likely to have access to resources needed to provide good quality care for both children and women. It is not uncommon to find that women who are empowered, (1) have relative control over their time and income, (2) have less time constraints and more social support, (3) are knowledgeable and have the capacity to contest long held beliefs that could be detrimental to their health and that of their children and (4) are confident, with better self-esteem and the right mental attitudes to life. The different resources and how they influence women and children's health status are discussed as follows.

3.4.1.1 Control of Household Resources

There is evidence in the bargaining literature that suggest that increasing power of women relative to their partners is associated with control over household resources. In Indonesia, it was found that women's status relative to their husbands, influence household financial arrangements such as control over cash, spending decisions and time use (Thomas et al., 1997). Women's control over household resources could be essential in improving caring practices via access to food resources, storage and preparation of food, in addition to hygienic household environment. Besides these benefits, it is also argued that women's control over household resources could mean ability to make efficient and timely allocation of resources that benefits their health status and that of their children (Smith et al., 2003). It is not uncommon for women to use the resources they control to seek for medical attention for themselves and their children in times of illness. Evidence in the bargaining literature supports the fact that women's control of economic resources such as individual assets (Beegle et al., 2001), income shares (Hoddinott and Haddad, 1995), assets brought into marriage (Thomas et al., 1997; Quisumbing and Maluccio, 2003) are significantly correlated with children and women's health status.

3.4.1.2 Time Constraints

The multi-faceted roles of women in many societies, means constraints on the time of women for providing effective and good quality care for themselves and their children. In many traditional societies, women tend to take up the responsibility of childcare with little or no assistance from their partners. In both urban and rural areas, women work under very harsh conditions, combining household duties with labour market engagements and reproductive roles. The performance of these roles hardly leave women with the time needed to provide good quality care for themselves and their children. In the absence of other adult females or older children who can substitute for care provision, the nutrition and health status of women and their children can be adversely affected (Smith et al., 2003; World Bank, 2006; Mwangome et al., 2010). In households and communities where power differentials between women and their partners (arising from education, control over resources and normative gender prescribed roles) exist, constraints on women's time could be exacerbated. For example, increasing constraints on women's time as a result of household workload and reproductive roles can have adverse implication on women's ability to seek healthcare or send their children for treatment on a timely basis (Blackden and Woden, 2006).

3.4.1.3 Knowledge and Beliefs

Knowledge and beliefs are close correlates of women's empowerment (Engle, 1999; Smith et al., 2003). Thus, the more empowered women are, the more likely it is that they will be knowledgeable and also have the capacity to contest norms and belief systems that may be detrimental to their wellbeing. For example, empowered women are more likely to contest norms that restrict their mobility and community socialisation. This can help them to build social networks and engage in interactions that proffer knowledge regarding improved nutrition and healthcare technologies for improved mother and child health. As earlier indicated, empowered women are also more likely to question unscientific social beliefs and care practices that may impact women and children's health negatively. For example, women empowered via education and access to other resources (knowledge, skills etc), are more likely to look at episodes of illness and diseases as medical rather than spiritual (Smith et al., 2003). In such cases, they are more likely to accept medical intervention to treat illnesses compared to less empowered women (Smith et al., 2003; Kishor, 2000a; 2000b).

3.4.1.4 Mental Health, Confidence and Self Esteem

Concerning women's mental health, confidence and self-esteem, the argument is that empowered women are more likely to be independent, confident, have better self-esteem, experience less violence and also contest norms that portray women as weaker or inferior actors in the household, community or nation compared to men (Smith et al., 2003). The importance of these qualities lies in their possible favourable impact on the health of women and their children. Women who are more confident are more likely to adopt new caring practices that may enhance the health and nutrition of their children. For example, women's level of confidence is identified as a critical success factor for complimentary feeding (Engle, 1999; Smith et al., 2003). Women who are independent are not only more likely to have several options in terms of reproductive health but also more likely to make independent decisions that affect their health status in general.

3.4.2 Indirect Transmission Channels.

The indirect channels in Figure 3.1 are those with arrows labelled C, D and E. With respect to the indirect channels, we explain how women's empowerment via care resources influences care for women and children. Specifically, we explain how women's empowerment indirectly affects (1) care for children through care for women, (2) children's health status through care for women and women's nutrition and health status.

The argument with respect to childcare is that the quality of care given to children by their mothers or caretakers is a function of the quality of care they receive. For example, adequate food consumption, appropriate and timely health and prenatal care during pregnancy, coupled with the required levels of rest are likely to make mothers healthy, stronger and better placed to discharge their caregiving responsibilities towards their children. Appropriate food consumption by the mother can be important for breastfeeding (Engle et al., 1999), whiles protection from abuse will not only positively impact women’s physical abilities to provide care, but also the quality of psycho-social care given to children. Women who plan their birth with appropriate spacing are more likely to have reduced workload in terms of children to care for. This increases the possibility of having quality time devoted to the care of children. The quality of care received by the child eventually affects the health status of the child as in arrow F in Figure 3.1.

In the case of women and children’s health status, we argue that the care women receive directly affect the health status of women but with an indirect effect on the health of the child through the woman’s health status (see Arrows D and E). For example, food consumption, access to health and reproductive care will affect the physical health and nutritional status of the woman. This will in turn affect the future health status of an unborn child. There is substantial literature both in medicine and nutrition that suggest that the health and nutrition status of the mother affects the nutrition of the foetus in the utero (Rosenzweig and Schultz, 1983; Fogel and Costa, 1997; Behrman and Rosenzweig, 2004; Almond et al., 2005; Case et al., 2005). Episodes of violence against women especially during pregnancy could have adverse health consequences for foetal growth (foetal distress, foetal injury, preterm labour and still birth) (Sharps et al., 2007; Jasinski, 2004) and post-birth health status of the child (Sharps et al., 2007; Murphy et al., 2001; Valladares et al., 2002; Silverman et al., 2006).

3.4.3 Other Possible Effects of Women’s Empowerment

Figure 3.1, creates the impression that empowering women will necessarily reflect positively on the health status of women and their children. On the contrary, effects other than what has been discussed above are plausible. This includes the effect of women’s empowerment on women and children’s health being positive and significant only when women collaborate with their husband/partners, indifferent irrespective of whether the woman or husband/partner is empowered or negative.

3.4.3.1 Collaborative Effect

It is possible that the effect of women’s empowerment on the health status of women and children will become positive or stronger if such power gains are used in a manner that includes the husband/partner in decisions made. This is based on the notion that men are likely to be more efficient in investment decisions and also have access to more resources. Thus decisions that have men's support are likely to attract more household resources and therefore a higher likelihood of success.

Evidence via randomized experiments from Ghana and Sri Lanka suggest that, higher returns accrue on unrestricted cash grants given to men compared to women. The reason being that unlike women, men invest in their business resulting in higher returns to capital (De Mel et al., 2009; Fafchamps et al., 2011). Intuitively, higher returns on men's business could mean higher household income as well as income security in the long-term. It is therefore possible for the positive impacts of such long-term income security for the entire household to outweigh the benefits arising from short-term spending by women on their needs and that of their children. Evidence from Nepal also suggests a stronger effect of women's autonomy on use of healthcare services when couples agree on the autonomy status of the woman compared to when they do not agree (Allendorf, 2007a). Findings from the Tsimane Amazonian panel study, also suggest that joint couple's decision on food acquisition has better impact on children's nutrition compared to when the woman or husband/partner makes such decisions individually (Patel et al., 2007).

3.4.3.2 Indifferent Effect

Secondly, power gains by women may lead to positive household outcomes if such power gains leads to a systematic pattern of economic choice, which benefits household members. It is possible that power gains by women may not result in choices that benefit the household. A systematic review of 5,774 studies on the impact of interventions such as cash transfers received by women compared to men, suggest that the control of cash transfers by women may not in any way result in positive life outcomes (Yoong et al., 2012). To the authors, "it is not yet clear if such interventions consistently lead to any systematic pattern of economic choices. Thus, the suggestion that transfers targeted at women, leads to higher benefits for the household as a whole than if such transfers were targeted at men, may be erroneous" (Yoong et al., 2012: 1). Randomised experiments conducted in Burkina Faso suggest that irrespective of whether conditional cash transfers were received by the mother or father, it has a positive impact on the demand for preventive child health services (Akresh et al., 2012). When conditional cash transfer is replaced with unconditional cash transfer, the impact (i.e. no significant impact) on demand for preventive child health services remained indifferent, irrespective of the recipient of the cash transfer (Akresh et al., 2012).

3.4.3.3 Negative Effect

In some instances, power gain by women can impact the health of women and children negatively. Empowered women for example are more likely to be engaged in the labour market. This could mean enormous constraints on their already overstretched time, thereby reducing the time available for providing care, especially for their children. In cases where older women are present in the household or commercial care services are available, they could substitute for mother's care. The challenge however, is that such substitute care givers may not be able to provide the quality of care that would have been provided by the actual or biological mothers of the children (e.g. breastfeeding, bonding, nurturing, psycho-social care etc) which is important for child health (Dodd, 2005; House, 2007; Chen and Li, 2009).

Another argument supporting a possible negative effect is the fact that power gain by women could lead to social conflicts especially at the household level (Smith et al., 2003). The basis of this argument is that increases in women's power could mean men giving up certain areas of control (i.e. sharing previously controlled areas with women), which can result in tension both within and outside the household. Such tensions could escalate if not well managed and ultimately result in household dissolution, with adverse implications for the health of women and children. In traditional societies where gender relations are rooted in unjust and patriarchal gender stereotypes, power struggles between women and men may not only result in household dissolutions, but also trigger dysfunctional behaviour (physical and psychological abuse) from men. As already discussed, abuse towards women could compromise their own health and by extension the health of their children (Sen and Batliwala, 2000; Campbell, 2002; Rivara et al., 2007; Sarkar, 2008; Chopra et al., 2009).

In summary, women's empowerment influences women and children's health status via access to care giving resources. This in turn affects the quality of care received by women and children and its implications on their health status. The main argument is that empowered women are more likely to have access to care giving resources. This enhances women's ability to deliver good quality care for themselves and their children and consequently the impact of good quality care on the health status of women and children. Besides the main argument, the discussion also suggests that power gains by women may not always affect women and children's health positively.

3.5 Women's Empowerment and Women and Children's Health: The Empirical Literature

In this section, we review different indicators used in the empirical literature to measure women's empowerment or bargaining power as well as findings thereof.

3.5.1 Indicators of Women's Empowerment

Different indicators have been used to measure women's empowerment in the literature. Below in Table 3.1, we summarise some of the indicators used as proxies for women's empowerment/bargaining power.

Table 3.1: Indicators of Women's Empowerment/Bargaining Power

Authors	**Indicators**	**Discipline**	**Data Source**
Doss, (2006)	• Current Assets	Economics	Living Standard Survey Data, Ghana for 1991/92 and 1998/99
Quisumbing, (1994)	• Education, • Land • Non land assets	Economics	Survey of 344 households in 5 selected villages by the International Rice Research Institute (1985)
Quisumbing and Malluccio, (2003)	• Human Capital • Women's assets at marriage	Economics	Household Data from Bangladesh, Indonesia, Ethiopia and South Africa
Thomas (1990);	• Male non- labour income • Female non-labour income	Economics	A random national household sample of nearly 55,000 households from Brazil (The National Survey of Household Expenditure)
Thomas et al., (1997)	• Total income • Women's control of income • Assets brought into marriage by husbands and wives		First 2 waves of the Indonesian Family Life Survey collected by RAND in 1993 and 1997
Hoddinot and Haddad, (1995)	• Women's share of income	Economics	Living Standard Survey Data from Cote de' Ivoire
Fafchamps et al.,	• Land brought into marriage	Economics	Four rounds of the

(2009)	• Livestock brought into marriage • Involvement in household purchases • Wife earns non-farm income • Land upon divorce • Livestock upon divorce • Violence • Cognitive ability		Ethiopian Rural Household Survey collected between 1993 to 1997
Beegele, et al., (2001)	• Assets share • Social status of parents of husband/wife • Education of parents of husband/wife	Economics	Indonesian Family Life Survey (IFLS2) 1997
Smith et al., (2003)	• Couple education differences • Couple age differences • Woman is employed? • Woman earns cash?	Economics	DHS Data for South Asia, SSA and LAC from 1990-1998
Kishor, (2000a)	• Participation in the modern sector • Sharing of roles and decision-making • Lifetime exposure to employment • Financial autonomy • Traditional marriage • Marital advantage • Women's emancipation • Equality in marriage • Appreciation of women	Demography	1995 – 1996 DHS data from Egypt
Allendorf, (2007b)	• Women's land right • Decision-making • Mobility	Development Studies	2001 DHS data from Nepal
Bloom et al., (2001)	• Women's status: • Appreciation • Domestic violence • Input in decision-making • Woman's confidence in community interactions • Contributions to household • Perceived changes in women's self-worth • Agency	Development Studies	Probability sample of 336 poor to middle income households drawn via a two-stage cluster design from urban Varansi in India (1995-1996)
Hindin,(2000b)	• Autonomy • Decision-making	Demography and Health Studies	DHS Data for Zimbabwe-1999, Malawi-2000 and

			Zambia- 2002,
UNDP, 2010 (GII)	• Labour market participation • Educational attainment • Adolescent fertility and maternal mortality	Human Development	Cross-country macro data
World Economic Forum, 2010 (GGGI)	• Economic Participation and opportunity • Educational attainment • Health and survival • Political empowerment	Human Development	Cross-country macro data
Branisa et al., (2009) - (SIGI)	• Family code • Physical integrity • Son preference • Restricted civil liberties • Restricted resources and entitlements	Human Development	Cross-country macro data
Composite Women's Empowerment Index Index – (CWEI)	• **Family Decisions** • **Perception on partner violence** • **Women's autonomy** • **Societal preferences** • **Access to resources**	**Development Economics**	**Cross-country DHS data from SSA (made up of 20 countries) between 2003 - 2010**

Source: Constructed by the author based on the literature

A study of the indicators in Table 3.1 suggests two things.[26] It appears that papers published in economics and human development related journals tend to use variables that proxy women's access to resources and or capabilities as indicators of women's empowerment. From our working definition of women's empowerment (see Section 3.2), resources and or capabilities/functionings constitute only one of the forms or sources of empowerment. Thus, it can be argued that the use of resource or capabilities-based indicators alone, tells only one side of the women's empowerment story.

On the contrary, papers published in demography and development related journals, have often used indicators referred to as direct measures of empowerment[27]. These include women's participation in household decision-making (e.g. purchase of daily household items, large household purchases, women's health and reproductive issues,

[26] Table 3.1 is based on the review of Malhotra et al., (2002) and the general women's empowerment/ bargaining power literature.

[27] Indicators capturing women's decision-making ability in the household, perceptions about male violent behaviour towards women and women's mobility and autonomy are often used as direct measures of women's empowerment (Ahmed, 2006).

visits to family members), perceptions of violence against women and ease of mobility. Unlike resource-based proxies, an advantage with the use of direct measures of women's empowerment is that they are self-reported, making it less prone to errors. Notwithstanding this advantage, direct measures of women's empowerment could still contain errors especially in circumstances where women underestimate their decision-making ability (Becker et al., 2006; Beegle et al., 2001). Although in the demography and development literature, direct measures of women's empowerment have principally been used to capture women's exercise of agency, it can equally be argued that they capture underlying normative institutions that define gender-segregated roles and privileges and the way women exercise agency (see Chapter 3). Thus, the availability of questions on direct measures of empowerment in major surveys such as the DHS has made their use popular. However, just as resource-based proxies of women's empowerment, direct measures of women's empowerment may also tell just one side of the women's empowerment story (women's exercise of agency) especially when used alone as is often the case in the demography and development literature.

Considering that women's empowerment is multi-dimensional (Kabeer, 1999; 2002; 2005; Kishor, 2000a; Malhotra et al., 2002), the use of other indicators that together with resources and or agency capture the multi-dimensional nature of women's empowerment becomes essential. It is in the light of this that the composite women's empowerment index (CWEI) computed in this study becomes important. The superiority of the CWEI lies in the fact that unlike existing cross-country women's empowerment indices such as the GII, GGGI and the SIGI, it combines access to resources (outcome variables) with social institutions that reflect the process of empowerment. In addition, the use of nationally representative household data gives it an extra advantage over existing indices of women's empowerment based on macro data. An advantage in using nationally representative household data to compute a cross-country women's empowerment index, lies in the fact that it lends itself less, to challenges (e.g. administrative manipulation and errors etc) likely to be associated with macro data as used in the GII GGGI and the SIGI. Even where the CWEI is compared to single country measures of empowerment as in Table 3.1 above, the CWEI can still be said to be superior in terms of the mix of dimensions captured based on the variables used (see detail discussion on the CWEI in Chapter 4 and Appendix 1).

3.5.2 Findings on the Effect of Women's Empowerment on Health Status

Just as women's empowerment, different indicators have been used to measure health status. In the case of women, health status indicators used includes fertility, use of contraceptives, use of reproductive health services, female mortality and nutrition. Health status indicators, such as child anthropometric statistics (height for age, weight for height, weight for age and body mass index), infant mortality, ratio of boy to girl deaths, vaccinations etc have also been used as indicators of child health status.[28] Empirical evidence on the effect of women's empowerment on women and children's health is discussed below.

3.5.2.1 Women's Empowerment on Women's Health Status

Abadian, (1996) analysed data from United Nations and World Bank surveys and found that women's autonomy (singulate mean age at marriage, mean spousal age difference and female enrolment in secondary school) has a negative influence on fertility. Gage, (1995) also analysed the 1988 DHS for Togo and found that women's control over choice of spouse and access to cash, increases the use contraceptives. Evidence from Egypt indicates that women's mobility is strongly positively correlated with the use of contraceptives (Govindasamy and Malhotra, 1996). Compared to the first two, the third study seems unique in that the authors capture as much as possible, the different aspect of women's empowerment (Mobility, decision-making and control of household finances) together with individual characteristics (education, cash/non-cash, employment, religion, socioeconomic status etc). Evidence from Zimbabwe also suggest that control of household decisions by men, meant women were less likely to consent to the use of contraceptives, discuss preferred number of children with their spouse and report current or future use of contraceptives (Hindin, 2000a). The study also suggests that measures of women's autonomy provide further independent explanatory power on fertility related behavior.

Findings based on data from Zimbabwe, Zambia and Malawi, suggest that women's decision-making power or inputs into household decisions is negatively correlated with low BMI (Hindin, 2000 and 2005). The author argues that lack of input into household decision-making is linked to poor reproductive health outcomes, through its effect on

[28] For the different child health status indicators used in the literature, see the review by Malhotra et al., (2002). The following studies are also important in this regard (Thomas et al., 1997; Haddad, 1999; Smith et al., 2003; Osmani and Sen, 2003; Sethuraman et al., 2006; Allendorf, 2007b; Hossain et al., 2007; Shroff et al., 2009; Bhagowalia et al., 2010).

Chronic Energy Deficiency (CED). From the Zimbabwean study, the author report that women in her study sample were 10% thinner and up to 1.93 times likely to be CED when men were solely in control of the different domains of decision-making. In another study, Bloom et al., (2001) using control over finances, decision-making power and freedom of movement as indicators of women's autonomy, found that women with greater freedom of movement were more likely to use antenatal and delivery services. Studies in Nepal have also found that spousal discussion of family planning issues and women's autonomy is more likely to increase the use of antenatal care and health facility delivery (Furuta and Salway, 2006; Allendorf, 2007a).

In Indonesia, women's share of household assets was found to be positively correlated with the use of reproductive health services such as antenatal care and health facility delivery (Beegle et al., 2001). Smith et al., (2003) found a U-shaped relationship between women's household decision-making power and BMI for South Asia and LAC, but an inverted U-shaped relationship for SSA. Additional evidence from Indonesia also reveals that women who enter into marriage with higher assets are less likely than their sisters to experience respiratory disorders (Thomas et al., 1997).

3.5.2.2 Woman's Empowerment on Children's Health Status

There is evidence within the child health literature, suggesting that women's empowerment is correlated with child health status. Evidence from Cote de' Ivoire suggest that increasing wife's income share is positively correlated with height for weight outcomes of sons (Haddad and Hoddinott, 1994). In a cross-country study, Quisumbing and Maluccio, (2003) investigated the effect of women's assets at marriage on expenditure shares of education, food, alcohol/tobacco use, health, children's clothing and child schooling using data from South Africa, Bangladesh, Indonesia and Ethiopia. Findings of the study reveal that, women's control of resources leads to differential expenditure increase on education for boys and girls across the countries studied. In evaluating gender differences on the impact of cash transfer via South Africa's old age pension, Duflo, (2003), finds that pensions received by women has a large impact on the anththropometric status of girls but with a little effect on boys. On the contrary, the author reports that no similar effect was found with respect to pensions received by men.

Smith et al., (2003), used DHS data from countries in South-East Asia, SSA and LAC to study the effect of women's status on child nutrition (HAZ, WHZ and WAZ). The authors report a significant positive relationship between their measure of women's empowerment and child nutrition for SSA countries in the data. Desai and Johnson (2005) also used DHS data from countries in the same regions to estimate the relationship between women's decision-making and child immunization, height for age and mortality. The results indicate a positive relationship between women's decision-making and all the three indicators of child health in the African countries studied. Evidence from Malawi and Kenya also suggest an inverse relationship between intimate partner violence, under-2 mortality and child stunting in Kenya and Malawi (Rico et al., 2011). Using selected measures of bargaining (assets brought into marriage, involvement in household purchases, non-farm earnings, assets upon divorce, violence and cognitive ability) based on data from rural Ethiopia, Fafchamps et al., (2009) argue that female bargaining benefits child nutrition.

Evidence from Bangladesh via proportional hazard models, equally suggest that enhanced women's autonomy and authority in the household is significantly negatively associated with post-neonatal and child mortality (Hossain et al., 2007). There are several other studies, mainly from South Asia, suggesting a positive relationship between various indicators of women's empowerment and child health (see for example, Thomas et al., 1997; Haddad, 1999; Osmani and Sen, 2003; Sethuraman et al., 2006; 2008; Hossain et al., 2007; Allendorf, 2007a; Shroff et al., 2009; Bhagowalia et al., 2010).

3.5.3 Other Determinants of Women and Children's Health Status

Besides women's empowerment, there are several other factors that have been found to influence the health status of women and children. This section reviews some of these variables taking into consideration outcome variables that will be used as indicators for women and children's health status. Outcome variables to be used in this study include use of reproductive health services and women's nutrition as proxies for women's health status. For children's health status, we use anthropometric measures of child nutrition. Thus, the variables reviewed as determinants of women and children's health status are those found to be significant predictors of these outcome variables.

3.5.3.1 Other Determinants of Women's Health Status

Age of Woman - The age of a woman will affect her use of reproductive health services and nutrition via different channels. Age could be a proxy for a woman's accumulation of knowledge and experience concerning health and nutrition technologies (Elo, 1992; Glei et al., 2003; Burgard, 2004). Such experience and knowledge could become very essential in the decision to use or not to use reproductive health services (Addai, 2000; Celik and Hotchkiss, 2000; Chakraborty et al., 2003; Mekonnen and Mekonnen, 2003) or adopt appropriate nutritional practices. Others have also argued that age could be correlated with biological risk associated with pregnancy (Burgard, 2004; Glei et al., 2003) or membership of traditional groups (Navaneetham and Dharmalingam, 2002), which can affect the decision to use health services in general and reproductive health services in particular.

Older women are also more likely to have been married, begun reproductive life or working and earning income. The socioeconomic support that comes with marriage, together with physiological changes associated with reproduction can contribute to weight gains and higher BMI, hence a significant correlation between BMI and age. Evidence from a couple of SSA countries (Ghana, Nigeria, Ethiopia and Zimbabwe) suggests a positive relationship between age and women's BMI (Amoah, 2003; Hindin, 2000b; Uthman, 2009a; Bitew and Telake, 2010; Dake et al., 2011). Findings based on cross-country DHS dataset from SSA also suggest an inverted U-shaped relationship between age and women's BMI (Smith et al., 2003).

Birth Order - There is evidence in the literature suggesting that the order of birth influences the use of reproductive health services. It is argued that first time deliveries are often associated with high-level risk. Such first timers are more likely to use reproductive health services. Alternatively, health workers may recommend the use of health facilities for delivery for such women (Navaneetham and Dharmalingam, 2002). It is also possible that women of higher order birth may have experience from previous pregnancies and childbirth. Such women may rely on their experience and therefore reduce the use of reproductive health services (Stephenson and Tsui, 2002). Higher order births could also be risky, in that it may come with excessive stress and birth related complications that can threaten the lives of women. In Kenya, Ethiopia, India and Turkey, higher and lower order births were both found to be significantly positively correlated with the use of antenatal services (Magadi et al., 2001; Mekonnen and

Mekonnen, 2003; Celik and Hotchkiss, 2000). High order births may also be associated with maternal depletion, especially in high fertility countries. One of the channels via which birth order has been explained to affect women's weight is through local obsogenic culture that is associated with pregnancy and childbirth. In several developing countries, women's feeding practices after childbirth change drastically leading to weight gains (Holdsworth et al., 2004; Dake et al., 2011; de-Graft, 2010).

Religion - Religious background has also been found to be a good predictor of utilization of health services. Religion may be a socio-cultural space for practicing and upholding one's faith, beliefs and values. Thus, in instances where the demands of modern medicine conflict with such beliefs and norms, a choice could be made not to use health services irrespective of the consequences. Evidence from Ghana and Nigeria suggest that Muslim women are less likely to go for antenatal services and deliver at a hospital if the health provider was a male (Addai, 2000; Abor et al., 2011; Ikeako et al., 2006).[29] In Ethiopia, Muslim women were found to be more likely to use antenatal health services (Mekonnen and Mekonnen, 2003). It has also been found that in some part of Africa, beliefs by some groups that obstructed labour is caused by infidelity hinder women's care seeking behaviour (Mrisho et al., 2007). In Ethiopia, it was found that women who followed traditional religious beliefs were 50% less likely to use reproductive health services compared to Catholic/Christian women (Dagne, 2010).

Education - Although the pathways by which women's education influence health status and use of health services is not entirely known, different potential channels have been put forth in the literature. It is argued that educated couples, especially the woman, is more likely to have increased knowledge of the benefits of preventive medicine, be aware of the existence of health services, receptive to new health related information, interact outside of their homes to have access to improved health producing technologies and familiar with modern health care culture (Gabrysch and Campbell, 2009). Couples education could also be a proxy for better copping abilities as well as reduced power differentials between women and health providers. This enhances their ability of women to demand for health services in times of need (Burgard, 2004; Furuta and Salway, 2006). Couples education may also capture other unobservable

[29] In Ghana for example, institutional reports suggest that privacy during child birth seem to be a crucial issue for women from areas in the Northern part of the country, that are predominantly Muslim. For such women, delivering at home is preferable if that will help them to avoid encounters with male health service providers in a health facility (Ministry of Health, 2009).

socioeconomic effects and therefore result in a positive correlation with women's health status and health services use (Overbosch et al., 2004; Sahn et al., 2003; Lawson, 2004). Several other studies have found a positive significant correlation between women's education and use of reproductive health services (Addai, 2000; Gage, 2007; Celik and Hotchkiss, 2000; Kabir et al., 2005; Mekonnen and Mekonnen, 2003).

In the context of women's nutritional status, education could constitute a channel for wealth accumulation. Adequate household wealth can be essential in securing household food security and the effect of such on women's nutrition. In addition, education may make it easy for women to access improved nutritional technologies, which can help women improve on their dietary habits and nutritional status. Several studies have found significant correlations between couples education and different thresholds of women's nutrition (Amoah, 2003; Dake et al., 2011; Uthman, 2009a; Bitew and Telake, 2010; Hindin, 2005b; Smith et al., 2003).

Household Wealth - The influence of household wealth on utilization of health services in general and reproductive health services in particular, is well documented. Some authors have used income as a measure of household welfare and found it to be significantly positively correlated with the use of reproductive health services (Elo, 1992; Fosu, 1994). However, considering the challenges associated with the use of income (eg. measurement error, consumption smoothing etc), emphasis is usually on the use of welfare measures that reflect long-term control of resources such as consumption or expenditure if available (Deaton and Grosh, 2002). In the absence of income, consumption or expenditure data, a common practice in the literature has been the use of asset/wealth index as a proxy for household welfare (Filmer and Pritchett, 2001; Montgomery et al., 2000; Sahn and Stifel, 2003b; Sahn and Stifel, 2003a).[30]

Irrespective of the measure used for household welfare, findings have been consistent in pointing to a positive correlation with the use of reproductive health services. For example, poor living standard, measured by consumption is negatively correlated with antenatal care use in Ghana (Overbosch et al., 2004). Household wealth captured via car

[30] An asset/wealth index is a composite measure of household welfare, computed by aggregating household assets via the use of principal component analysis (Filmer and Pritchett, 2001). In the context of DHS data household assets including type of flooring, water supply, sanitation facilities, electricity, radio, television, telephone, refrigerator, persons per sleeping room, ownership of agricultural land and country specific items in some instances (Rutstein and Johnson, 2004).

ownership in Turkey (Celik and Hotchkiss, 2000), socio-economic status measured by high value possessions in India (Mathews and Gubhaju, 2004) and income in Pakistan (Nisar and White, 2003), were found to be positively correlated with the use of reproductive health services. Studies using an assets index as a proxy for household wealth, have equally found a positive correlation with the use of reproductive health services (see Abor et al., 2011; Ahmed et al., 2010; Zere et al., 2010; Rahman et al., 2011).

Household wealth can also affect women's nutritional status, as such households are more likely to have the resources needed to ensure household food security. Thus, women living in such households are more likely to have their nutritional requirement. In addition, wealthy households are more likely to afford hospital fees in case of episodes of illness or diseases. Availability of food resources and easy access to healthcare can improve the nutritional status of women. It is expected that household wealth will be positively correlated with women's nutritional status. Existing studies have found a positive correlation between household wealth and obesity in Ghana (Amoah, 2003; Dake et al., 2011), Nigeria (Uthman, 2009a) and Ethiopia (Bitew and Telake, 2010).

Family Composition - Family composition such as the availability of other elderly women in the household and gender of the head of household influences the use of reproductive health services and women's nutrition. In households with younger children, other older women in the household may substitute for childcare and make it possible for mothers of such children to seek reproductive healthcare. Evidence from Pakistan suggests that household size is significantly positively correlated with skilled attendance at birth and use of postnatal care (Hou and Ma, 2012). Having other elderly women in the household could equally imply a bigger household size. A large household size could constitute a form of constraint on family resources and therefore reduce the use of reproductive health services (Wong et al., 1987). Chakraborty, (2003) found a U-shaped relationship between family size and use of health services in treating pregnancy related complications.

In the same breadth, presence of other elderly women in the household can influence women's nutrition status positively or negatively. For example, additional elderly women in the household could lead to constraints on household resources, reduce household food security and affect nutritional status negatively. On the contrary, elderly women in the household could help with household chores. This can reduce women's workload and its associated stress, leading to more time available for leisure, use of healthcare and the effect of such on women's nutrition. For example, Smith et al., (2003) finds a negative relationship between household size and women's nutritional status in South Asia and LAC but a positive correlation in SSA.

Another important aspect of family composition is the gender of the head of household. The effect of gender of head of household on use of reproductive health services could be mixed. In several traditional societies, men are supposed to be the main breadwinners. Thus, a male household head could be a proxy for resource availability and therefore influence the use of reproductive health services positively. On the other hand, a female household head could mean more autonomy and increased household decision-making power, which may lead to increase use of reproductive health services (Matsumura and Gubhaju, 2001; Gebreselassie, 2008; Jayaraman et al., 2008; Hou and Ma, 2012). For the same reasons already put forth, gender of the head of household can also influence women's nutritional status. For example, Hindin (2000b) found a positive significant correlation between wives who were head of households and women's BMI in Zimbabwe, but a negative insignificant relationship was found between men household heads and BMI in Nepal (Furr and Dnas, 2006).

Residence - In several developing countries, as may be the case in SSA, urban centres tend to have a higher distribution of social infrastructure such as health, water and sanitation facilities compared to rural areas. Thus, urban dwellers are more likely to be closer to such facilities than may be the case in rural areas. In addition, the rural urban divide can influence the use of health service and nutrition of women via differences in education and ability to pay. Several studies from Ghana, Ethiopia, Rwanda, India, Ecuador, Nepal and Turkey have found a positive relationship between women living in urban areas and use of reproductive health services (Celik and Hotchkiss, 2000; Mekonnen and Mekonnen, 2003; Paredes et al., 2005; Allendorf, 2010; Abor et al., 2011).

Rural urban differences may also be an important predictor of women's nutrition status. Rural women may have income constraints and are also more likely to be engaged in manual agricultural work. This may imply heavy demands on body stores of energy and yet, reduced capacity to afford daily nutritional requirements, therefore compromising their nutritional status (Mohan et al., 2004; Xu et al., 2005; Malik and Bakir, 2007). Evidence from studies in Ghana and Nigeria suggest that women residing in urban areas are more likely to be overweight or obese (Amoah, 2003; Dake et al., 2011; Uthman, 2009a). Other studies from Zimbabwe and Ethiopia have found a positive relationship between women living in urban areas and women's BMI (Hindin, 2000b;Bitew and Telake, 2010).

Availability and Access to Health Services - Availability in terms of the existence of medical infrastructure, health personnel with the requisite skill to provide quality care are deemed essential in improving the use of health services in general and reproductive health services in particular (Buekens, 2001; Graham et al., 2001; Parkhurst et al., 2005; Gage, 2007). Even where health services are available, another important factor that has been noted as having the potential of constraining the use of reproductive health services by women is physical accessibility (e.g. distance to health facility, availability of transportation etc). Evidence from rural Mali suggest that transportation barriers are very important in determining whether women make four or more prenatal visits, with distance from health facility being equally crucial for institutional deliveries or the use of trained assistants during childbirth (Gage, 2007).

In the empirical literature, different proxies have been used to capture availability of health services. For example, category of health personnel, health infrastructure and availability of drugs (Lavy et al., 1996; Thomas et al., 1996; Sahn, 1994) and accessibility (e.g. distance to health facility and prices of drug supplies) (see Lavy et al., 1996; Thomas et al., 1996; Overbosch et al., 2004). Where these variables are not available, others have used variables that capture the use of health services as proxies for the availability or accessibility of health services via two different methods. In the first method, variables on the use of health services are used to compute an index via Principal Component Analysis (PCA) (Van de Poel et al., 2007).[31] However, this approach has been criticised on the basis that health services utilisation variables at the individual level could be endogenous, since they depend on other household characteristics. A proposed solution to this challenge is the use of non-self cluster shares of such health utilisation variables (Sahn and Stifel, 2002; Christiaensen and Alderman,

[31] The use of antenatal care, birth attended by health professionals and proportion of children with the recommended vaccination were used to compute an index of health availability via PCA using 2003 DHS data from Ghana (Van de Poel et al., 2007).

2004; Kabubo-Mariara et al., 2009). For example, Kabubo-Mariara et al., (2009) used non-self cluster shares of use of modern contraceptive methods, prenatal care, and birth attended by health professionals as proxies for health services availability. Due to data constraints, the current study uses non-self cluster proportion of health service utilisation variables as proxies for health services availability and accessibility.

3.5.3.2 Other Determinants of Children's Health Status

Child's Age – A Child's age is suggested to influence the health status of the child. Child age has been found in most instances to have a U-shaped relationship with child health (Alderman, 1990; Sahn, 1994; Thomas et al., 1996; Sahn and Alderman, 1997; Van de Poel et al., 2007; Chirwa and Ngalawa, 2008; Kabubo-Mariara et al., 2009). The argument made is to the effect that at the early stages of children's growth, they are extremely protected and have less risk exposures. However, as they grow, they become more exposed and most likely to contract infections, especially where household sanitation is poor. In addition to the issue of risk exposure is the fact that several children may be weaned from breastfeeding as they grow (i.e. between 12 – 24 months). This may have implications for deterioration in their nutritional status, with higher susceptibility to infections and diseases (see Sahn, 1994; Christiaensen and Alderman, 2004; Pongou et al., 2006; Hong, 2007; Linnemayr et al., 2008; Kabubo-Mariara et al., 2009).

Child Sex - There is evidence from existing studies that the gender of a child may affect his/her health status, such as HAZ and WHZ (Sahn, 1994; Wagstaff et al., 2003; Christiaensen and Alderman, 2004; Pongou et al., 2006; Hong, 2007; Linnemayr et al., 2008; Kabubo-Mariara et al., 2009). Differences in health status by gender may be due to genetic differences or gender preferences, which are known to weigh in favour of the male child, especially in South Asia. For example, Chen et al, (1981) found evidence of discrimination against female children in the allocation of food and health resources. However, there are other studies with evidence to the contrary (Horton, 1986).

Size of Child at Birth - The size of a child at birth or birth weight is seen as a good measure of the nutritional status of the fetus in the utero (Mwabu, 2009). It has also been argued that health conditions in the utero have consequences for life survival, both as infants and in later years (Fogel and Costa, 1997). There are studies that have found strong correlations between childbirth weight and child health (Van de Poel et al., 2007). Thus, it is expected that in the child health specifications, the size of the child at birth will influence the nutritional status of the child via child HAZ and WHZ.

Parental Education - Parental education especially that of the mother is perhaps one indicator that has consistently been predicted as influencing children's health. Since the work of Rosenzweig and Schultz, (1983), the health literature has consistently confirmed the importance of parental education on both short and long-term indicators of child health and nutrition (Sahn, 1994; Wagstaff et al., 2003; Christiaensen and Alderman, 2004; Van de Poel et al., 2007). There is however, no consensus on the pathway through which education influences the health of children. Some authors have suggested that parental education's effect on health status may be transmitted through the altering of the household preference function, improvement in household productivity and care practices (Rosenzweig and Schultz, 1983; Sahn, 1994). It is important to note that instances exist where father's education has shown a negative correlation with child nutrition as in the case of Sahn, (1994) in Cote d'Ivoire. Thus in this study, the expectation is that parental education, especially that of the woman will affect the selected health status indicators of the child positively.

Age at First Birth - Age at first birth could be a proxy for the level of a woman's experience, which could be beneficial for childcare and consequently the nutrition and health of the child. All things being equal, older parents especially women are expected to have accumulated much knowledge about health related issues compared to younger and immature women. It is possible that such knowledge could be used to better the health and nutrition of children. It is expected that a woman's age at first birth will be positively correlated with child nutrition. There are several models of child health that have controlled for mother's age and or age at first birth (Sahn, 1994; Smith et al., 2003; Van de Poel et al., 2007).

Gender of Head of Household - Although the literature on the relationship between household headship and household welfare is not conclusive, there is evidence that in some instances, female headed households are poorer compared to their male counterparts (Appleton, 1996; Buvinić and Gupta, 1997; Haidar and Kogi-Makau, 2009). Thus female-headed households may be disadvantaged in terms of resources and may eventually affect the health of children. Chirwa and Ngalawa (2008) found that in

Malawi, children from male-headed households were less prone to having stunted growth compared to their counterparts from female-headed households.

Number of Children Under-Five - We assume that the number of children in a household who are under-five years of age affect child health through its effect on household resources. For example, an increasing number of children in a household, ceteris peribus, could mean crowding out household resources as well as reduction in the levels of care given to children. This may in turn have negative consequences on the health, growth and survival potential of children. Alternatively, the number of children could have a positive effect on child health especially where the children are older and can provide substitute childcare for younger children. Findings from Cote d' Ivoire suggest a positive correlation between the number of children in a household and HAZ (Sahn, 1994). Smith et al., (2003) using DHS data from SSA, South Asia and the Caribbean found a negative correlation between number of children under five and indicators of child nutrition/health.

Number of adult women in the Household - The intuition behind the use of this variable lies in its substitution and complementary role. The presence of older women in the house could substitute for a woman's household production and therefore free up additional time for childcare. In addition, the presence of older women in the household could also mean available healthcare knowledge via the experience of these women in childcare (complimentary child care role). Data from Cote d' Ivoire reveals a positive correlation between the number of females older than 14 years and HAZ (Sahn, 1994), whiles in Kenya, the share of women aged 15-49 in the household, was found to be negatively correlated with stunting (Kabubo-Mariara et al., 2009).

Household Welfare - Conventionally, household welfare has been measured by household income. However, considering the challenges associated with the use of income, emphasis has been laid on the use of consumption or expenditure if available (Deaton and Grosh, 2002). Unfortunately, the DHS data does not have any of these variables. Consistent with prior studies (Filmer and Pritchett, 2001; Sahn and Stifel, 2000; Montgomery et al., 2000; Bollen et al., 2001; Sahn and Stifel, 2003a), we use an asset index as a proxy for income in controlling for household welfare[32]. Several studies have reported a positive correlation between an asset index and measures of child health (Wagstaff et al., 2003; Van de Poel et al., 2007; Chirwa and Ngalawa, 2008; Kabubo-Mariara et al., 2009).

Place of Residence - In most developing countries, inequities in the distribution of wealth and social infrastructure between rural and urban centres persist. Such resource inequities may directly or indirectly affect children's health. Thus, the inclusion of place of residence is expected to control for such unobserved resource differences that may influence both long and short-term child health status. Prior studies in SSA have found a positive correlation between urban residence and HAZ (Smith et al., 2003;Chirwa and Ngalawa, 2008). Sahn, (1994) also found that family size variables were positively significantly related to HAZ in rural areas of Cote d'Ivoire but with no significant effect in urban areas.

Access to Safe Water and Sanitation - The importance of environmental hygiene and sanitation to producing improved child health has been emphasized both in policy and academic documents. Children between the ages of 1-5 years are vulnerable to disease causing risk factors due to their weak immune systems. The vulnerability of children tends to be aggravated, especially in circumstances where access to safe water and good hygiene is compromised. For example, in the UNICEF framework for child nutritional determinants, access to safe water and hygienic sanitation is said to be an underlying cause of child malnutrition, disability and death (UNICEF, 1998). Access to safe water and the maintenance of good hygienic practices within the child's environment has the advantage of preventing infections and diseases. Episodes of infections and diseases have the capacity to compromise the child's immune system, ability to feed and therefore nutritional and health status. Prior studies in SSA have found a positive correlation between access to safe drinking water, sanitation and child health (Strauss, 1990; Smith et al., 2003; Christiaensen and Alderman, 2004; Pongou et al., 2006; Bassole, 2007).

[32] Wagstaff and Watanabe (2003) compared measured inequality in wasting and stunting in 19 countries and concluded that in most countries the choice between consumption and asset index as a measure of welfare makes little difference.

Access to Health Services - Proximity to healthcare services has long been argued to be positively correlated with child health. Access to such services in terms of distance to health facilities, availability of transportation in the case of emergencies and money to pay for health care related cost, greatly informs the use of health services and consequently the health status of children. Within the SSA child health literature, several authors have used variables such as distance from the nearest health facility, availability of transportation to health facility, health infrastructure, health supplies and prices of health services as proxies for availability and accessibility of health services. The results of several of these studies have found a positive correlation between healthcare availability and accessibility variables and child health (Sahn, 1994; Lavy et al., 1996; Thomas et al., 1996; Sahn and Stifel, 2002; Christiaensen and Alderman, 2004; Bassole, 2007; Kabubo-Mariara et al., 2009).[33] As indicated in Section 3.4.3.1, the study uses non-self cluster shares of health utilisation variables as proxies for the availability and accessibility of health services.

3.6 Conclusion

This chapter defines the framework necessary for carrying out the rest of the study. For example, the discussion on women's empowerment makes clear what we mean by women's empowerment. It also makes it possible to identify the dimensions of women's empowerment in this study. The discussion also places in context, what will be an appropriate theoretical framework and possible channels through which women's empowerment can affect women and children's health status.

The discussion of the literature though not exhaustive, helps in identifying possible variables to be used to measure the different dimensions of women's empowerment as well as determinants of women and children's health. The importance of the conceptual and empirical literature lies in the fact that it makes it possible to have an idea of the possible effect of women's empowerment on women and children's health status. This chapter therefore provides a framework that helps in the execution of the rest of the study in a manner consistent with the objectives set out in Chapter 1.

[33] The studies using different health availability and accessibility proxies referred to in the text were conducted in Ghana, Cote de' Iviore, Sub-Saharan Africa, Ethiopia, Senegal, and Kenya.

CHAPTER FOUR

EFFECT OF WOMEN'S EMPOWERMENT ON CHILDREN'S HEALTH STATUS: EVIDENCE FROM SUB-SAHARAN AFRICA.

4.0 Introduction

This chapter examines the effect of women's empowerment on indicators of child health (i.e. height for age - HAZ and weight for height z-scores - WHZ) using DHS data from 20 SSA countries. The current chapter computes a composite index representing different dimensions of women's empowerment (i.e. women's access to resources and the broader institutional context of norms – referred to as social norms). The social norms dimension is further broken down into four sub-dimensions (women's participation in family decisions, women's perception of violent behaviour by their partners, women's autonomy and societal preferences). Using the composite index and its dimensions as indicators of women's empowerment, the effect of women's empowerment on children's health is examined. Specifically, the chapter examines (1) the effect of the composite index on child health (2) whether social norms are equally as important as access to resources (women's economic power) in predicting child health. (3) age cohorts and quantile specific effects of the composite women's empowerment index on child health.

The results suggest that not only is the composite women's empowerment index positively correlated with both long and short-term health of the child (HAZ and WHZ), but dimensions such as social norms are equally as important as women's access to resources in predicting child health. The dimensions on participation in family decisions, perception on violent behaviour by partners and women's access to resources are also independently significantly correlated with child health. Age and quantile-specific estimates also suggest that the effect of women's empowerment and several other covariates depends on the child's age or location (quantile) of the child in the distribution of the child health variable.

The rest of the chapter discusses the background and motivation in Section 4.1. This is followed by the objectives of the study in Section 4.2, and data sources in Section 4.3. Section 4.4 looks at variable definition and measurement, with Section 4.5 discussing econometric methods. Bivariate and multivariate results are discussed in Section 4.6 and 4.7. The chapter concludes in Section 4.8. Note that all tables and figures in this chapter are found at the end of the chapter.

4.1 Background and Motivation

An important development challenge in many developing countries is the issue of child health, especially child survival. In Chapter 2, we discussed global trends in child health with available data suggesting significant improvement in child survival worldwide. It is also important to note that the discussion emphasised the fact that SSA has the worst outcome in child health (especially in under-five deaths and prevalence of malnutrition) as well as the slowest rate of progress. Indeed, the current rate of progress on child health in SSA is said to be so slow that even the few countries making some progress are likely to miss the MDG target on child mortality by 35 years (Chopra and Darnton-Hill, 2006). In addition, it is believed that with the exception of Cape Verde, Eritrea, Mauritius, Seychelles, Botswana and Malawi, the rest of the countries in SSA are unlikely to achieve the MDG target on under-five deaths (Kinney et al., 2010). Related to the issue of under-five deaths is malnutrition or undernutrition, considering that it accounts for over half of deaths among children (Black et al., 2003; Ezzati et al., 2002) and over one-third of under-five deaths (United Nations, 2010a). Available data in 2011 also suggest that malnutrition in SSA (stunting: 42% and under-weight: 24.7%), though lower than South Asia (stunting: 48% and under-weight: 42.5%) is higher than MENA (stunting: 31% and under-weight: 6.6%) and LAC (stunting: 14% and under-weight: 3.8%). This makes SSA one of the regions with the highest prevalence of malnutrition in the world.

To address the child health challenge, a substantial proportion of the SSA literature in economics and demography has discussed the general determinants of child health. Findings in Ghana (Alderman, 1990; Lavy et al., 1996; Van de Poel et al., 2007; Hong, 2007), Cote de' Ivoire (Thomas et al., 1996; Sahn, 1994), Senegal (Bassole, 2007), Malawi (Chirwa and Ngalawa, 2008), Kenya (Kabubo-Mariara et al., 2009), Mozambique (Sahn and Alderman, 1997) and cross-country SSA data (Desai and Alva, 1998; Fay et al., 2005; Smith et al., 2003) point to parental education, mother and child characteristics, household and community characteristics as important correlates of children's health.

Other authors have also examined the effect of women's empowerment on child health, with results in most instances pointing to a positive correlation between women's empowerment and child health (Haddad and Hoddinott, 1994; Duflo, 2003; Smith et al., 2003; Desai and Johnson, 2005; Ahmed, 2006; Tolhurst et al., 2008; Fafchamps et al., 2009; Derose et al., 2010; Rico et al., 2011). It is also important to emphasize that outside of SSA, women's empowerment has been found to be positively correlated with other development outcomes such household expenditure and income (Rubalcava and Thomas, 2000; Quisumbing and Brière, 2000; Quisumbing and Maluccio, 2003).[34]

However, a challenge in this literature as discussed in Chapter 1 and 3, is the single-sided approach to the measurement of women's empowerment, whether in the economics and human development or demography literature. In Chapter 1 and 3, we argued that social norms and access to resources are two important dimensions of women's empowerment. However, the literature in economics and human development seem to have focused more on the use of proxies that capture access to resources/capabilities as measures of women's empowerment, thereby presenting a single-sided story. In the demography literature, where variables that capture some aspect of social norms are sometimes used, they are used alone, thereby presenting the same single-sided story as in the economics and human development literature. The single-sided analysis makes it difficult to ascertain the comparative importance of the different dimensions of women's empowerment. Thus, this study measures women's empowerment from both access to resources and social norms and examine their differential effect on child health.

An equally important issue in the child health literature is the tendency for researchers to tag children under-five as a homogenous group. Is it possible that the effect of policy interventions to improve child health may differ among children of different age cohorts or at different percentiles in the distribution of a selected child health indicator? To the best of my knowledge, only two papers in the context of SSA have discussed the impact of child health determinants within different age and health status cohorts. An example is the case of Mozambique, where it was found that the effect of income and education on child nutrition differs by age cohorts (Sahn and Alderman, 1997). Findings from Senegal also suggest that the effect of public infrastructure and health facilities on child nutrition varies according to the location of the child in the distribution of the child nutrition variable (Bassole, 2007). Thus we argue that children under-five differ in many aspects and that the effect of women's empowerment on child health may depend on the category/cohorts of children in question.

[34] Other studies of women's empowerment and child health outside of SSA include Shroff et al., (2009), Durrant and Sathar, (2000), Osmani and Sen, (2003) Sethuraman, (2008).

4.2 Objectives

Following from the background discussion, the focus of this chapter is to estimate the effect of women's empowerment on child health using DHS data from 20 SSA countries.[35] Specifically, this chapter seeks to extend the SSA literature on women's empowerment and child health by examining:

1. The effect of women's empowerment on selected indicators of child health - anthropometric measures of under-five nutrition (child height for age and weight for height z-scores).
2. The differential effect of social norms and women's access to resources on child health
3. The child age cohorts and quantile specific effect of women's empowerment on child health
4. Whether the use of a composite index, sub-indices or individual variables making up the composite index, moderate the effect of women's empowerment on child health.

4.3 Data Source

The study uses DHS data from 20 countries in SSA. DHS data is collected via a nationally representative household survey conducted by statistical bureaus of home countries with technical assistance from OR/ICF Macro and ICF International Company. The study uses the latest DHS data for each of the 20 countries between 2003 and 2011, provided it contains all the variables needed. This includes data from Burkina Faso (2003), Cameroon (2004), Democratic Republic of Congo (2007), Ethiopia (2005), Guinea (2005), Malawi (2010), Mali (2006), Mozambique (2003), Namibia (2006), Niger (2006), Nigeria (2008), Sierra Leone (2008), Rwanda (2005), Senegal (2005), Swaziland (2007), Tanzania (2005), Uganda (2006), Zambia (2007) and Zimbabwe (2006).[36] In the case of Ethiopia, Rwanda, Senegal, Tanzania and Zimbabwe, we used datasets five years older than the latest datasets. This is because the latest datasets did not contain all the variables needed to estimate the effect of women's empowerment on child health. Secondly, DHS data is collected every 5 years in each county. Thus, inability to use the latest available dataset meant one needed to go back five years.

---

[35] Women's empowerment is captured by a composite index made up of two sub-indices, representing social norms and access to resources respectively.

[36] Benin, Chad, Congo Brazzaville, Kenya, Lesotho, Liberia and Madagascar had datasets that fit the time range used, but were not included, because none of the datasets available for the time range selected had all the variables needed to estimate the effect of women's empowerment on child health status. The figures in brackets by the countries indicates the year in which the DHS data was collected.

Basically, 3 sets of questionnaires are used in collecting DHS data. This includes the household, women and men's questionnaire. The main purpose of the household questionnaire is to identify women and men eligible for individual interview and also to collect information on the characteristics of households and its residents. The women's questionnaire is used to collect information on socioeconomic characteristics of women, together with information on women's reproductive health, relating to their most recent pregnancy occurring in the 5 years preceding the survey. The men's questionnaire collects basically the same information as the women's questionnaire from men except that it does not include women's reproductive histories. The questionnaire used in DHS surveys is based on a model questionnaire developed by the Measure DHS program. Thus, the questionnaire used in each country is principally the same with the exception of a few changes to take care of specific country-level needs. Secondly, questions asked have the same codes and response categories across countries. In the current study, all the variables used had the same codes and response categories across the 20 countries. This made it easy to pool the data across the 20 countries.

In all countries where DHS data is collected, actual data collection is preceded by the training of stakeholders, particularly supervisors, field workers, sector ministries and agencies involved in the project. The training program is normally conducted by the statistical bureau of the home country, with technical support from Measure DHS (i.e. OR/ICF Macro and ICF International Company). After the training program the questionnaire is pretested to prepare the data collection team for the actual fieldwork.

The major domains taken into consideration in collecting DHS data are the country as whole, the different regions/provinces and rural urban divide. This is to ensure that the final sample drawn and resulting statistics are representative of the 3 domains mentioned above. To achieve this objective, a two-stage probability sampling strategy is used. In the first stage, a country is divided into its regions/provinces and each region/province into urban and rural areas. Based on the latest available population census sampling frame, primary sampling units (PSU's) known as clusters are selected from each region/province in a manner that reflect the rural/urban divide and proportional to the size of the regions/provinces. This is done using systematic sampling with probability proportional to size. In the second stage, households are selected from the clusters using systematic sampling with equal probability. Females aged 15-49 years are interviewed from the selected households. In addition, men aged 15-59 years from a sub-sample of a second or third of total households selected are also interviewed. The survey also collect information on children aged between 0-59 months. Information collected by DHS surveys in the 20 countries relevant to the study includes; background characteristics of women and their husband/partners, reproductive histories, knowledge of and use of family planning methods, antenatal visits and delivery care, anthropometric measures for women and children, issues on perception of violence against women, participation in decision-making and women's mobility as well as other socio-economic characteristics. Information on the number of clusters and total number of households sampled, together with the average number of households sampled per cluster in each country is available in Table AP2-9 in Appendix 2. Detailed population representation of the sample of each country, with respect to gender, regions/provinces and rural and urban areas are found in the respective final DHS report for each country.

To estimate the effect of women's empowerment on child health, we merge the children's sample with the women's sample in each county.[37] This makes it possible to obtain the records of all children in the survey together with women and husband/partners associated with the children (i.e. mothers/fathers or guardian).[38] This means that women not associated with a child are dropped. In addition, children who had missing data on any of the independent variables are dropped. Across the 20 countries, children with missing data on weight (2.75%) and height (3.10%) were also dropped. Moreover, children with z-scores outside the WHO acceptable range for height for age $(-6 > x > 6)$ and weight for height $(-5 > x > 5)$ were excluded. Overall, 4.68% and 3.88% of children had z-scores outside the acceptable range for height for age and weight for height respectively. After cleaning the dataset for each country they were pooled into a single dataset to be used in estimating the effect of women's empowerment on children's health. The next section discusses the individual variables used in estimating the empirical model.

[37] The DHS data is organized in files. Data collected on women and children are stored in separate files. Thus, in estimating a child health equation, one will need to merge the children's file with the women's file in other to have access to women/mother's information for the estimation.

[38] However, the full sample of women is used in estimating the effect of women's empowerment on women's health status in Chapter 5.

4.4 Variable Definition and Measurement

4.4.1 Indicators of Child Health Status (Dependent Variables)

Different measures have been used in the literature to measure child health status; including self-reported health measures (Idler and Kasl, 1995). However, self-reported measures have inherent problems that can systematically bias findings. The main argument raised against self-reported health measures is that they can be sensitive to respondents' interpretation of what constitute illness. Thus, we use child anthropometric measures, which are deemed objective (Secker and Jeejeebhoy, 2007) and less affected by systematic reporting errors compared to self-reported illness.[39] There is a large body of literature that suggests that anthropometric indicators such as height for age and weight for height are good indicators of child nutrition and health status (de Onis and Blössner, 2003). It is suggested that anthropometric deficits in children are associated with impaired growth, which can result in delayed mental development, poor school performance, reduced intellectual capacity and in some instances death (Mendez and Adair, 1999; de Onis, 2001). Another argument in the child anthropometric literature is that well nourished children of different ethnic backgrounds around the world have basically the same growth patterns (Martorell and Habicht, 1986; Falkner and Tanner, 1986). Thus, it is possible to determine the growth potential of a sample of children by comparing their anthropometric statistics to another sample of children considered as having ideal growth (i.e. a reference group).

There are three well-known anthropometric measures for child nutrition/health in the child health literature. These are height for age (HAZ), weight for height (WHZ) and weight for age (WAZ) z-scores. Height for age and weight for height z-scores measure long-term and short-term health and nutrition respectively. Weight for age combines information on height for age and weight for height into a composite indicator. Consistent with prior studies, we use height for age and weight for height in our analysis, considering that weight for age could be redundant in the presence of the other two (Alderman, 1990; Thomas et al., 1996). The values of these anthropometric measures are calculated by comparing the value of a child in a chosen sample to the median value of a reference population for the same sex divided by the standard deviation of the reference population as in Equation 4.1 below.

[39] Besides possible errors, Self-reported health measures are not available in the DHS dataset.

$$Z = \frac{hw_o - hw_r}{\phi_r} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4.1)$$

Z represents the z-score, hw_o is the observed height or weight of a child for a specific age and sex, hw_r is the median height or weight of a child for the same sex and age from the reference population, whiles ϕ_r is the standard deviation of height and weight for the reference population.

In the case of HAZ, the comparison uses age and height whiles for WHZ it relies on weight and height of the child involved (WHO Multicentre Growth Reference Study Group and de Onis, 2006; O'Donnell et al., 2008). Children with HAZ or WHZ values of less than negative two (-2) are considered as having stunted and wasted growth respectively. Within the child health literature, the National Centre for Health Statistics' (NCHS/WHO) growth reference population, based on United States infants and children has widely been used in calculating child anthropometric indicators. In spite of the popularity of the NCHS/WHO reference population, we use the WHO Multi-Growth Reference Study (WHO-MGRS).[40] The change is informed by the reason that the NCHS/WHO reference population has been criticized as hardly being an appropriate standardization for developing countries (Cole et al., 2000; Wang et al., 2006; de Onis et al., 2006).[41] The authors argue among other things, that it is difficult to use the NCHS/WHO reference for global nutrition comparisons, since its underlying data comes from a single country – the United States. It is therefore unlikely that the NCHS/WHO reference population will represent optimal growth patterns for all age groups from the different regions of the world. They also contend that the high prevalence of obesity in the United States is likely to result in an unhealthy sample used as the reference population.[42] Another limitation of the NCHS/WHO reference population is based on the fact that its reference curves were developed from cross-sectional data. At the core of this limitation is the argument that cross-sectional data

[40] The WHO Multi-Growth Reference study is the result of a comprehensive study commissioned by WHO, due to the debate that the NCHS/WHO reference population does not reflect the realities of child anthropometrics in developing countries. The WHO-MGRS is based on growth data and related information on children from diverse backgrounds, cultural settings and countries (Brazil, Ghana, India, Norway, Oman and USA).

[41] Wang et al., (2006) discusses extensively the data and methodological limitations of the current NCHS/WHO reference population.

[42] The distribution of weights in the NCHS/WHO sample is positively skewed with a high prevalence of overweight (Cole et al., 2000; Wang et al., 2006). For extensive discussions of the data, conceptual and methodological limitation of the NCHS/WHO Reference Population, see (Cole et al., 2000; Wang et al., 2006).

may not be appropriate for monitoring longitudinal growth. It is in the light of these limitations that the WHO-MGRS reference curves were developed in 2006 (WHO Multicentre Growth Reference Study Group and de Onis, 2006). It is argued that the WHO-MGRS reflect the realities of child growth patterns in developing countries, compared to the NCHS/WHO reference population (WHO Multicentre Growth Reference Study Group and de Onis, 2006; de Onis et al., 2006).[43]

Besides using the WHO-MGRS, we alternatively calculate both HAZ and WHZ using the NCHS/WHO reference population and compare the results from the two samples as in Figure 4.1 and 4.2. The graphs suggest that the distribution of HAZ based on WHO-MGRS is comparable to NCHS/WHO for children between ages 6 to about 24 months. However the distribution of HAZ based on the WHO-MGRS reference curve lies below that of the NCHS/WHO for children between the ages of 0-6 months and 24-59 months. Weight for height calculations based on NCHS/WHO tends to be higher for children between the ages of 0 and 9 months compared to MGRS-WHO. After the 9th month, WHZ values based on MGRS-WHO becomes higher than those computed using NCHS/WHO. The difference in the values of HAZ and WHZ for the two reference curves is perhaps a confirmation of the suggestion that using children from the United States may not be an appropriate reference point for children from developing countries.

Although anthropometric measures are seen as objective measures of health status, they are not without limitations. Using data from Bangladesh, Trapp and Menken, (2005) assessed the problems of using anthropometric measures as proxies for child health. Their findings suggest that anthropometric proxies may in some context fail to correspond to poor health and therefore unable to predict expected relationships in terms of current and past morbidities. They also suggest that biological differences in growth by sex may confound easy assessment, with the risk of a poor reference population classifying children who are small but healthy as sick. Data collection constraints such as children with missing information, implausible values of height and weight or in some cases, incomplete information on the age of children may also affect the quality of anthropometric data.

[43] The WHO-MGRS used an all-encompassing prescriptive approach (i.e. how children should grow rather than how they grew) in defining standards for comparison. In addition, the study used both longitudinal and cross-sectional data from multiple countries - Brazil, Ghana, India, Norway, Oman and United States (see WHO Multicentre Growth Reference Study Group and de Onis, 2006).

Notwithstanding these limitations, anthropometric measures have often been used by public health experts to capture nutrition and health status of children, especially in developing countries (Prista et al., 2003). There are several studies in SSA that have used anthropometric measures as indicators of child health and nutritional status (Alderman, 1990;Van de Poel et al., 2007) for Ghana; (Sahn, 1994; Thomas et al., 1996) for Cote d'Iviore, (Bassole, 2007) for Senegal, (Chirwa and Ngalawa, 2008) for Malawi, (Kabubo-Mariara et al., 2009) for Kenya.

4.4.2 Explanatory Variables

Explanatory variables include the main variable of interest; women's empowerment (measured via a composite index), other covariates controlled for and country fixed effects.

4.4.2.1 Composite Women's Empowerment Index (CWEI)

Women's empowerment is measured via a composite index (CWEI) and related sub-indices. The variables used for the computation of the composite index are based on the definition and conceptualization of women's empowerment in Chapter 3. In this definition and conceptualisation, women's empowerment has two components; access to resources and social norms. The social norms component is further disaggregated into 4 sub-dimensions (women's participation in family decision-making, women's perception of violent behaviour by their partners, women's autonomy and societal preferences). Based on the existing gender and women's empowerment literature, proxies or direct indicators that capture the underlying concept of a particular dimension are selected from the DHS data to represent that dimension. The specific variables representing each of the 5 dimensions of CWEI mentioned above are contained in Table AP1-1 in Appendix 1.

The CWEI is computed using a fairly robust and systematic procedure. First, an intra-variable correlation of the variables representing a particular dimension of CWEI is carried out to ensure that all the variables of a particular dimension measure the same underlying concept. The rational for carrying out this test is to ensure that variables not measuring the same underlying concept are not put together. Secondly, the variables of each dimension are standardized and aggregated using polychoric Principal Component Analysis (PCA). This is done to extract a latent variable (first principal component-FPC) that is a weighted (factor loadings) sum of the variables capturing much of the variation in the variables of a particular dimension. The FPC extracted from a dimension is taken as a sub-index for that dimension. Given that the extracted Sub-index is in a standardized form $(1 > \chi > 1)$ it is rescaled to lie between 0 and 1 to make interpretation easier.

Thirdly, the sub-indices of the 5 dimensions (women's participation in family decision-making, women's perception of violent behaviour by their partners, women's autonomy and societal preferences) are aggregated using an unweighted non-linear function of the sub-indices. The use of equal weight is on the fact that we do not have any basis to justify the use of weights either theoretically or practically. In addition, the use of the non-linear function in the aggregation procedure is to ensure that disempowerment in each dimension is punished whiles allowing for partial compensation among sub-indices. The composite index computed is referred to as the composite women's empowerment index (CWEI). Given that the social norms dimension has 4 sub-indices (dimensions), a second composite index is computed from the dimensions on social norms, referred to as the social norms index. It is important to emphasise that this second composite index (social norms index) is mainly for the purposes of estimating the effect of social norms on child health. Thirdly we carry out sensitivity analysis to ascertain the extent to which variation in the underlying assumptions of the composite index (i.e. input indicators, applied weights and aggregation method) results in significant changes in the composite index. The results of the sensitivity test suggest that with the exception of the weighting method (i.e. from polychoric PCA to standard PCA), variations in the underlying assumptions used in computing the CWEI does not change it significantly.

Based on the above procedure, 5 sub-indices, representing 5 dimensions of women's empowerment discussed in Chapter 3 (women's participation in family decision-making, women's perception of violent behaviour by their partners, women's autonomy and societal preferences) were computed. In addition, 2 composite indices; the composite women's empowerment index and the social norms index were also computed. A detailed discussion of the procedure used in calculating the CWEI and its sub-indices together with a thorough discussion of results is attached in Appendix 1.

4.4.2.2 Other Independent Variables

Besides women's empowerment, other covariates known to be correlated with child health (see discussion in Chapter 3) are included in our specifications estimating the effect of women's empowerment on child health. The covariates includes **child characteristics:** child age, gender and size at birth, **household characteristics:** parental education, mother's height, age at first birth, sex of head of household, number of children in household, number of women in household, asset index, **community level characteristics:** type of residence, non-self cluster proportion of households with pipe water and flush toilets and non-self cluster proportion of women who had 4+ antenatal visits and delivered in a health facility. Summary statistics of all the dependent variables together with the other covariates estimated are contained in Table 4.1.

4.5 Econometric Model

4.5.1 Ordinary Least Squares Model

Following from Equation 3.4 and given that the indicators of child health – HAZ and WHZ are in a continuous form, we use Ordinary Least Squares (OLS) to estimate the effect of the composite women's empowerment index (CWEI) and its underlying dimensions on the indicators of child health. Thus, if we denote HAZ and WHZ by N, and assume that N is determined by a set of exogenous covariates, i at the level of the child, m at the level of the mother, h at the household level, k at the level of the community and c the country level. The parameters of the determinants of N can be estimated via Equation 4.2, which is the empirical analog of Equation 3.4 (see Chapter 3). It should be noted that Equation 4.2 is estimated based on the variables available in the DHS dataset. [44]

$$N_{imhkc} = \beta_0 + \beta_1 cwei\_index_{mc} + \beta_2 X_{imhkc} + \beta_3 X_{hc} + \beta_4 X_{kc} + \eta_c + \varepsilon_{imhkc} \quad \text{……….} \ (4.2)$$

The parameter β_1, is a parameter for the composite women's empowerment index and its underlying dimensions (sub-indices). The parameters β_2 , β_3 , β_4 are set of parameters for vectors of explanatory variables, X_{imhkc} at the **child level**: child age, gender and size at birth, X_{hc} at the **household level**: parental education, mother's height,

[44] The DHS dataset does not include data on prices and wages. Though that is available in the Ghana Living Standard Survey (GLSS), we opt for the DHS, considering that the variables used to compute the social norms indices are not available in the GLSS.

age at first birth, sex of head of household, number of children in household, number of women in household, asset index and X_{kc} at the **community level**: type of residence, non-self cluster proportion of households with pipe water and flush toilets and non-self cluster proportion of women who had 4+ antenatal visits and delivered in a health facility. The term η_c is a set of dummies for country fixed effect and ε_{imhkc} is a stochastic random error term.

Equation 4.2 is used on the assumption that model errors are independently and identically distributed (iid). However, the sampling strategy of the DHS (Enumeration area stratification) implies the possibility of intra-cluster correlations at the enumeration area. In addition, several households have 2 or more children. The data suggest that 42% of households have 2 children, 19%, 3 children and 11.3%, 4 children and above. Thus the use of Equation 4.2 may imply consistent estimates of the coefficients but inconsistent estimates of the standard errors. We therefore adjust the standard errors accordingly to correct for possible intra-cluster correlations using households. Although examples exist in the literature where authors have clustered using enumeration areas (Sahn and Stifel, 2002; Smith et al., 2003), we nonetheless use households to ensure that clustering is corrected for not only at the enumeration area but also at the household level where there are multiple children.

4.5.2 Quantile Regression Model (QRM)

Unlike OLS, quantile regression models provide a flexible means by which one can model the differential effect of a regressor on different quantiles of the conditional distribution of the dependent variable for both iid and non iid consistent scenarios (Koenker and Bassett Jr, 1978; Koenker and Machado, 1999; Koenker and Hallock, 2001). Thus, a QRM provides a better characterization of the data and also provides more robust results even in the presence of hectroskedasticity. In the context of this study, the added value in the use of QRM is the possibility to estimate the effect of CWEI at different points in the distribution of HAZ and WHZ. This could help in better policy targeting since one is likely to know the differential effect of a policy variable at different points in the distribution of the dependent variable. Following from Koenker and Basset, (1978) the QRM analog of Equation 4.2 can be written as:

$$N_{imhkc} = \beta_0^{(\tau)} + \beta_1^{(\tau)} cwei\_index_m + \beta_2^{(\tau)} X_{imhkc} + \beta_3^{(\tau)} X_{hc} + \beta_4^{(\tau)} X_{kc} + \eta_c + \varepsilon_{imhkc}^{(\tau)} \quad \text{..... (4.3)}$$

Where 0< τ<1 is that proportion of the population with quantile scores below the quantile at τ. Thus, the conditional τth quantile as below

$$Q^{(\tau)}(y_{ic} / x_i) = \beta_0^{(\tau)} + \beta_1^{(\tau)} cwei\_index_m + \beta_2^{(\tau)} X_{imhkc} + \beta_3^{(\tau)} X_{hc} + \beta_4^{(\tau)} X_{kc} + \eta_c + \varepsilon_{imhkc}^{(\tau)}$$

is computed via the quantile specific parameters: $\beta_0^{(\tau)}$, $\beta_1^{(\tau)}$ and $\beta_2^{(\tau)}$, $\beta_3^{(\tau)}$, $\beta_4^{(\tau)}$ as well as the specific values of the covariates, X_{imhkc}, X_{hc} and X_{kc}. Note also that the distribution of the error term $\varepsilon_{imhkc}^{(\tau)}$ is deemed as unspecified with the τth quantile of the error term conditional on the covariates being zero. Aside τ, the definition of the terms in Equation 4.3 remains the same as in 4.2. To correct for potential hectroskedasticity (intra-cluster correlation) arising from the DHS sampling technique and multiple children per household, we estimate robust standard errors, bootstrapped to 400 replications.[45] Thus, Equation 4.3 is used to estimate the effect of the composite women's empowerment index on HAZ and WHZ at different values of τ, such that the values of τ at which Equation 4.3 is estimated include 10%, 25%, 50%, 75% and 90%.

[45] The choice of 400 replications is based on a comparison of three estimations, where 400, 1,000 and 10,000 replications were used based on 10% of the sample. The results from the three estimations suggest a difference of about 4% between the standard error of the estimation with 400 replications and that of the 10,000 replications. However, the time it takes to fit one model with 10,000 replications is about 15 times the time for the 400 replications. Thus, a decision was made to use 400 replications to save time and computing resources.

4.6 Descriptive Findings

This section discusses the dependent variables in the context of the countries studied, together with some bivariate association between the dependent variables and the main variable of interest (women's empowerment) as well as other covariates. Table 4.2 presents the percentage of stunted and wasted children together with country rankings.[46]

The results in Table 4.2 suggest that Senegal and Ghana have the least percentages of stunted children, with Rwanda and Niger having the highest among the 20 countries studied. In the case of wasted children, Swaziland and Tanzania have the lowest percentage, whiles Burkina Faso and Mali have the highest. Considering that wasting reflects short-term nutrition and episodes of illness in children, a higher percentage may reflect weak health systems. For example, Burkina Faso, Ethiopia, Mali, Niger and Nigeria, members of the bottom five countries on the wasting rankings have some of the worse Maternal Mortality Rates (MMR) in the world, an indicator used to measure the strength of a country's health system (WHO, 2010).[47] On the contrary, a higher prevalence of stunting may not only reflect troubled health systems but also poverty. The bottom 4 countries on the stunting ranking are part of a group of countries in SSA referred to by the International Monetary Fund (IMF) as fragile low-income countries (IMF, 2012). Senegal, which has the lowest prevalence of stunting, has 3.5 times as much stunted children in poorer households compared to the richest households. This may be an indication of higher levels of child health inequality in Senegal.

Besides the absolute values of stunting and wasting, we also discuss their distribution within the sample of each country according to living standards (wealth index). The results in Table 4.3 suggest that in all the countries studied, the poor have a higher

[46] The percentages in Table 4.2 were cross-referenced with official reports from DHS for mainly the English speaking countries and the results are comparable to the figures in Table 4.3. The figures for HAZ and WHZ include Ethiopia (47% and 11%), Malawi (47% and 4%), Sierra Leone (36% and 10%), Swaziland (29% and 3%), Tanzania (38% and 3%), Uganda (38% and 6%), Zambia (45% and 5%), Zimbabwe (29% and 6%) and Ghana (28% and 9%). In addition, we cross-referenced with data from the nutrition database of the World Development Indicators. Based on data availability, the percentages and year of data collection for the respective countries are as follows: Ghana-2008 (28.6%), Burkina Faso-2003 (43.1%), Cameroon-2004 (35.4%), DRC-2007 (45.8%), Ethiopia-2005 (50.7%), Guinea-2005 (39.3%), Malawi-2010 (47.8%), Mali-2006 (38.5%), Mozambique-2003 (47%), Namibia-2007 (29.6%), Niger-2006 (54.8%), Nigeria-2008 (41%), Sierra Leone-2008 (37.4%), Rwanda-2005 (51.7%), Senegal-2005 (20.1%), Swaziland-2006 (29.5%), Tanzania-2004 (44.4%), Uganda-2006 (38.7%), Zambia-2007 (45.8%), Zimbabwe-2006 (35.8%) (World Bank, 2012).

[47] The MMR for Nigeria (840/100,000), Mali (830/100,000), Niger (870/100,000) are above the SSA average of 640/100,000, whiles that of Burkina Faso (560/100,000) and Ethiopia (470/100,000) though lower than the SSA average are still very high compared to figures like 150/100,000 in Namibia and 350/100,000 in Ghana- statistics is taken from (WHO, 2010).

prevalence of stunted and wasted children compared to the rich and richest. In countries like Ghana, Cameroon, Mali, Mozambique, Namibia, Nigeria, Swaziland and Tanzania, the percentage of stunted children in poorer households is over 2 times what you find in the richest households. The distribution of wasting in the population by wealth quantiles is not different from the story on stunting. Considering that in many SSA countries, a relatively large percentage of the population is considered poor, a higher burden of stunting and wasting among the poor could mean several generations of malnourished and unhealthy individuals with it concomitant effect on poverty and growth.[48]

The results of other bivariate associations suggest a positive correlation between the CWEI and HAZ and WHZ respectively (see Figure 4.3 and 4.4). The countries with a higher score on the CWEI tend to have higher mean z-scores for both HAZ and WHZ. What seems to be an exception is Guinea and Cameroon with relatively higher mean z-scores of HAZ and WHZ but lower scores on the CWEI. On child age and sex, the results in Table 4.4 suggest that at all ages, girls are less likely to be stunted or wasted and severely stunted or wasted compared to boys. The results also suggest that children between the ages of 0-23 months are likely to have a lesser percentage of stunted, severely stunted, wasted and severely wasted children compared those in the 24-59 months bracket. The current findings are consistent with that of several authors both within and outside of SSA (Sahn and Stifel, 2002; Smith et al., 2003).

The results of additional bivariate relationships (see Table 4.5) suggests that progressively, bigger size at birth (i.e. below average, average and above and very large) and a situation of no parental education to some education (i.e. primary secondary and tertiary) reduces the likelihood that a child will be stunted or wasted. The results suggest that investment in women’s education at every level yields a higher return compared to that of the partner. Female household headship and residing in an urban area are suggested to be associated with lower percentages of stunted and wasted children. The relationship between household headship and child health is unclear in the health literature. Although the current finding is not surprising, there are instances where female-headed households have been found to be poorer compared to their male counterparts (Appleton, 1996; Buvinić and Gupta, 1997; Haidar and Kogi-Makau,

[48] It is estimated that about half of SSA’s population are poor (based on $1 a day threshold). Besides, SSA has consistently had the least score on the HDI since the 1990’s with the HDI of some SSA countries even deteriorating over the years (UNDP, 2005; 2011).

2009), leading to poor household health status. These bivariate findings are important in the sense that it gives first hand information on determinants of child HAZ and WHZ. However, given that the relationships are mainly bivariate, it may exclude the effect of other variables that equally affect child HAZ and WHZ. Thus we extend the analysis to accommodate multivariate relationships.

4.7 Multivariate Regression Results

In pursuance of the objectives of this chapter, several multivariate regression results examining the effect of (1) the composite women's empowerment index (2) differential effect of women's access to resources and social norms and (3) Child age cohort and quantile specific effect of CWEI (4) dimensions of the composite women's empowerment index on child health.

4.7.1 Effect of Women's Empowerment on Children's Health Status

Table 4.6 present results on the effect of CWEI on child health (HAZ and WHZ). The results suggest that CWEI is significantly positively correlated with both HAZ ($p<0.01$) and WHZ ($p<0.05$).

Secondly, we test the preposition that social norms are as important as women's access to resources in determining child health. To do this, we first estimate a model with the social norms index as one of the covariates (see model I in Table 4.7). The results show that the social norms index is significantly positively correlated with both HAZ and WHZ. We then include the women's access to resources index and re-estimate the model (see model II in Table 4.7). The social norms index remains significant albeit that the coefficient drops by 4.3% in the HAZ model but increases by 2.2% in the WHZ model. The significance of the social norms index after adjusting for women's access to resources and other covariates suggest that social norms is an important component of women's empowerment and an essential determinant of child health. In addition, the reduction in the coefficient on the social norms index after adjusting for women's access to resources suggest that social norms was previously (i.e. in model I) capturing part of the effect of women's access to resources (i.e. 4.3%). The current results support the argument that the broader institutional context of norms constitutes an essential aspect of women's empowerment (Folbre, 1994; Agarwal, 1997; Murthy, 1998; Jütting and Morrisson, 2005; Mabsout and van Staveren, 2010; Doss, 2011). Thus, over concentration on access to resources may mean ignoring other equally important dimensions of women's empowerment.

In addition, the results in Table 4.7 indicate that in the HAZ models, women's access to resources is significantly positive, with a coefficient more than 1.5 times that of social norms. In the case of the WHZ models, the coefficient of women's access to resources is significantly negative and about 13% lower than the corresponding coefficient of the social norms index. This result suggests that women's access to resources plays an independent role in improving long-term child health (see for example, Haddad and Hoddinott, 1994; Quisumbing and Maluccio, 2003; Duflo, 2003). This is not surprising, considering that women's access to cash, participation in the labour market and education (components of the access to resources index) are all essential inputs in child health production.

It is important to note that it may take time for access to these resources to reflect on child health, hence the positive effect on long-term child health (HAZ). In the case of short-term child health (WHZ), the results suggest that empowering women through access to cash, participation in the labour market and longer periods of education may be detrimental to the health of children in the short-run. As already indicated, it takes time for returns on these resources to manifest in child health status. Besides, participation in the labour market and long periods of education (formal or informal) may mean limited time for childcare, which can have negative implications on child health in the short term. Indeed, limited time for childcare could also have negative impact on long-term child health status. Even where child careers a brought in to help, it may not be possible for them to provide the type of care biological mothers of children would have provided (e.g. breastfeeding, bonding, nurturing, psycho-social care etc) thereby compromising the health of children especially in the short-term (Dodd, 2005; House, 2007; Chen and Li, 2009).

For robustness, we replace the country dummies with a real variable (i.e. 20 year average of health expenditure per capita and GNI per capita). The results in Table AP2-1 and AP2-2 in Appendix 2 are similar to the results in Table 4.6 and 4.7, except that the effect of CWEI is no longer significant in the HAZ models. Judging from the results in Table AP2-2, the insignificance of CWEI in the HAZ models could be attributed to the insignificance of social norms. This may be an indication that for long-term child health, general welfare in the country (GNI per capita) and in particular, investment in the health sector (health expenditure per capita) may be more important than the effect of improvements in social norms.

Thirdly, the effect of CWEI on HAZ and WHZ is estimated via different child age cohorts. The results (see Tables 4.8 for HAZ and 4.9 for WHZ) suggest that CWEI as a determinant of HAZ is significant mainly for children between the ages of 24-35 and 36-47 months. In addition, the coefficients of CWEI for the different age cohorts are highest at age 24-35 and 36-47 months. In the case of WHZ, the coefficients of CWEI are significant for children aged 0-11, 12-23 and 48-59 months. Juxtaposing the current results on the results in Table 4.6, suggest that the effect of CWEI on child health is higher and significant in age ranges where child health status is likely to be poor. Although this does not seem to be the case for the 24-35 months age range in the WHZ model. A possible explanation for the HAZ results may well be that after 23 months, children might have been exposed to complimentary feeding and therefore a higher possibility of being exposed to disease causing risk factors. Beside the need for resources to treat episodes of illnesses, complimentary feeding may require additional resources, making the effect of CWEI significant in this age range. The insignificance of CWEI at age 48-59 month in the HAZ model may be due to the fact that children in this age group could be deemed as being out of the risk continuum. Several authors have found mean HAZ to be high in the first 12 months and getting to a child's fifth birthday (Sahn, 1994; Smith et al., 2003; Pongou et al., 2006; Hong, 2007; Linnemayr et al., 2008).

Fourthly, the effect CWEI on HAZ and WHZ is estimated at different quantiles in the distribution of HAZ and WHZ. The results in Table 4.10 suggest a positive and significant correlation between CWEI and HAZ within the 25th to 90th quantile. In the WHZ models (see Table 4.11) the coefficient of CWEI is negative at the 10th and 25th quantiles, but changes to positive at the 50th, 75th and 90th quantiles. The results also suggest an increase in the size of the coefficients from lower to higher quantiles. For example, the coefficient of CWEI in the HAZ models increases by 17% (25th to 50th quantile), 37% (50th to 75th quantile) and 46% (75th to 90th quantile). For the WHZ models, the increase in the size of the coefficient ranges from 57% (50th to 75th quantile) to 10.8% (75th to 90th quantile). This could mean that efforts at empowering women are unlikely to yield the desired results among children with very poor health status.

However, such an explanation may be too simplistic. It may well be that children with poor health status come from the poorest of homes (see Table 4.3) and associated with minimal opportunities (e.g. parental education, access to pipe water and good sanitation). Thus, interventions to improve women's power alone may not be sufficient to illicit the desired outcomes in child health and not necessarily the fact that it does not influence children with poorer health status. Although we have not seen any paper estimating the effect of women's empowerment at different quantiles in the distribution of HAZ and WHZ, the interpretation of the current results seems reasonable.

In the fifth stage, we decompose CWEI into its components sub-indices (women's participation in family decisions, perception of violent behaviour by partners, autonomy, societal preferences and women's access to resources) and estimate their individual effect on HAZ and WHZ. The results in Tables 4.12 and 4.13 suggest that women's participation in family decisions, perception of violent behaviour by partners and access to resources are significantly correlated with HAZ and WHZ. All the significant coefficients are positive except women's access to resources, which is significantly negatively correlated with WHZ. As already explained, investment in child health from the gains of women's access to resources (access to cash, employment and long periods of education) may take time to reflect in child health outcomes. Such delayed effect could mean compromised child health in the short-term. Hence the negative effect on WHZ but a positive effect on HAZ.

On the contrary, interventions to empower women, which address the broader institutional context of norms, may have immediate or delayed effect depending on the type of norms. Where such norms are of a soft (family) orientation, they are likely to have immediate effect. If the norms are of a hard orientation (societal) the effect is likely to delay considering that such norms take time to change (North, 1990; Albiston, 2005). It is therefore not surprising that dimensions such as participation in family decisions and violent behaviour by partners, which have both soft and hard orientations are positively correlated with HAZ and WHZ, whiles women's autonomy and societal preferences computed mainly from hard variable are not significantly correlated with child health status.

Finally, we consider the fact that indices have the capacity to mask the real effect of variables making up the index. Thus, we decompose the sub-indices into their underlying variables and estimate their individual effect on HAZ and WHZ. The results in Table 4.14 suggest that women's participation in family decisions positively and significantly affect HAZ and WHZ, if such decisions are taken in conjunction with husband/partner compared to when the decision is taken by someone else or the woman alone. This confirms the argument that interventions at empowering women should not be directed towards women alone. Evidence from several studies in recent times have suggested that empowering women alone may not necessarily elicit the right policy outcomes (Allendorf, 2007b; Patel et al., 2007; De Mel et al., 2009; Fafchamps et al., 2011). Opposition to violent behaviour by partners is also significantly positively associated with HAZ and WHZ, confirming the earlier explanation that dimensions that have both soft and hard orientations are likely to have a positive impact on both long and short-term child health.

Although the results in Tables 4.12 and 4.13 suggest that two sub-indices (women's autonomy and societal preferences) are not significantly correlated with child health, using the underlying variables suggest otherwise. Under women's autonomy, women who have no problem either asking for permission to seek medical help or seeking medical help from a female provider are positively correlated with WHZ. Surprisingly, indifference to the use of female provided health services is negatively correlated with HAZ. Under societal preferences, number of wives is negatively correlated with HAZ whiles age at first marriage is positively correlated with WHZ. The results of the underlying variables for women's autonomy and societal preferences are consistent with conventional wisdom. Women who have no problem asking for permission to seek medical help or using non-female medical providers are likely to rely on such freedoms to better the health of their children as well. In the same vein, age at first marriage is likely to affect child health through its effect on pregnancy and delivery related complications associated with women who give birth at a very young age.

On women's access to resources, the results suggest that a working woman, earning only cash or a combination of cash and in-kind, is significantly positively correlated with HAZ. On the contrary, earning only cash negatively affects WHZ, whiles couples education difference is positively associated with WHZ. The result of the individual variables on women's access to resources is consistent with the results of its associated sub-index (see Tables 4.7, 4.12 and 4.13). Thus the explanation already given above suffices for the current results.

In addition to the above estimations, we assume that the sub-regional trends identified with CWEI and its two dimensions (social norms and access to resources – see Apendix 1 Table AP1-10 and AP1-11) may mean sub-regional differences in their effect on child health. Thus, we pool the data on sub-regional basis and use that to re-estimate the effect of CWEI and its two dimensions (social norms and women's access to resources) on child health status.[49] The results in Table 4.15 suggest that in some instances, the sub-regional estimates are not entirely different from results based on the pooled data for 20 countries. For example, in all the three sub-regions, women's access to resources is significantly correlated with child health status as in the case of the 20 country pooled data in Table 4.7. However, the effect of social norms on child health status differs between sub-regions. Whereas social norms is significantly positively correlated with HAZ and WHZ respectively in West Africa, the effect is negative in Southern Africa, with the estimates for WHZ being significant. In East and Central Africa, the effect of social norms is positive on HAZ but negative on WHZ. It is also interesting to note that the West African estimates have more significant coefficients compared to East and Central Africa and Southern Africa. This may be an indication that women's empowerment constitute a far more important determinant of child health in West Africa compared to the other two sub-regions.

It has been argued that the effect of women's empowerment may depend on the context within which women exercise agency and or the outcome variable in question (Kabeer, 1999; Kishor, 2000a; Sen and Batliwala, 2000; Malhotra et al., 2002). Thus, the sub-regional differences in the effect of social norms on child health may be a reflection of this argument. Notwithstanding, the negative effect of social norms on child health in Southern Africa is surprising though not implausible. The results in Table AP1-11 in Appendix 1 suggest that, women from Southern African countries have the highest score on the social norms dimension of women's empowerment, followed by East and Central Africa and West Africa. Thus, one expects social norms to be positively and significantly correlated with child health in Southern Africa.
As per the results in Table AP1-10 and AP1-11 in Appendix 1 (see also discussion in section 6 of Appendix 1) women in Southern Africa are more likely to contest social norms that are detrimental to their well being compared to their counterparts in East and

[49] The 20 countries used for this study are divided into three sub-regions; **West Africa** (Burkina Faso, Ghana, Guinea, Mali, Niger, Nigeria, Sierra Leone and Senegal), **East and Central Africa** (Cameroon, Democratic Republic of Congo-DRC, Ethiopia, Rwanda, Tanzania, Uganda) and **Sothern Africa** (Malawi, Mozambique, Namibia, Swaziland, Zambia and Zimbabwe).

Central Africa and West Africa. Such contestations may mean the need for men to give up certain areas of control with the possibility to trigger power struggles both within and outside of the household. It has been argued that in societies such as SSA, where gender relations are rooted in unjust patriarchal gender stereotypes, such power struggles could mean household dissolutions and or dysfunctional behaviour (physical and psychological abuse) from men with possible negative implications on the health of children (Sen and Batliwala, 2000; Campbell, 2002; Rivara et al., 2007; Sarkar, 2008; Chopra et al., 2009). Thus the negative correlation between social norms and child health in Southern Africa may be one of the negative consequences of women's exercise of agency. It is important to admit that the negative effect of social norms on child health in Southern Africa may be due to other reason outside the scope of this study.[50]

4.7.2 Effect of Other Independent Variables on Children's Health Status

In this sub-section, we discuss the effect of other covariates adjusted for in the child health estimates. The discussion is based on the results in Table 4.6. In addition, we also discuss the differential effect of each of the covariates based on the age cohorts (see Tables 4.8 and 4.9) and quantile (see Table 4.10 and 4.11) estimation. The rest of the discussions are as follows:

Child Age - Compared to the reference point (0-11 months) all reported age dummies showed a negative correlation with HAZ (see Table 4.6). The negative effect increases with age and peaks around age 36-47 months and thereafter reduces, giving a U-shaped relationship. Several authors have found a negative correlation between child age and long-term child health (Chirwa and Ngalawa, 2008) for Malawi, (Kabubo-Mariara et al., 2009) for Kenya. Using cross-country datasets, Smith et al., (2003) also found a negative correlation between child age dummies and long-term child nutrition. A plausible explanation for the U-shaped relationship may be due to weaning from breastfeeding as children grow (i.e. between 12 – 24 months).

[50] We additionally estimated the effect of women's empowerment on child health based on country level data. Though it reveals inter-country differences, the trend is not entirely different from the results based on sub-regional data. Given that the trend in the country level estimations is not entirely different from the sub-regional estimates and that the focus of the chapter is not exploring inter-country differences, we have not included the results of the country level estimations. The results are however available on request.

Weaning from breast milk could lead to deterioration in children's nutritional status and make them susceptible to infections and diseases (Sahn, 1994; Kabubo-Mariara et al., 2009). Weaning from breast milk could also mean the introduction of complimentary feeding which could further compromise the nutrition of under-five children especially if the right quantity and formula is not used (Brakohiapa et al., 1988; Van de Poel et al., 2007). On the contrary, the correlation with WHZ is positive for children above 23 months. There are equally other researchers who have found a positive correlation between child age and child health. Shroff et al., (2009) found a positive correlation between child age and stunting in India. Analysis of DHS data from Bangladesh also reveals a positive correlation between child age and stunting (Bhagowalia et al., 2010).

Child Sex – The results suggest that the female child is more likely to have better long and short-term health status compared to the boy child. Generally, the literature suggests that female children tend to have better health than boys (Sahn, 1994; Smith et al., 2003; Kabubo-Mariara et al., 2009). The multivariate results confirm the bivariate results in Table 4.4. Even where children are segregated into different age cohorts, female children remain more likely to have better long-term health status than boys (see Table 4.8). However, this situation changes, as girls above 35 months are less likely to have better short-term health compared to boys (see Table 4.9). It may well be that the resilience of the girl child to episodes of illness is mainly biological. Thus, as children grow and parents begin to discriminate against the girl child, her nutritional status and resistance to diseases get compromised, making her more susceptible to illness compared to the boy child. Turning to the quantiles, the girl child is still more likely to have a better HAZ compared to the boy child, with the size of the coefficient reducing as one moves away from children with very low HAZ values (10^{th} quantile to 25^{th}, 50^{th} and 75^{th}). This trend is similar in the case of WHZ except that girls in the 75^{th} and 90^{th} percentile are less likely to have better WHZ compared to the boy child.

Size at Birth - The results suggest that as birth size improves from below average to average and above and from average and above to above average, so does child health both in the long and short-term. The result does not change even where the models are estimated based on child age cohorts and different quantiles in the distribution of HAZ and WHZ. The coefficients in all cases are statistically significant at ($p<0.01$). Hong (2007), using the 2003 DHS data in Ghana, found a positive relationship between child size at birth and long-term child nutrition.

Parental Education - All levels of women's education (primary, secondary and tertiary) is positively correlated with HAZ and WHZ. The same is also true for partner's education, but only with respect to WHZ. The result is consistent with the long held view that education is an important correlate of child health status. Educated parents are argued to be more likely to (1) be efficient in the production of childcare via superior childcare practices and better standards of hygiene (2) achieve higher allocative efficiency through the choice of better health inputs (3) adopt better behaviours that may enhance their own health and that of their children (Rosenweig and Schultz, 1982; 1983; Behrman and Deolalikar, 1988;Sahn, 1994; Strauss and Thomas, 1995; Smith et al., 2003; Wagstaff et al., 2003; Christiaensen and Alderman, 2004). The results also suggest that the higher the level of education the higher the returns to child health (see Table 4.6- the coefficients on education increases with the level of education). This finding may be explained in terms of the possible correlation between education, labour Market participation, household wealth and other socioeconomic characteristics (Wolfe and Behrman, 1987; Desai and Alva, 1998). Thus, highly educated parents are more likely to have access to the required resources for childcare and nutrition. Hence, the progressively higher effect of education on child health at each higher level of education.

Using the age cohorts, women's education continues to influence child health positively, except that for children 0-11 months, the effect of education on HAZ is insignificant at each level of women's education. From the quantile estimates, parental education continues to be a positive predictor of child health. However, this influence becomes weak at the 75th and 90th quantile. For example, the effect of women's education on HAZ and WHZ is insignificant or negative at the 90th quantile. This may imply that returns on women's education may be minimal or possibly negative among children who already have a better health status. Although the results in Table 4.6 suggest that partner's education is not significantly correlated with HAZ, the quantile results in Table 4.12 suggest the opposite. For example, partner's primary and secondary education is significantly positively correlated with child health status at the 10th and 25th quantiles of the HAZ distribution. The results in Table 4.6 and 4.11 confirms the fact that treating children as a homogenous group has the possibility of concealing the effect of several policy relevant covariates (Sahn and Alderman, 1997).

Mother's Height - As expected and consistent with prior studies in SSA, mother's height is positively correlated with both HAZ and WHZ (see Table 4.6). Using the age cohorts and quantile estimates (see Tables 4.8 to 4.11) women's height remains a significant predictor of child health but mainly in the HAZ models. Mother's height is expected to capture mother's genetic and phenotypic influence on child health. Thus, the insignificance of mother's height in the WHZ models may be due to the fact that the effect of geno and phenotypes on child health may be realized through the child's life course. Prior studies in Ghana, Cote de'Iviore, Kenya, India and Pakistan have found a positive association between mother's height and child nutrition and health status (Sahn, 1994; Lavy et al., 1996; Kabubo-Mariara et al., 2009; Subramanian et al., 2009).

Number of Children in Households - Number of children under-five years in a household is significantly negatively correlated with child health. In the age cohorts estimates, the effect of number of children in the household on child health continues to remain negative. However the coefficients are insignificant for children 0-11 months in the HAZ model and 48-59 months in the WHZ model. In addition, the size of the coefficient in the HAZ model increases as age increases, meaning that having more grown up children in the household has a far more negative implication on child health compared to younger children. Generally, one expects that increasing number of under-five children in a household will overcrowd household resources especially in poorer households. The implication could be reduced ability of households to provide adequate nutrition for the increasing child members, with adverse implications for their nutrition and health. Additionally, increasing number of under-five children could also mean reduced attention in-terms of childcare, with consequential negative implications for their long-term nutrition and health. The significantly negative correlation is therefore consistent with conventional thinking. Using Living Standard Survey (LSS) data from Cote d'Ivoire, Sahn (1994) found a negative correlation between number of children between 0-5 years and child height for age. Other studies using household size have also found a negative correlation with height for age (Smith et al., 2003; Kabubo-Mariara et al., 2009).

Number of Adult Women in the Household - The results (see Table 4.6) suggest a positive correlation between the number of adult women in the household and child health. In the age cohort estimations, the effect of number of adult women in the household on HAZ is significant if the child is 24 months or above (see Table 4.8). A similar trend is found in the quantile-based estimates, as the effect of number of adult women in the household on HAZ is no longer significant for children in the 75th and 90th quantiles (see Table 4.10). The positive significant correlation is not unexpected. Additional women in the household could substitute for child health production by the mother. This may make it possible for children to have access to appropriate care even in the absence of their biological mothers, with possible positive implications on child nutrition and health. Also, the presence of additional women in the household could create some form of advantage in terms of scale economies in household health production. Such scale economies may eventually benefit children in the household.

Using DHS data from South Asia, SSA and LAC, Smith et al., (2003) found a negative correlation between the percentage of females, 15-55 years of age and child health (HAZ and WHZ) for South Asia but a positive correlation for SSA and LAC. Christiaensen and Alderman (2004) also found a positive correlation between number of women 16-65 years and child height for age in Ethiopia. The age cohort and quantile estimates point to the fact that additional older women in the household will not yield significant returns in long-term child health outcomes if children are below 24 months of age or are in the upper 75% of the HAZ distribution.

Household Wealth - Consistent with expectations, household welfare (wealth index) is significantly positively correlated with HAZ but not WHZ (see Table 4.6).[51] Using the age cohorts and quntile estimates, wealth index remains significantly positively correlated with HAZ, with an increasing effect with age (see Table 4.8 and 4.10). Contrary to the results in Table 4.6, wealth index is significantly positively correlated with WHZ but only for age cohorts 12-23 and 24-35 months. It is not exactly clear why wealth index becomes significantly positive with WHZ at these age ranges. The results are nonetheless important by bringing to the fore, the importance of household wealth in predicting WHZ as compared to the results in Table 4.6. This also emphasizes the point that it may be erroneous to treat children under five as a homogenous group. Overall, the results suggest that increasing household wealth delivers improvements in children's health status. Asset indices have been used extensively in the child health literature, with findings showing a positive relationship with child health (see: Sahn and Stifel, 2003a; Wagstaff and Watanabe, 2003; Smith et al., 2003; Pongou et al., 2006; Van de

[51] The estimate for WHZ is also positive but not significant. Household welafare is proxied by an asset index (Filmer and Pritchett, 2001; Sahn and Stifel, 2003a).

Poel et al., 2007; Kabubo-Mariara et al., 2009). The current result is therefore a confirmation of prior findings.

Good Quality Water and Toilet Facilities- The results (see Table 4.6) suggest that proportion of households in a cluster with pipe water is positively correlated with child health but not significant in the case of WHZ. The cluster proportion of households with flush toilets is negatively correlated with child health though not significant. The importance of environmental hygiene and sanitation to producing improved child health has been emphasized both in policy and academic documents. For example, the UNICEF framework for child nutritional determinants, argues the lack of access to good water and sanitation as an underlying cause of child malnutrition, disability and death. Access to good quality water has the advantage of preventing infections and diseases in children. Prior studies have found a positive relationship between access to good water and sanitation and child health (Strauss, 1990; Lavy et al., 1996; Smith et al., 2003; Pongou et al., 2006; Bassole, 2007).

Although the negative correlation between cluster proportion of flush toilet and HAZ is counter intuitive, it is not entirely unexpected. Other authors have found similar results (Lawson and Appleton, 2007; Van de Poel et al., 2007; Kabubo-Mariara et al., 2009). In the case of Lawson and Appleton, they argue that the negative effect could be due to the poor maintenance of such sanitation infrastructure. This explanation sounds reasonable in that poorly maintained toilets facilities could create sanitation and hygiene challenges that can further compromise the health of children. In the age-based estimates, the positive effect of pipe-borne water and flush toilet in the neighbourhood on HAZ is significant among children aged 24-35 and 36 to 47 months. In the quantile estimates, the effect of pipe water in the neighbourhood on HAZ reduces as child health improves, with the 75^{th} and 90^{th} quantiles being insignificant.

Availability and Access to Health Services – The two proxies capturing availability and accessibility of health services (non-self cluster proportion of women with 4+ antenatal visits and delivery in a health facility) are significantly positively correlated with child health (see Table 4.6).[52] This is consistent with several studies in SSA that have found a positive correlation between proxies of health services availability and

[52] Note that the correlation between non-cluster proportion of women with four or more antenatal visits and WHZ is insignificant.

accessibility and child HAZ (Sahn, 1994; Lavy et al., 1996; Thomas et al., 1996; Sahn and Stifel, 2002; Christiaensen and Alderman, 2004; Bassole, 2007; Kabubo-Mariara et al., 2009).[53]

From the quantile estimates (see Tables 4.10 and 4.11), health services availability and accessibility seem to be more important among children in the lower 75% of the HAZ and WHZ distribution compared to those in the top 25%. The reason for this may be straight forward. Children in the top 25% of the HAZ distribution are likely to be very healthy and are therefore unlikely to use health services. For the age cohorts, health services availability and accessibility variables are significant among children between 12 to 47 months. As already explained, after 12 months, most children would have been weaned from breastfeeding or started complimentary feeding. The period after 12 months also sees increased interaction between children and their environment. The combination of increased exposure and complimentary feeding could expose children to more risk such as infections and illnesses. From 4 years and above, children begin to develop stronger immune systems and resistance to diseases. Thus, episodes of infections and illnesses may reduce at this point. This may explain the reason why health services variables are not significant among 0-11 and 48-59 months old cohorts.

4.7.3 Robustness Checks

In the absence of any endogenous covariate in our specifications, using OLS yields consistent estimates. Arguably, there is a cause to suspect that CWEI could be endogenous. Intuitively, it can be argued that unobservable or immeasurable family attributes of women in the sample are simultaneously correlated with CWEI and child health. For instance, a wife's self-motivation, ability and self-determination may exert some form of influence on household preferences and decision-making. In addition, an enlightened and liberal minded husband/partner, may be more tolerant and allow the wife more family decision-making space and autonomy, whiles investing to improve the health of his children. In such a situation, the unobservable/immeasurable family effect will positively affect both women's empowerment and child health (HAZ and WHZ), therefore making CWEI endogenous. Thus we decide to test statistically, whether CWEI is endogenous as suspected. Within the literature, the standard approach to test

[53] The studies using different health availability and accessibility proxies referred to in the text were conducted in Ghana, Cote de' Iviore, Sub-Saharan Africa, Ethiopia, Senegal, and Kenya. Some of the proxies used include distance from nearest health facility, availability of transportation to health facility, health infrastructure, health supplies and prices of health services.

for endogeneity of a covariate is through an instrumental variable approach. The challenge however, is identifying appropriate and valid instruments from the DHS datasets. The paucity of instruments in the DHS dataset has meant that several studies using it have not been able to control for endogeneity (Gage, 1995; Hindin, 2000b; Smith et al., 2003; Allendorf, 2007b; Bhagowalia et al., 2010). Nonetheless, we use existing variables to construct 3 variables as instrument for CWEI.

The variables are (1) couple's age ratio, (2) non-self cluster proportion of women in monogamous marriages, (3) non-self cluster differences in deaths among girls and boys. The validity test in Table AP2-10 in Appendix 2 suggests that all the three instruments are valid for HAZ but only one (couples age ratio) is valid for WHZ. The decision to use non-self cluster versions of 2 of the variables proposed as instruments is on the basis that at the individual level, the variables could be endogenous as already explained in Chapter 3.

Within the bargaining literature, several authors have used couple's age difference as a proxy for women's bargaining power (Thomas, 1994; Abadian, 1996; Kritz et al., 2000; Smith et al., 2003). The argument in support of couple's age difference is that the higher a woman's age compared to her husband/partner, the more likely it is that she will be able to assert her preferences in household decisions (i.e. posses more bargaining power/empowerment). On the other hand, monogamous marriages in the neighbourhood has been argued to be correlated with women's relative status in the household via neighbourhood externalities such as role models and community values and norms regarding gender roles (Ahmed, 2006). It is possible that women in monogamous marriages will not suffer the challenges normally faced by women in polygamous marriages. For example, women in polygamous marriages could suffer discrimination and suppression through competition for resources in marriage, as well as the adverse interpretations of community values and norms regarding gender roles.

Death differences among girls and boys may be the results of systematic household resource allocation decisions in favour of one gender. In such a situation, members of the gender discriminated against could eventually become disempowered. Evidence from SSA and South Asia suggest that excess female mortality is as a result of discrimination in several areas against girls (Gupta, 1987; Muhuri and Preston, 1991;

Arnold, 1992; 1997; Arnold et al., 1998). Thus, the 3 variables could be correlated with CWEI.

Based on the 3 instruments above, we use the efficient two-step General Method of Moment (GMM) estimator to carry out several tests.[54] The choice of a GMM estimator is based on the fact that it generates efficient estimates of the coefficients and consistent estimates of the standard errors compared with other IV estimators such as the Two-Stage Least Squares (2SLS) (Baum et al., 2007). Secondly, compared to 2SLS, the GMM estimator makes it possible to calculate consistent and efficient estimates of the standard errors in the presence of intra-cluster correlations. Although estimates of the coefficients and standard errors are not the focus of the test being carried out, they nonetheless have effect on them, hence the choice of a GMM estimator over 2SLS.

The results of the tests (see Table AP2-11) suggest that the overidentification test, which is a test of the null hypothesis that instruments (in the case of more instruments than endogenous regressors) are valid and that the instruments are uncorrelated with the error term in the second stage, is not rejected. In addition, the Crag-Donald F-statisitc and first stage F statistics, which checks for the strength of instruments is above the threshold of 10, below which instruments are deemed to be weak (Staiger and Stock, 1997).[55] Together, the 2 test above suggest that the instruments chosen for CWEI are valid and not weak. Finally, we test for the exogeneity of CWEI, using the Durbin-Wu-Hauseman test of the null hypothesis that CWEI is exogenous. The result does not reject the null hypothesis that CWEI is exogenous at $p<0.05$, for both the HAZ and WHZ specifications (see see Table AP2-11). This means that CWEI may not be endogenous as assumed. Indeed, the failure to reject the null of exogeneity supports the OLS results already discussed, given that the results are largely consistent with the existing literature. Even where the 3 instruments are used to estimate the effect of CWEI on HAZ and WHZ via an IV procedure (two-step GMM) the results do not change substantially from the OLS results. This further supports the use of OLS, considering

[54] The user-written Stata command, ivreg2, developed by Baum et al., (2007) is used to conduct the IV test. All estimations were carried out using Stata 11.2 (StataCorp, 2009)
[55] Staiger and Stock (1997) argues that an F-statistic of less than 10 indicates the existence of weak instruments.

that it is simpler and more efficient than an IV estimator, especially when the supposed endogenous regressor is not endogenous (Cameron and Trivedi, 2009).[56]

4.8 Policy Discussions

The results in this chapter confirm existing studies that have argued women's empowerment as an important correlate of household health. Most importantly, it emphasise the point that social norms are just as important as access to resources in the women's empowerment discourse. In many developing countries, interventions to empower women have been motivated by findings in the women's empowerment literature. Considering that access to resources (economic-based proxies) dominate the indicators used to measure women's empowerment, resulting interventions have mostly emphasized women's access to resources. For example, interventions such as giving microcredit to women's groups as in the case of the Grameen Bank in Bangladesh, addressing land and property rights of women in India and Ghana, improving educational opportunities for women, especially gender parity in primary and secondary school enrollment and completion, promoting gender equality in national leadership positions (e.g. percentage of women in parliament or who are ministers) as in the case Rwanda etc.

As important as these interventions are, the difficulty however is that they are implemented in the context of prevailing social norms/institutions that often favour men. The success of these policies in terms of empowering women may therefore be constrained by the dynamics of prevailing social norms. For example, in Nepal, Allendorf, (2007a) finds that women's land right is correlated with their level of empowerment and consequently child health. However, the author argues that using women's ownership of land to improve their level of empowerment could be difficult due to land fragmentation and opposition to women's inheritance of land. The author rather advocates for a policy that helps to move women out of the subsistence economy whiles the issue of land rights is pursued as a long-term agenda. In southern Ghana, women's inability to fallow their plot (a practice that explains gender yield differences)

[56] Documentation accompanying the DHS data advices the use of sample weights in the calculation of descriptive statistics (i.e. mean median percentages etc), but not regression coefficients (Rutstein and Rojas, 2006). Thus, all descriptive statistics are calculated using sample weights. On the calculation of regression coefficients, we estimated two sets of regressions, one with and the other without sample weights. The results suggested that the outcomes are not significantly different. Thus, the discussion in section 4.6 is based on regression coefficients estimated without sample weights. The results with sample weights are not presented but are available upon request.

is said to be rooted in the politics of power in the village, which is often defined by existing social institutions.

In the context of the above discussion, we argue that the findings of this study do not only emphasise the importance of social norms/institutions as an essential and integral part of women's empowerment, but also its instrumental value in improving development outcomes. Thus, we advocate for a policy shift from concentration on policy interventions that addresses only women's access to resources, to a holistic framework that equally address social norms/institutions likely to constrain the outcome of women's economic empowerment policies.

Having said this, another challenge is how policy makers negotiate a right balance in terms of where to place emphasis in other to improve development outcomes such as child health. Should emphasis be placed on social norms, women's access to resources or variables that have traditionally been identified as influencing child health outcomes? A simplistic way to address this question is to rely on the relative return on investment in any of the three mentioned areas (access to resources, social norms and traditional variables). Accordingly, we use the regression results in this chapter to perform a simple simulation exercise, to assess the effect of improvement in the three areas on our outcome variable- child health.

To do this, we re-estimate the models examining the effect of CWEI and its sub-indices on HAZ and WHZ. In each case, the dependent variable (HAZ or WHZ) is predicted and its mean at different thresholds of selected independent variables calculated. Secondly, we use the WHO threshold to categorise HAZ and WHZ into binary variables (i.e. stunting and wasting respectively- see Section 4.4.1). The above models are re-estimated using stunting and wasting as dependent variables. The probability of having either stunted or wasted growth is then calculated for each child in the sample. Finally, the mean probability of stunting or wasting at different thresholds of selected independent variables is calculated. The policy implications of a given independent variable is determined by examining the percentage change in the mean of the predicted dependent variable as one moves from a lower to a higher threshold on the independent variable. It is important to caution that this exercise does not seek to suggest causality between the selected independent variables and child health, considering possible identification challenge with the estimated models. Notwithstanding, the results from the simulation is informative, in that it gives the reader an idea of the extent to which improvement in the selected independent variables will affect child health status.

As per the results in Tables 4.16A and 4.16B, the mean of the predicted dependent variables (HAZ or WHZ and stunting or wasting) is calculated for different quantiles of CWEI and its sub-indices.[57] The results suggest that the predicted mean HAZ of children whose mothers are in the middle 20% and top 20% of the CWEI distribution is 3.5% and 26.1% respectively higher than children whose mothers are in the lowest 20% of the CWEI distribution. With respect to WHZ, children of women in the lowest 20% of the CWEI distribution have mean predicted WHZ, 46% lower than children of women in the middle 20% of CWEI and 96% lower than children of women in the top 20% of the CWEI distribution. The trend is almost the same using stunting and wasting as dependent variables, except that the percentage change is higher.

The sub-indices also follow a similar trend, except that changes in social norms seem to have a higher impact on child health compared to improvements in women's access to resources. For example, a movement from the lowest 20% to the top 20% on the social norms index, increases predicted mean HAZ by 16% compared to 8.7% on the access to resources index. For the same level of movement, predicted mean WHZ improves by 96.3% compared to a deterioration of 373.8% for women's access to resources. The percentage change also suggests that CWEI and its sub-indices have a higher effect on WHZ compared to HAZ.

Besides women's empowerment, the policy implications of changes in women's education, household wealth, place of residence, number of children under five and availability of health services are also examined. The results in Table 4.17 suggest that an upward movement in women's level of education is likely to improve child health more than any of the other independent variable. For example, the percentage increase in predicted mean HAZ and WHZ is 38% and 108% between women with no education and secondary education, 10% and 10.6% between women of the poorest wealth quintile to the middle quintile, 56% and 301% in favour of urban women compared to rural women, 15% and 68% between the lowest and middle 20% of women in the

[57] The percentage change in bracket suggests percentage reduction whiles the positive is percentage increase.

community with 4+ antenatal uptake and 14% and 57% between the lowest and middle 20% of women in the community who deliver in a health facility respectively.[58] Compared to the mean predicted HAZ, the percentage change in the mean predicted WHZ is higher for the same level of change in the independent variables. The results for stunting and wasting also follow a similar trend.

Generally, the results in Tables 4.16 and 4.17 suggest that improvements in social norms are likely to have a better return on child health compared to women's access to resources. This confirms the suggestion that access to resources is not a sufficient condition for the exercise of agency (Lokshin and Ravallion, 2005) and the fact that access to resources often has a lower impact on agency compared to variables denoting social norms (Roy and Niranjan, 2004; Kamal and Zunaid, 2006; Allendorf, 2007b). In the same vein, improvements in variables such as women's education, household wealth, place of residence, number of additional children above 36 months and availability and accessibility of health services have higher returns on child health compared to women's empowerment in general. This finding could be important for policy options available to SSA governments. A first option will be for governments to pursue programs that seek to bridge the gender inequality gap and improve women's empowerment. Considering that social norms tend to underlie gender differences in several development outcomes (Kabeer, 2005; Narayan, 2005; Goldstein and Udry, 2008; Wahhaj and Kanzianga, 2010), issues related to social norms must have as much attention as women's access to resources (economic empowerment).

As already indicated, improvement in women's empowerment may have a lesser effect on child health compared to improvement in education, household wealth and availability of health services as per the results in Table 4.17.[59] This makes improvement in women's education, household wealth and access to health services a more attractive policy option for improving child health. This policy option becomes

[58] The first number in the set of percentages given above is the mean predicted HAZ whiles the second is the mean predicted WHZ. In addition, the focus on percentage changes arising from movement from the lowest 20% to the middle 20%, no education to secondary education, poorest to the middle quintile is based on the fact that such improvement are realistic and possible to achieve by government, compared to for example a jump from no education to tertiary education or poorest to the richest quintile.

[59] It is important to note that the comparison of improvements in women's empowerment and other variables such as education, household wealth etc is not in the stricted sence. The comparison is mainly to intuitively argue that improvements in other determinants of child health such as education, household wealth and access to health services are more likely to improve child health than improvements in women's empowerment. The quantum of improvement is assumed not to be relevant since women's empowerment and the other determinants are not comparable in the strictest sense.

even more crucial when one consider the fact that improvements in women's empowerment (social norms/institutions) may take a longer time to achieve. This is based on the fact that social and normative institutions take a long time to form, often taken for granted (North, 1990; Albiston, 2005) and so equally takes a long time to change. In the institutional literature, it has been argued that formal institutions such as laws, rules and regulations, governance mechanism etc take a long time to change, due generally to their sticky and path dependent nature (North, 1990; Williamson, 1998; 2000). As a result, one will expect informal institutions such as social norms to take a much longer time to change. Thus, a policy to pursue improvements in women's empowerment though rational and supported by the current evidence, may take a longer time for its effect to be realized, especially on child health.

On the contrary, aggressive policies to improve women's education, household wealth, access to health services and bridging the rural-urban gap may yield both short and long-term returns. As already emphasised in the women's empowerment and child health literature, policies that seek to increase household incomes and the number of women who have secondary education may in the short-term improve child health, but also bridge the gender inequality gap and consequently empower women in the long-term. Specifically, SSA governments could pursue (1) policies that improves basic education, especially for women – primary to secondary education (2) wealth creation strategies aimed at improving household wealth and targeting substantial movement from the poorest to the middle wealth quintile (3) considering that a major difference between rural and urban areas in most SSA countries is the poor nature of infrastructural facilities (roads, schools, health facilities etc) in the latter, improving and bridging the rural-urban infrastructure gap could be a possible solution to reducing the child health gap. This measure could also be important in reducing possible rural-urban drift.

Finally, improvements in access to health services and emphasis on smaller family size could also be important. As already discussed in section 4.7.1 (see Table AP2-1 and AP2-2), general wellbeing as measured by GNI per capita and investments in the health sector, measured by health expenditure per capita is likely to reduce the importance of social norms to long-term child health. Not only does this finding support the policy proposal given above, but also makes the issue of improving household wealth and availability and accessibility to health services very essential in this discourse.

Besides women's empowerment, the age cohorts and quantile-specific estimates shows that the effect of all other covariates including women's empowerment depends on the age or location of the child in the distribution of the child health variable. Specifically, the age cohort and quantile-specific estimates suggest that policy interventions are likely to have the highest effect, if targeted at children in age groups where children are likely to be more exposed to disease causing risk factors or within quantiles where children are likely to be worse off in terms of health status. The policy relevance of this lies in the clarity it brings to any attempt to design policies that target specific groups. The results suggest that policy makers are likely to have better returns on investment in child health, if policies are not crafted and targeted at children as a homogeneous group. The high levels of inequality in SSA (Okojie and Shimeles, 2006) implies that policy makers may need to pay more attention to vulnerable populations if interventions implemented are to succeed (UNDP, 2010; 2011; Ferreira and Ravallion, 2008). As per the results, targeted policies based on levels of vulnerability (e.g. different age groups and severity of illness/health status) are likely to have a stronger impact on child health outcomes compared to alternatives that treat the population of children as a homogenous group.

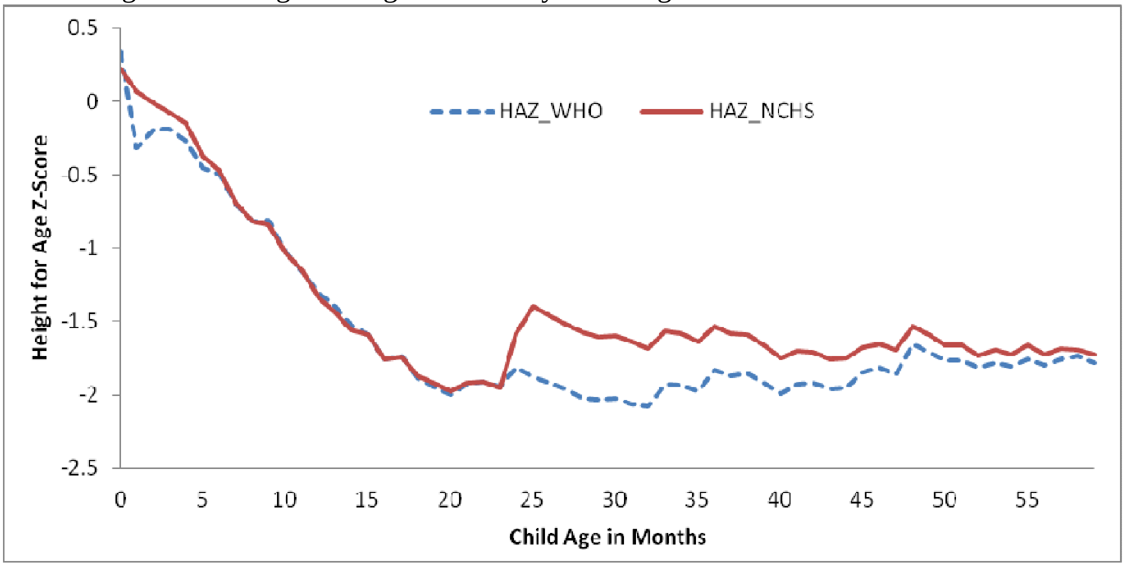
4.9 Conclusion

The results discussed in this chapter reiterate the argument that women's empowerment is an important determinant of child health. Although the women's empowerment literature seems to have concentrated on women's access to resources in measuring women's empowerment, the current results suggest that the broader institutional context of norms is an important aspect of women's empowerment and an essential determinant of child health status. This emphasises the multi-dimensionality of women's empowerment and the fact that apart from access to resources, there are equally important dimensions that ought to be explored. The importance of identifying other crucial dimensions of women's empowerment lies in the fact that it may help policy makers craft interventions that are holistic in nature. In addition, the differences in the result of the sub-indices and individual variables used to compute the composite index suggest that using indices alone could be problematic. As already explained, they could mask the real effect of underlying variables and without due care may lead to wrong policy prescriptions.

It is important to note that the use of equal weights in computing the composite women's empowerment index as well a possible identification issues in our models could constitute limitations. Notwithstanding these limitations, we believe that the robust methods used throughout the chapter makes the results sufficiently reliable. In this chapter the effect of women's empowerment focused mainly on child health. However, it is possible that the effect of women's empowerment on other areas of household health status may differ. Thus the next chapter focuses on the effect of women's empowerment on women's health status.

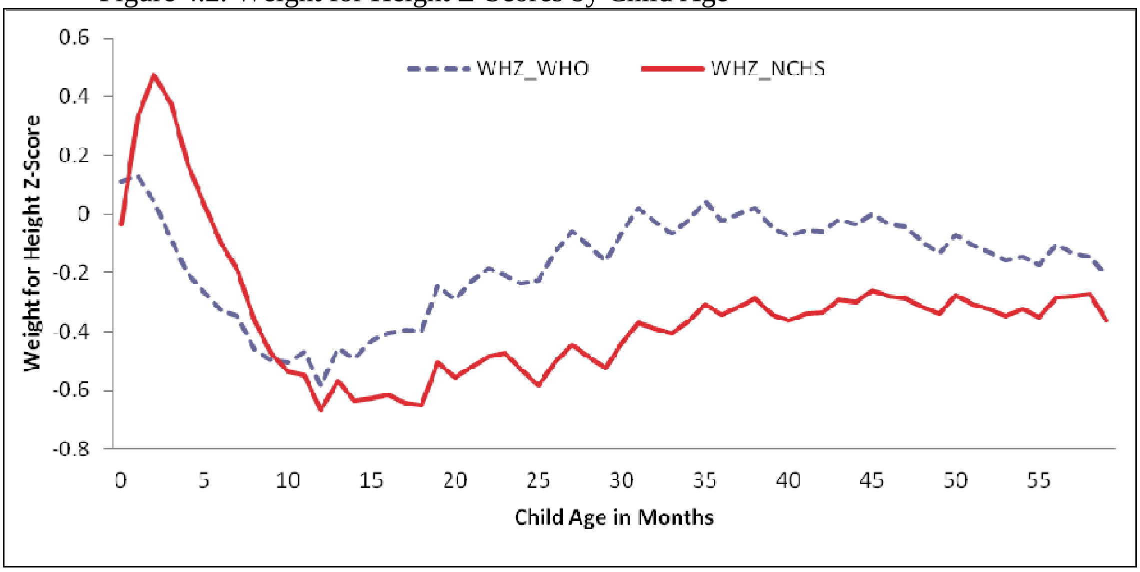
LIST OF FIGURES AND TABLES TO CHAPTER 4

Figure 4.1: Height for Age Z-scores by Child Age



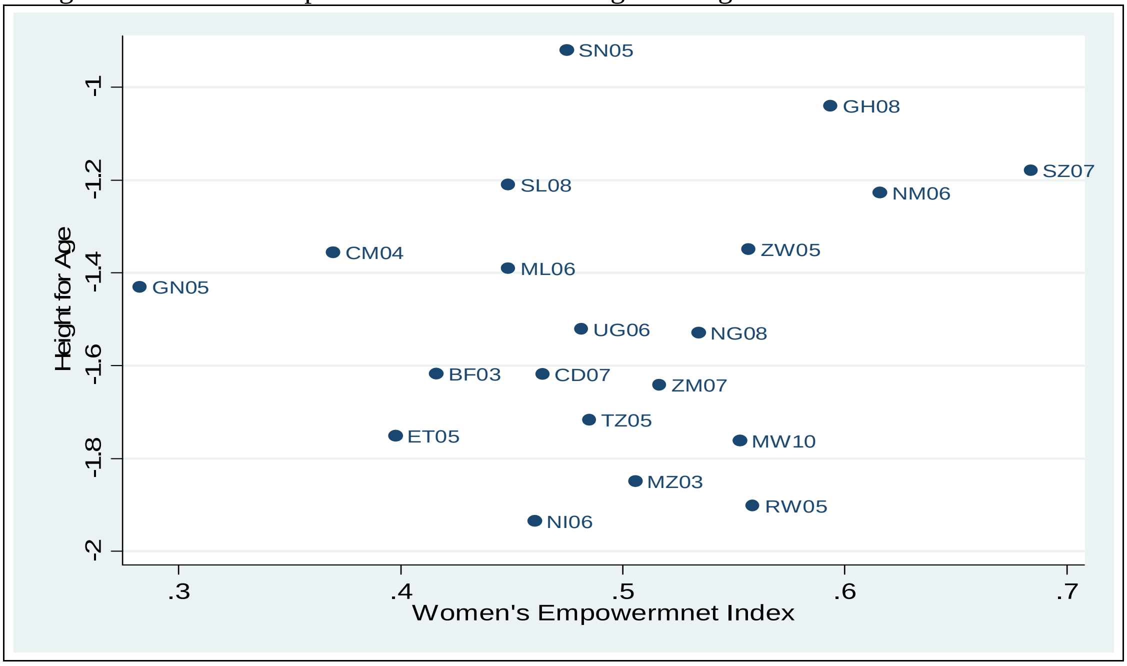
Source: Author's Calculations via DHS Data

Figure 4.2: Weight for Height Z-Scores by Child Age



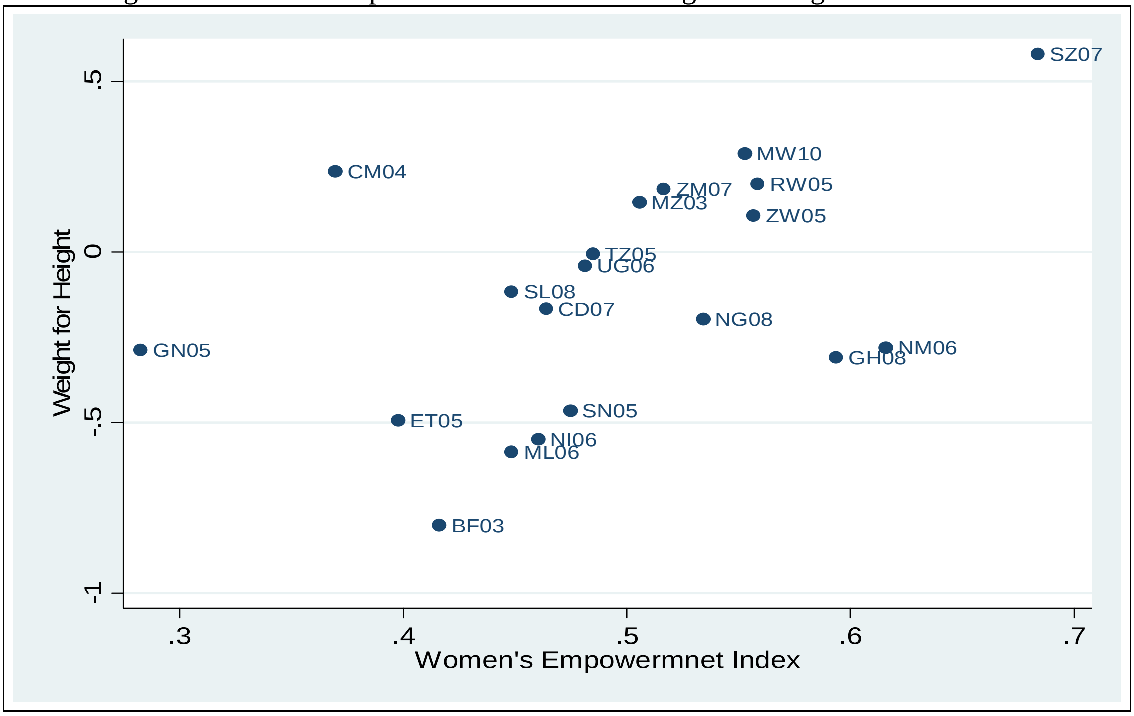
Source: Author's Calculations via DHS Data

Figure 4.3: Relationship Between CWEI and Height for Age Z-Scores



Source: Author's Calculations via DHS Data

Figure 4.4: Relationship Between CWEI and Weight for Height Z-Scores



Source: Author's Calculations via DHS Data

Table 4.1: Summary Statistics of Dependent and Independent Variables Used.

Variables	**Obs**	**Mean**	**SD**	**Variable Type**
Height for Age Z-score	37,086	-1.480	1.882	Continuous
Composite Empowerment Index	37,086	0.467	0.151	Continuous
Social Norms Index	37,086	0.482	0.179	Continuous
Access to Resources Index	37,086	0.613	0.174	Continuous
Other Explanatory Variables				
Child Age (months)				
0-11 **(reference)**	37,086	0.308	0.462	
12-23	37,086	0.294	0.456	Dummy
24-35	37,086	0.209	0.406	Dummy
36-47	37,086	0.118	0.323	Dummy
48-59	37,086	0.071	0.258	Dummy
Female Child	37,086	0.501	0.500	Dummy
Size at Birth				
Below Average **(reference)**	37,086	0.146	0.353	Dummy
Average and Above	37,086	0.716	0.451	Dummy
Very Large	37,086	0.137	0.344	Dummy
Woman's Education				
No education **(reference)**	37,086	0.497	0.500	Dummy
Primary	37,086	0.338	0.473	Dummy
Secondary	37,086	0.141	0.348	Dummy
Tertiary	37,086	0.023	0.151	Dummy
Partner's Education				
No education **(reference)**	37,086	0.418	0.493	Dummy
Primary	37,086	0.338	0.473	Dummy
Secondary	37,086	0.198	0.398	Dummy
Tertiary	37,086	0.046	0.210	Dummy
Woman's Height	37,086	158.573	7.125	Continuous
Age at First Birth	37,086	18.965	3.669	Continuous
Female Household head	37,086	0.109	0.312	Dummy
No. of Children in Household	37,086	2.062	1.227	Continuous
No. of Women in Household	37,086	1.583	1.027	Continuous
Asset Index	37,086	-0.142	0.887	Continuous
NSCPH- Pipe Water	37,086	0.376	0.151	Continuous
NSCPH- Flush Toilet	37,086	0.066	0.088	Continuous
NSCPW- Antenatal Visits	37,086	0.427	0.318	Continuous
NSCPW- Health Facility Delivery	37,086	0.418	0.318	Continuous
Rural Residence	37,086	0.781	0.413	Dummy
Sample Dummy				
HAZ Specification	37,086	-1.480	1.882	
WHZ Specification	36,987	-0.231	1.548	

Source: Author's calculations via DHS Datasets. Note: NSCPH is non-self cluster proportion of households, NSCPW is non-self cluster proportion of women and NSCD is non-self cluster differences. Note that the summary statistics given above refers mainly to the main model for the height for age specifications. The same variables are used in the weight for height specifications but with a slightly different sample as indicated by the sample dummy variable. Note also that other specifications (based on the sub-indices and individual indicators used in computing the sub-indices) used different samples as indicated in the tables containing the respective results. Note, the summary statistics for the instruments used for the robustness checks are not reported.

Table 4.2: Percentage of Children Under-Five, Stunted and Wasted

Countries	% Stunted		% Wasted	
	Value	Rank	Value	Rank
Senegal - 2005	20.17	1	8.52	11
Ghana – 2008	27.23	2	8.89	12
Swaziland - 2007	27.56	3	2.53	1
Namibia - 2006	29.35	4	7.59	10
Zimbabwe - 2006	32.81	5	6.49	8
Cameroon - 2004	35.42	6	6.26	7
Sierra Leone - 2008	36.39	7	10.42	14
Mali – 2006	37.8	8	15.58	19
Uganda - 2006	37.98	9	6.59	9
Guinea - 2005	39.29	10	11.3	15
Nigeria - 2008	40.39	11	13.95	18
Burkina Faso - 2003	43.07	12	21.36	20
Tanzania - 2005	43.69	13	3.57	2
Dem Rep of Congo - 2007	44.74	14	10.1	13
Zambia - 2007	45.42	15	5.31	6
Malawi - 2010	46.91	16	4.14	3
Mozambique - 2003	47.13	17	5.09	5
Ethiopia - 2005	50.05	18	12.18	16
Rwanda - 2005	50.66	19	4.67	4
Niger – 2006	54.85	20	12.96	17
West Africa	39	A	10.32	B
East and Central Africa	44.36	C	14.61	C
Southern Africa	40.98	B	5.30	A
Sub-Saharan Africa	41		10.32	

Source: Author's Calculations via DHS Datasets

Table 4.3: Distribution of Stunting and Wasting Across Wealth Quintiles

Countries/DHS Data	**Percentage with Stunted Growth By: Wealth Quintiles**					**Percentage with Wasted Growth Wealth Quintiles**				
	Poorest	**Poorer**	**Middle**	**Richer**	**Richest**	**Poorest**	**Poorer**	**Middle**	**Richer**	**Richest**
Ghana – 2008	32.83	33.69	28.85	20.13	14.45	10.03	10.22	10.05	6.85	6.00
Burkina Faso – 2003	50.61	46.38	46.31	41.59	25.19	21.44	23.61	22.18	23.46	14.12
Cameroon – 2004	45.02	39.98	39.86	27.70	15.39	8.06	9.96	5.16	3.23	2.87
Dem Rep of Congo – 2007	46.05	47.44	51.95	48.45	24.46	10.92	11.56	8.84	10.31	8.61
Ethiopia – 2005	51.81	53.97	51.74	49.89	39.71	14.43	16.19	12.23	8.53	7.90
Guinea – 2005	44.37	44.56	41.21	34.67	25.71	12.43	11.64	10.74	11.90	8.92
Malawi – 2010	54.84	50.42	47.11	46.57	35.47	4.95	4.75	4.78	3.98	2.08
Mali – 2006	44.72	42.54	42.59	36.02	20.84	16.10	15.66	16.19	15.66	14.11
Mozambique – 2003	53.85	54.11	52.87	40.91	26.49	7.34	5.02	3.83	4.65	3.57
Namibia – 2006	38.47	35.34	28.84	25.13	14.71	8.03	9.64	8.59	6.69	4.15
Niger – 2006	56.85	58.59	58.33	58.17	41.37	15.22	13.60	15.26	10.88	9.67
Nigeria – 2008	52.38	48.99	41.66	33.18	23.14	20.83	17.32	11.79	9.62	9.07
Sierra Leone – 2008	35.69	44.45	38.37	35.32	22.85	11.96	9.45	9.85	9.29	12.26
Rwanda – 2005	60.33	54.06	50.87	50.51	33.99	5.19	5.56	4.52	3.87	4.00
Senegal – 2005	30.91	24.05	19.84	11.67	8.64	10.26	10.61	9.10	4.96	6.24
Swaziland – 2007	36.21	30.39	26.37	24.12	17.20	3.33	2.69	3.42	1.69	1.12
Tanzania – 2005	50.39	48.24	46.70	43.66	22.80	4.22	4.43	3.16	2.89	2.87
Uganda – 2006	43.14	37.06	44.56	36.78	25.60	6.56	6.10	7.39	6.65	6.13
Zambia – 2007	47.02	50.87	47.84	42.89	33.25	6.47	5.52	5.01	4.57	4.36
Zimbabwe – 2006	32.81	36.95	34.99	30.76	26.55	7.59	6.96	5.37	7.15	4.30

Source: Author’s Calculations via DHS Datasets

Table 4.4: Sex and Age Distribution of Under-Five Health (Nutritional) Status

Age (Months)	Sex	Height for Age			Weight for Height		
		%< -2SD	%< -3SD	%> +2SD	%< -2SD	%< -3SD	%> +2SD
0-23	Boys	36.39	18.34	5.58	15.21	6.27	7.57
	Girls	29.37	13.22	6.71	13.51	5.60	7.57
	Combined	32.85	15.76	6.15	14.36	5.93	7.57
24-59	Boys	48.68	24.52	1.68	7.63	3.12	5.50
	Girls	45.78	22.44	1.94	6.86	2.73	4.93
	Combined	47.23	23.49	1.81	7.25	2.92	5.22
Observations		42,244	20,750	3,793	10,585	4,332	6,398

Source: Authors computations from DHS Data. Computations is based on the WHO Multi-Growth Reference Study reference population (de Onis et al., 2006)

Table 4.5: Relationship Between Selected Explanatory Variables and Child Health Status

Variables	% of Children		% of Children	
	Not Stunted	Stunted	Not Wasted	Wasted
Size at Birth				
Below Average **(reference)**	51.84	48.16	86.1	13.9
Average and Above	59.66	40.34	90.26	9.74
Very Large	63.82	36.18	90.84	9.16
Woman's Education				
No education **(reference)**	54.14	45.86	85.84	14.16
Primary	58.14	41.86	93.03	6.97
Secondary	71.25	28.75	93.28	6.72
Tertiary	84.76	15.24	95.04	4.96
Partner's Education				
No education **(reference)**	54.7	45.3	84.95	15.05
Primary	55.71	44.29	93.02	6.98
Secondary	66.43	33.57	92.45	7.55
Tertiary	75.04	24.96	92.87	7.13
Gender of Household Head				
Male **(reference)**	58.5	41.5	89.24	10.76
Female	61.46	38.54	92.01	7.99
Type of Residence				
Urban **(reference)**	70.11	29.89	91.59	8.41
Rural	55.2	44.8	89.04	10.96

Source: Author's calculations via DHS Datasets

Table 4.6: Effect of Women's Empowerment on Child Health Status

Variables	Height for Age Z Score		Weight for Height Z-Score	
	Beta	**SE**	**Beta**	**SE**
Composite Empowerment. Index	0.252	[0.071]***	0.158	[0.068]**
Child Age (months)				
12-23	-1.224	[0.024]***	-0.140	[0.022]***
24-35	-1.533	[0.029]***	0.108	[0.024]***
36-47	-1.585	[0.032]***	0.242	[0.026]***
48-49	-1.298	[0.035]***	0.141	[0.030]***
Female Child	0.263	[0.017]***	0.043	[0.016]***
Size at Birth				
Average and Above	0.341	[0.025]***	0.229	[0.026]***
Very Large	0.491	[0.036]***	0.413	[0.030]***
Woman's Education				
Primary	0.061	[0.026]**	0.111	[0.021]***
Secondary	0.170	[0.036]***	0.154	[0.032]***
Tertiary	0.340	[0.071]***	0.218	[0.067]***
Partner's Education				
Primary	0.036	[0.026]	0.090	[0.026]***
Secondary	0.031	[0.032]	0.095	[0.031]***
Tertiary	-0.033	[0.058]	0.169	[0.051]***
Woman's Height	0.039	[0.002]***	0.002	[0.001]**
Age at First Birth	-0.001	[0.003]	-0.002	[0.002]
Female Household Head	0.027	[0.031]	-0.025	[0.025]
No. of Children in Household	-0.037	[0.010]***	-0.049	[0.008]***
No. of Women in Household	0.017	[0.010]*	0.018	[0.009]**
Wealth Index	0.209	[0.015]***	0.021	[0.014]
NSCPH- Pipe Water	0.136	[0.073]*	0.002	[0.060]
NSCPH- Flush Toilet	-0.155	[0.125]	-0.079	[0.115]
NSCPW- 4+ Antenatal Visits	0.085	[0.037]**	0.039	[0.032]
NSCPW- Health Facility Delivery	0.166	[0.040]***	0.104	[0.036]***
Rural Residence	-0.057	[0.029]**	0.021	[0.028]
Country Fixed Effect	**Yes**		**Yes**	
Constant	-6.701	[0.266]***	-1.312	[0.187]***
Observations	37086		36987	
R^2	0.188		0.077	
Adj. R^2	0.187		0.076	

Source: Author's calculations. Betas are significant at p<0.01 (***), p<0.05 (**) and p< 0.1 (*). Country fixed effects are controlled for but not report. Reported standard errors are based on a cluster robust covariance matrix.

Table: 4.7: Effect of Social Norms and Access to Resources on Child Health Status

Variables	**Height for Age Z Score**				**Weight for Height Z-Score**			
	Model I		**Model II**		**Model I**		**Model II**	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**
Social Norms Index	0.146	[0.062]**	0.140	[0.062]**	0.189	[0.058]***	0.193	[0.058]***
Access to Resources Index			0.234	[0.053]***			-0.168	[0.048]***
Child Age (months)								
12-23	-1.223	[0.024]***	-1.224	[0.024]***	-0.140	[0.022]***	-0.139	[0.022]***
24-35	-1.532	[0.029]***	-1.534	[0.029]***	0.108	[0.024]***	0.110	[0.023]***
36-47	-1.584	[0.032]***	-1.586	[0.032]***	0.242	[0.026]***	0.243	[0.026]***
48-49	-1.296	[0.034]***	-1.300	[0.034]***	0.140	[0.030]***	0.143	[0.030]***
Female Child	0.263	[0.017]***	0.264	[0.017]***	0.043	[0.016]***	0.042	[0.016]***
Size at Birth								
Average and Above	0.341	[0.025]***	0.341	[0.025]***	0.229	[0.026]***	0.229	[0.026]***
Very Large	0.490	[0.036]***	0.491	[0.036]***	0.413	[0.030]***	0.412	[0.030]***
Woman's Education								
Primary	0.058	[0.026]**	0.069	[0.026]***	0.108	[0.021]***	0.101	[0.021]***
Secondary	0.167	[0.036]***	0.186	[0.036]***	0.148	[0.032]***	0.134	[0.032]***
Tertiary	0.338	[0.071]***	0.361	[0.071]***	0.209	[0.067]***	0.192	[0.067]***
Partner's Education								
Primary	0.040	[0.026]	0.029	[0.025]	0.091	[0.026]***	0.099	[0.026]***
Secondary	0.038	[0.032]	0.016	[0.032]	0.098	[0.031]***	0.114	[0.030]***
Tertiary	-0.023	[0.058]	-0.054	[0.057]	0.174	[0.051]***	0.196	[0.050]***
Woman's Height	0.039	[0.002]***	0.039	[0.002]***	0.002	[0.001]**	0.002	[0.001]**
Age at First Birth	-0.001	[0.003]	-0.001	[0.003]	-0.002	[0.002]	-0.002	[0.002]
Female Household Head	0.029	[0.031]	0.028	[0.031]	-0.026	[0.025]	-0.026	[0.025]
No. of Children in HH	-0.038	[0.010]***	-0.038	[0.010]***	-0.049	[0.008]***	-0.048	[0.008]***
No. of Women in HH	0.017	[0.010]*	0.017	[0.010]*	0.019	[0.009]**	0.019	[0.009]**
Wealth Index	0.212	[0.015]***	0.203	[0.015]***	0.022	[0.014]	0.028	[0.015]*
NSCPH- Pipe Water	0.137	[0.073]*	0.140	[0.073]*	-0.000	[0.060]	-0.003	[0.060]
NSCPH- Flush Toilet	-0.153	[0.125]	-0.154	[0.125]	-0.082	[0.115]	-0.082	[0.115]
NSCPW- Antenatal Visits	0.085	[0.037]**	0.089	[0.037]**	0.037	[0.032]	0.035	[0.032]
NSCPW- Health Fac Deliv	0.170	[0.040]***	0.165	[0.040]***	0.102	[0.036]***	0.106	[0.036]***
Rural Residence	-0.060	[0.029]**	-0.051	[0.030]*	0.020	[0.028]	0.013	[0.028]
Country Fixed Effect	Yes		Yes		Yes		Yes	
Constant	-6.653	[0.266]***	-6.818	[0.265]***	-1.320	[0.186]***	-1.201	[0.189]***
Observations	37086		37086		36987		36987	
R^2	0.188		0.189		0.077		0.077	
Adj. R^2	0.187		0.188		0.076		0.076	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Country fixed effects are controlled for but not report. Reported standard errors are based on a cluster robust covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women.

Table 4.8: Effect of Women's Empowerment on Height for Age Z-Scores – Age-Based Estimates

Variables	**Month 0 - 11**		**Month 12 - 23**		**Month 24 - 35**		**Month 36 - 47**		**Month 48 - 49**	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**
Women's Empowerment Index	-0.043	[0.153]	0.117	[0.131]	0.622	[0.152]***	0.489	[0.185]***	0.293	[0.226]
Female Child	0.306	[0.035]***	0.334	[0.030]***	0.249	[0.034]***	0.103	[0.043]**	0.093	[0.056]*
Size at birth: Average and Above	0.452	[0.051]***	0.297	[0.044]***	0.318	[0.052]***	0.230	[0.071]***	0.264	[0.075]***
Size at birth: Very Large	0.657	[0.068]***	0.452	[0.059]***	0.436	[0.072]***	0.295	[0.097]***	0.456	[0.113]***
Woman's education: Primary	-0.013	[0.054]	0.094	[0.047]**	0.092	[0.052]*	0.096	[0.065]	0.018	[0.085]
Woman's education: Secondary	0.095	[0.072]	0.155	[0.069]**	0.196	[0.073]***	0.276	[0.093]***	0.182	[0.130]
Woman's education: Tertiary	0.230	[0.152]	0.507	[0.152]***	0.331	[0.155]**	0.233	[0.171]	0.497	[0.176]***
Partner's education: Primary	-0.006	[0.050]	0.065	[0.049]	0.022	[0.050]	0.107	[0.068]	0.104	[0.078]
Partner's education: Secondary	0.013	[0.060]	0.074	[0.064]	-0.010	[0.065]	0.091	[0.087]	0.081	[0.117]
Partner's education: Tertiary	-0.142	[0.123]	0.099	[0.104]	-0.155	[0.110]	0.083	[0.141]	0.037	[0.162]
Woman's Height	0.042	[0.003]***	0.039	[0.004]***	0.041	[0.003]***	0.027	[0.004]***	0.036	[0.005]***
Age at First Birth	-0.011	[0.005]**	0.003	[0.005]	0.011	[0.006]*	0.003	[0.007]	-0.005	[0.008]
Female Household Head	-0.054	[0.062]	0.122	[0.057]**	0.005	[0.055]	0.054	[0.069]	0.114	[0.080]
No. of Children in HH	0.026	[0.016]	-0.060	[0.015]***	-0.086	[0.022]***	-0.092	[0.027]***	-0.125	[0.041]***
No. of Women in HH	-0.030	[0.019]	0.001	[0.021]	0.079	[0.022]***	0.085	[0.025]***	0.070	[0.028]**
Wealth Index	0.163	[0.036]***	0.187	[0.029]***	0.216	[0.029]***	0.288	[0.033]***	0.226	[0.050]***
NSCPH- Pipe Water	0.025	[0.152]	0.036	[0.115]	0.304	[0.143]**	0.298	[0.165]*	0.126	[0.215]
NSCPH- Flush Toilet	0.051	[0.275]	0.031	[0.242]	-0.642	[0.260]**	-0.621	[0.270]**	0.199	[0.369]
NSCPW- Antenatal Visits	0.121	[0.075]	0.061	[0.073]	0.041	[0.072]	0.272	[0.092]***	-0.145	[0.077]*
NSCPW- Health Fac Delivery	-0.007	[0.080]	0.163	[0.066]**	0.317	[0.081]***	0.378	[0.097]***	0.165	[0.114]
Rural Residence	-0.069	[0.059]	-0.028	[0.052]	-0.135	[0.054]**	0.085	[0.079]	-0.132	[0.090]
Country Fixed Effect	Yes		Yes		Yes		Yes		Yes	
Constant	-6.851	[0.533]***	-8.024	[0.577]***	-9.022	[0.528]***	-6.998	[0.729]***	-7.289	[0.847]***
Observations	11279		10935		7766		4443		2663	
R^2	0.085		0.095		0.131		0.156		0.143	
Adj. R^2	0.082		0.091		0.127		0.148		0.130	

Source: Author's calculations. Betas are significant at p<0.01 (***), p<0.05 (**) and p< 0.1 (*). Reported standard errors are based on a cluster robust Covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women.

Table 4.9: Effect of Women's Empowerment on Weight for Height Z-Scores – Age-Based Estimates

Variables	**Month 0 - 11**		**Month 12 - 23**		**Month 24 - 35**		**Month 36 - 47**		**Month 48 - 49**	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**
Women's Empowerment Index	0.237	[0.124]*	0.303	[0.124]**	-0.036	[0.135]	-0.055	[0.154]	0.489	[0.216]**
Female Child	0.014	[0.032]	0.086	[0.025]***	0.074	[0.030]**	-0.006	[0.041]	-0.049	[0.057]
Size at birth: Average and Above	0.183	[0.044]***	0.269	[0.046]***	0.229	[0.047]***	0.216	[0.058]***	0.238	[0.078]***
Size at birth: Very Large	0.263	[0.060]***	0.485	[0.059]***	0.464	[0.064]***	0.451	[0.083]***	0.449	[0.100]***
Woman's education: Primary	0.197	[0.046]***	0.092	[0.039]**	0.059	[0.041]	0.050	[0.055]	0.109	[0.073]
Woman's education: Secondary	0.239	[0.068]***	0.109	[0.060]*	0.135	[0.066]**	0.108	[0.082]	0.190	[0.093]**
Woman's education: Tertiary	0.210	[0.132]	0.162	[0.127]	0.249	[0.142]*	0.281	[0.159]*	0.312	[0.165]*
Partner's education: Primary	0.036	[0.051]	0.110	[0.037]***	0.154	[0.050]***	0.180	[0.058]***	-0.139	[0.070]**
Partner's education: Secondary	0.005	[0.062]	0.118	[0.052]**	0.201	[0.051]***	0.127	[0.072]*	-0.075	[0.080]
Partner's education: Tertiary	0.177	[0.101]*	0.306	[0.084]***	0.165	[0.095]*	0.119	[0.117]	-0.089	[0.143]
Woman's Height	0.002	[0.002]	0.005	[0.002]***	0.002	[0.002]	0.000	[0.002]	-0.003	[0.004]
Age at First Birth	0.001	[0.005]	-0.002	[0.004]	-0.003	[0.005]	-0.008	[0.006]	-0.006	[0.009]
Female Household Head	0.017	[0.057]	-0.022	[0.039]	-0.088	[0.042]**	-0.036	[0.056]	-0.057	[0.076]
No. of Children in HH	-0.053	[0.016]***	-0.060	[0.014]***	-0.034	[0.016]**	-0.043	[0.022]*	-0.021	[0.033]
No. of Women in HH	0.005	[0.017]	0.038	[0.019]**	0.009	[0.019]	0.031	[0.023]	-0.032	[0.024]
Wealth Index	-0.012	[0.029]	0.091	[0.026]***	0.068	[0.025]***	-0.067	[0.027]**	-0.031	[0.036]
NSCPH- Pipe Water	0.039	[0.142]	0.002	[0.111]	-0.009	[0.120]	-0.001	[0.162]	-0.123	[0.187]
NSCPH- Flush Toilet	-0.306	[0.271]	-0.185	[0.204]	0.074	[0.260]	0.077	[0.243]	0.492	[0.331]
NSCPW- Antenatal Visits	0.000	[0.071]	0.092	[0.059]	0.062	[0.061]	0.022	[0.066]	0.080	[0.086]
NSCPW- Health Fac Delivery	0.053	[0.079]	0.159	[0.062]**	0.130	[0.068]*	-0.016	[0.093]	0.054	[0.105]
Rural Residence	-0.007	[0.055]	-0.017	[0.045]	0.100	[0.047]**	-0.016	[0.064]	0.121	[0.065]*
Country Fixed Effect	Yes		Yes		Yes		Yes		Yes	
Constant	-1.522	[0.424]***	-2.005	[0.364]***	-0.796	[0.379]**	-0.332	[0.427]	-0.243	[0.689]
Observations	11228		10921		7756		4438		2644	
R^2	0.079		0.090		0.084		0.062		0.069	
Adj. R^2	0.076		0.087		0.079		0.054		0.055	

Source: Author's calculations. Betas are significant at p<0.01 (***), p<0.05 (**) and p< 0.1 (*). Reported standard errors are based on a cluster robust Covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women.

Table 4.10: Effect of Women's Empowerment on Height for Age Z-Scores – Quantile Estimates

Variables	**10%**		**25%**		**50%**		**75%**		**90%**	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**
Women's Empowerment Index	0.130	[0.111]	0.196	[0.080]**	0.231	[0.081]***	0.317	[0.102]***	0.464	[0.140]***
Child Age: 12-23	-0.899	[0.035]***	-1.039	[0.026]***	-1.226	[0.026]***	-1.432	[0.033]***	-1.543	[0.046]***
Child Age: 24-35	-1.137	[0.044]***	-1.305	[0.035]***	-1.532	[0.034]***	-1.766	[0.038]***	-1.930	[0.051]***
Child Age: 36-47	-1.291	[0.055]***	-1.341	[0.038]***	-1.477	[0.033]***	-1.730	[0.038]***	-2.002	[0.058]***
Child Age: 48-49	-0.877	[0.068]***	-0.980	[0.044]***	-1.237	[0.037]***	-1.509	[0.041]***	-1.859	[0.068]***
Female Child	0.320	[0.032]***	0.291	[0.021]***	0.236	[0.017]***	0.178	[0.021]***	0.194	[0.031]***
Birth Size: Average and Above	0.394	[0.046]***	0.348	[0.034]***	0.340	[0.026]***	0.264	[0.032]***	0.320	[0.038]***
Birth Size: Very Large	0.528	[0.062]***	0.495	[0.045]***	0.523	[0.038]***	0.430	[0.044]***	0.526	[0.061]***
Women Educ: Primary	0.134	[0.044]***	0.101	[0.031]***	0.093	[0.025]***	0.042	[0.031]	-0.058	[0.053]
Women Educ: Secondary	0.282	[0.071]***	0.281	[0.044]***	0.196	[0.036]***	0.127	[0.050]**	0.045	[0.064]
Women Educ: Tertiary	0.677	[0.134]***	0.444	[0.088]***	0.385	[0.084]***	0.227	[0.084]***	0.134	[0.152]
Partner Educ: Primary	0.150	[0.047]***	0.098	[0.034]***	0.032	[0.025]	0.014	[0.030]	-0.025	[0.060]
Partner Educ: Secondary	0.121	[0.062]*	0.109	[0.037]***	0.030	[0.031]	-0.016	[0.049]	-0.050	[0.064]
Partner Educ: Tertiary	-0.009	[0.112]	-0.004	[0.059]	-0.056	[0.055]	-0.039	[0.063]	-0.096	[0.112]
Woman's Height	0.038	[0.002]***	0.043	[0.002]***	0.045	[0.001]***	0.043	[0.002]***	0.037	[0.004]***
Age at First Birth	-0.009	[0.005]*	-0.003	[0.003]	0.003	[0.003]	0.002	[0.003]	-0.004	[0.005]
Female Household Head	-0.031	[0.047]	-0.020	[0.037]	0.024	[0.033]	0.072	[0.033]**	-0.017	[0.049]
No. of Children in HH	-0.049	[0.014]***	-0.044	[0.012]***	-0.052	[0.011]***	-0.041	[0.012]***	-0.029	[0.020]
No. of Women in HH	0.041	[0.023]*	0.038	[0.013]***	0.026	[0.010]***	0.010	[0.012]	-0.004	[0.020]
Wealth Index	0.223	[0.027]***	0.209	[0.018]***	0.212	[0.016]***	0.238	[0.018]***	0.241	[0.025]***
NSCPH- Pipe Water	0.250	[0.137]*	0.239	[0.086]***	0.175	[0.070]**	0.088	[0.088]	0.014	[0.139]
NSCPH- Flush Toilet	-0.151	[0.235]	-0.301	[0.126]**	-0.201	[0.111]*	-0.161	[0.153]	-0.205	[0.250]
NSCPW- Antenatal Visits	0.117	[0.049]**	0.130	[0.051]**	0.099	[0.031]***	-0.000	[0.036]	-0.112	[0.056]**
NSCPW- Health Fac Delivery	0.486	[0.062]***	0.321	[0.047]***	0.165	[0.039]***	0.054	[0.043]	-0.020	[0.075]
Rural Residence	0.022	[0.053]	-0.030	[0.035]	-0.053	[0.029]*	-0.037	[0.031]	-0.039	[0.054]
Country Fixed Effect	**Yes**		**Yes**		**Yes**		**Yes**		**Yes**	
Constant	-8.796	[0.373]***	-8.856	[0.258]***	-7.926	[0.238]***	-6.270	[0.386]***	-3.993	[0.647]***
Observations	37086		37086		37086		37086		37086	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Country fixed effects are controlled for but not report. Standard errors are bootstrapped over 400 replications. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women.

Table 4.11: Effect of Women's Empowerment on Weight for Height Z-Scores – Quantile Estimates

Variables	**10%**		**25%**		**50%**		**75%**		**90%**	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**
Women's Empowerment Index	-0.261	[0.136]*	-0.087	[0.073]	0.165	[0.070]**	0.260	[0.082]***	0.288	[0.116]**
Child Age: 12-23	0.139	[0.041]***	0.089	[0.029]***	-0.059	[0.027]**	-0.270	[0.029]***	-0.606	[0.039]***
Child Age: 24-35	0.507	[0.046]***	0.426	[0.030]***	0.209	[0.027]***	-0.093	[0.030]***	-0.483	[0.042]***
Child Age: 36-47	0.756	[0.048]***	0.586	[0.031]***	0.297	[0.030]***	-0.028	[0.034]	-0.401	[0.046]***
Child Age: 48-49	0.709	[0.072]***	0.457	[0.040]***	0.183	[0.036]***	-0.188	[0.037]***	-0.581	[0.048]***
Female Child	0.092	[0.031]***	0.079	[0.022]***	0.051	[0.017]***	-0.001	[0.020]	-0.023	[0.022]
Birth Size: Average and Above	0.266	[0.046]***	0.289	[0.030]***	0.266	[0.023]***	0.260	[0.033]***	0.245	[0.045]***
Birth Size: Very Large	0.506	[0.058]***	0.520	[0.041]***	0.482	[0.030]***	0.469	[0.034]***	0.412	[0.053]***
Women Educ: Primary	0.142	[0.044]***	0.102	[0.028]***	0.100	[0.024]***	0.108	[0.023]***	0.063	[0.034]*
Women Educ: Secondary	0.220	[0.060]***	0.176	[0.034]***	0.137	[0.037]***	0.156	[0.038]***	0.050	[0.056]
Women Educ: Tertiary	0.252	[0.128]**	0.220	[0.089]**	0.273	[0.077]***	0.243	[0.089]***	0.079	[0.123]
Partner Educ: Primary	0.184	[0.048]***	0.141	[0.030]***	0.061	[0.030]**	0.058	[0.030]*	0.044	[0.042]
Partner Educ: Secondary	0.235	[0.057]***	0.142	[0.034]***	0.092	[0.038]**	0.025	[0.039]	0.023	[0.047]
Partner Educ: Tertiary	0.324	[0.103]***	0.166	[0.053]***	0.075	[0.050]	0.062	[0.069]	0.233	[0.097]**
Woman's Height	0.003	[0.002]	0.003	[0.001]**	0.002	[0.001]*	0.001	[0.001]	0.002	[0.002]
Age at First Birth	0.003	[0.005]	-0.001	[0.003]	-0.001	[0.002]	-0.003	[0.003]	-0.008	[0.004]**
Female Household Head	0.037	[0.046]	0.005	[0.032]	-0.048	[0.026]*	-0.047	[0.033]	-0.038	[0.040]
No. of Children in HH	-0.047	[0.017]***	-0.053	[0.010]***	-0.047	[0.008]***	-0.057	[0.010]***	-0.043	[0.013]***
No. of Women in HH	0.034	[0.020]*	0.035	[0.011]***	0.023	[0.008]***	0.021	[0.010]**	-0.006	[0.015]
Wealth Index	-0.002	[0.029]	0.019	[0.016]	0.014	[0.015]	0.028	[0.019]	0.058	[0.025]**
NSCPH- Pipe Water	0.162	[0.113]	-0.004	[0.075]	-0.145	[0.064]**	-0.058	[0.081]	0.091	[0.106]
NSCPH- Flush Toilet	0.084	[0.253]	-0.018	[0.141]	0.023	[0.109]	-0.072	[0.140]	-0.064	[0.236]
NSCPW- Antenatal Visits	0.130	[0.043]***	0.085	[0.036]**	0.018	[0.028]	-0.076	[0.041]*	-0.035	[0.063]
NSCPW- Health Fac Delivery	0.250	[0.066]***	0.202	[0.051]***	0.153	[0.038]***	0.050	[0.043]	-0.096	[0.064]
Rural Residence	0.044	[0.055]	0.047	[0.035]	0.023	[0.031]	-0.011	[0.035]	-0.022	[0.047]
Country Fixed Effect	**Yes**		**Yes**		**Yes**		**Yes**		**Yes**	
Constant	-3.685	[0.392]***	-2.612	[0.255]***	-1.338	[0.203]***	0.063	[0.227]	1.285	[0.335]***
Observations	36987		36987		36987		36987		36987	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Country fixed effects are controlled for but not report. Standard errors are bootstrapped over 400 replications. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women.

Table 4.12: Dimensions of Women's Empowerment on Height for Age Z-Scores

Variables	Family Decisions		Violence		Autonomy		Societal Norms		Access to Resources	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**
Women's Empowerment Index	0.127	[0.042]***	0.065	[0.023]***	-0.026	[0.032]	0.199	[0.138]	0.215	[0.050]***
Child Age: 12-23	-1.255	[0.020]***	-1.248	[0.020]***	-1.251	[0.020]***	-1.253	[0.020]***	-1.230	[0.022]***
Child Age: 24-35	-1.582	[0.023]***	-1.568	[0.024]***	-1.571	[0.023]***	-1.576	[0.024]***	-1.536	[0.027]***
Child Age: 36-47	-1.590	[0.027]***	-1.570	[0.027]***	-1.573	[0.027]***	-1.588	[0.029]***	-1.578	[0.029]***
Child Age: 48-49	-1.325	[0.029]***	-1.315	[0.029]***	-1.319	[0.028]***	-1.317	[0.029]***	-1.308	[0.033]***
Female Child	0.237	[0.014]***	0.246	[0.014]***	0.240	[0.013]***	0.241	[0.014]***	0.252	[0.015]***
Birth Size: Average and Above	0.343	[0.020]***	0.342	[0.020]***	0.346	[0.020]***	0.334	[0.022]***	0.360	[0.023]***
Birth Size: Very Large	0.489	[0.029]***	0.481	[0.028]***	0.491	[0.028]***	0.485	[0.029]***	0.507	[0.034]***
Women Educ: Primary	0.053	[0.021]**	0.056	[0.020]***	0.059	[0.021]***	0.047	[0.022]**	0.082	[0.025]***
Women Educ: Secondary	0.119	[0.029]***	0.128	[0.028]***	0.129	[0.029]***	0.127	[0.031]***	0.180	[0.034]***
Women Educ: Tertiary	0.325	[0.059]***	0.333	[0.060]***	0.334	[0.059]***	0.313	[0.060]***	0.355	[0.067]***
Partner Educ: Primary	0.030	[0.021]	0.038	[0.022]*	0.031	[0.022]	0.020	[0.023]	0.024	[0.024]
Partner Educ: Secondary	0.062	[0.027]**	0.055	[0.028]**	0.053	[0.028]*	0.043	[0.028]	0.025	[0.031]
Partner Educ: Tertiary	0.023	[0.044]	0.029	[0.045]	0.025	[0.044]	0.011	[0.046]	-0.021	[0.053]
Woman's Height	0.038	[0.001]***	0.038	[0.001]***	0.038	[0.001]***	0.037	[0.001]***	0.039	[0.001]***
Age at First Birth	0.001	[0.002]	0.001	[0.002]	0.002	[0.002]	0.000	[0.003]	0.000	[0.003]
Female Household Head	0.025	[0.019]	0.027	[0.019]	0.027	[0.018]	0.038	[0.022]*	0.031	[0.024]
No. of Children in HH	-0.040	[0.008]***	-0.038	[0.008]***	-0.038	[0.008]***	-0.038	[0.008]***	-0.040	[0.009]***
No. of Women in HH	0.015	[0.008]*	0.013	[0.008]	0.012	[0.008]	0.010	[0.009]	0.020	[0.010]**
Wealth Index	0.207	[0.011]***	0.207	[0.011]***	0.208	[0.011]***	0.212	[0.012]***	0.202	[0.014]***
NSCPH- Pipe Water	0.127	[0.061]**	0.131	[0.059]**	0.136	[0.059]**	0.131	[0.064]**	0.167	[0.066]**
NSCPH- Flush Toilet	-0.099	[0.092]	-0.181	[0.089]**	-0.142	[0.089]	-0.111	[0.095]	-0.180	[0.112]
NSCPW- Antenatal Visits	0.105	[0.034]***	0.105	[0.033]***	0.112	[0.033]***	0.114	[0.035]***	0.094	[0.035]***
NSCPW- Health Fac Delivery	0.186	[0.032]***	0.194	[0.031]***	0.189	[0.031]***	0.186	[0.031]***	0.159	[0.038]***
Rural Residence	-0.045	[0.023]**	-0.040	[0.023]*	-0.044	[0.023]*	-0.039	[0.023]*	-0.059	[0.027]**
Country Fixed Effect	Yes		Yes		Yes		Yes		Yes	
Constant	-6.560	[0.219]***	-6.597	[0.212]***	-6.479	[0.213]***	-6.538	[0.224]***	-6.818	[0.247]***
Observations	59252		59313		61182		55777		42832	
R^2	0.188		0.188		0.187		0.187		0.188	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Country fixed effects are controlled for but not report. Reported standard errors are based on a robust covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women.

Table 4.13: Dimensions of Women's Empowerment on Weight for Height Z-Scores

Variables	Family Decisions		Violence		Autonomy		Societal Norms		Access to Resources	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**
Women's Empowerment	0.116	[0.036]***	0.066	[0.017]***	0.029	[0.026]	0.177	[0.119]	-0.147	[0.045]***
12-23	-0.155	[0.017]***	-0.148	[0.018]***	-0.153	[0.017]***	-0.154	[0.018]***	-0.141	[0.021]***
24-35	0.089	[0.018]***	0.090	[0.018]***	0.091	[0.018]***	0.085	[0.019]***	0.118	[0.021]***
36-47	0.191	[0.019]***	0.193	[0.019]***	0.193	[0.018]***	0.190	[0.021]***	0.247	[0.022]***
48-49	0.108	[0.022]***	0.108	[0.023]***	0.104	[0.022]***	0.099	[0.024]***	0.148	[0.027]***
Female Child	0.067	[0.012]***	0.064	[0.012]***	0.070	[0.012]***	0.072	[0.012]***	0.048	[0.015]***
Average and Above	0.265	[0.020]***	0.275	[0.019]***	0.271	[0.019]***	0.257	[0.021]***	0.238	[0.024]***
Very Large	0.459	[0.027]***	0.472	[0.026]***	0.466	[0.026]***	0.446	[0.027]***	0.426	[0.029]***
Primary	0.125	[0.018]***	0.126	[0.018]***	0.128	[0.018]***	0.131	[0.019]***	0.107	[0.021]***
Secondary	0.179	[0.026]***	0.178	[0.026]***	0.184	[0.026]***	0.187	[0.026]***	0.149	[0.030]***
Tertiary	0.274	[0.052]***	0.252	[0.053]***	0.273	[0.051]***	0.280	[0.054]***	0.219	[0.062]***
Primary	0.096	[0.020]***	0.077	[0.020]***	0.092	[0.020]***	0.098	[0.021]***	0.098	[0.024]***
Secondary	0.092	[0.025]***	0.076	[0.025]***	0.088	[0.025]***	0.089	[0.026]***	0.110	[0.029]***
Tertiary	0.120	[0.037]***	0.115	[0.036]***	0.117	[0.036]***	0.116	[0.039]***	0.163	[0.045]***
Woman's Height	0.003	[0.001]***	0.003	[0.001]***	0.003	[0.001]***	0.003	[0.001]***	0.003	[0.001]**
Age at First Birth	-0.000	[0.002]	-0.000	[0.002]	0.000	[0.002]	-0.001	[0.002]	-0.001	[0.002]
Female Household Head	-0.036	[0.017]**	-0.039	[0.015]**	-0.040	[0.015]***	-0.014	[0.018]	-0.040	[0.018]**
No. of Children in HH	-0.041	[0.007]***	-0.041	[0.007]***	-0.041	[0.007]***	-0.040	[0.007]***	-0.046	[0.008]***
No. of Women in HH	0.018	[0.007]***	0.018	[0.007]**	0.017	[0.007]**	0.017	[0.007]**	0.015	[0.008]*
Wealth Index	0.032	[0.010]***	0.032	[0.010]***	0.031	[0.010]***	0.032	[0.010]***	0.031	[0.014]**
NSCPH- Pipe Water	0.046	[0.049]	0.050	[0.048]	0.047	[0.048]	0.060	[0.049]	-0.006	[0.056]
NSCPH- Flush Toilet	-0.085	[0.081]	-0.074	[0.077]	-0.065	[0.075]	-0.093	[0.082]	-0.099	[0.103]
NSCPW- Antenatal Visits	0.076	[0.027]***	0.076	[0.027]***	0.079	[0.027]***	0.083	[0.027]***	0.051	[0.032]
NSCPW- Health Fac Delivery	0.111	[0.027]***	0.109	[0.027]***	0.114	[0.028]***	0.095	[0.029]***	0.144	[0.034]***
Rural Residence	0.022	[0.021]	0.023	[0.021]	0.020	[0.021]	0.019	[0.022]	0.011	[0.026]
Country Fixed Effect										
Constant	-1.536	[0.152]***	-1.473	[0.142]***	-1.487	[0.143]***	-1.590	[0.159]***	-1.187	[0.175]***
Observations	59069		59136		60997		55600		42719	
R^2	0.079		0.077		0.079		0.076		0.082	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Country fixed effects are controlled for but not report. Reported standard errors are based on a robust covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women.

Table 4.14: Effect of Indicators of Women's Empowerment on Child Health

Indicators of Family Decisions

Responses	**Household decision-making on the following**							
	Woman's Health		**Large hh Purchase**		**Daily hh Purchase**		**Family Visit**	
	HAZ	**WHZ**	**HAZ**	**WHZ**	**HAZ**	**WHZ**	**HAZ**	**WHZ**
Husband Alone	-0.025	0.033	-0.026	0.028	-0.029	-0.011	0.002	0.018
	[0.039]	[0.035]	[0.034]	[0.028]	[0.034]	[0.031]	[0.042]	[0.035]
Woman/Husband	0.007	0.123***	0.014	0.134***	0.016	0.096***	0.047	0.082**
	[0.041]	[0.036]	[0.036]	[0.029]	[0.039]	[0.031]	[0.044]	[0.034]
Woman Alone	0.019	0.032	0.044	0.019	0.030	0.052	0.047	0.024
	[0.042]	[0.037]	[0.039]	[0.034]	[0.039]	[0.034]	[0.046]	[0.037]
All Other Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	59613	59428	59500	59317	59530	59346	59493	59309

Indicators of Physical Violence

Responses	**Do women agree if their husband/Partner beats them for doing the following?**									
	Go out no Permission		**Neglect Children**		**Argues with Husb**		**Refuses sex**		**Burns food**	
	HAZ	**WHZ**	**HAZ**	**WHZ**	**HAZ**	**WHZ**	**HAZ**	**WHZ**	**HAZ**	**WHZ**
Do not Agree	0.037**	0.052***	0.038**	0.025*	0.045**	0.047***	0.039**	0.028**	0.039**	0.037***
	[0.016]	[0.014]	[0.016]	[0.013]	[0.018]	[0.013]	[0.016]	[0.013]	[0.019]	[0.014]
All Other Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	60834	60648	60863	60680	60644	60463	60323	60142	60714	60530

Indicators of Autonomy

Responses	**Do women have a problem for wanting to do any of the following?**					
	Perm for Med Help		**Med Help Alone**		**No Female Provider**	
	HAZ	**WHZ**	**HAZ**	**WHZ**	**HAZ**	**WHZ**
No Problem	0.029	0.044**	-0.017	-0.024	-0.043*	0.040**
	[0.024]	[0.021]	[0.020]	[0.016]	[0.022]	[0.020]
All Other Covariates	Yes	Yes	Yes	Yes	Yes	Yes
Observations	61348	61161	61328	61143	61277	61092

Table 4.14: Effect of Indicators of Women's Empowerment on Child Health- Cont.

	Indicators of Societal Norms					
Responses	**No. of Wives**		**Age @ 1st Mriage**		**Couple Age Diff**	
	HAZ	**WHZ**	**HAZ**	**WHZ**	**HAZ**	**WHZ**
	-0.022*	-0.007	-0.001	0.005**	0.000	0.000
	[0.012]	[0.009]	[0.003]	[0.003]	[0.001]	[0.000]
All Other Covariates	Yes	Yes	Yes	Yes	Yes	Yes
Observation	56750	56570	61437	61249	56823	56644
	Access to Resources (Economic Power)					
	Earnings Type		**Couple Educ Diff**		**Woman Working?**	
	HAZ	**WHZ**	**HAZ**	**WHZ**	**HAZ**	**WHZ**
In-Inkind only	-0.026	0.023	-0.001	0.007*	0.038**	0.017
	[0.030]	[0.026]	[0.004]	[0.004]	[0.016]	[0.012]
In-kind and Cash	0.055**	-0.013				
	[0.026]	[0.021]				
Cash Only	0.075***	-0.065***				
	[0.021]	[0.020]				
All Other Covariates	Yes	Yes	Yes	Yes	Yes	Yes
Observation	60911	60724	43244	43131	61317	61129

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. In this Model we also controlled for all other covariates but not reported. Note that the reference for the estimates above include family Norms (Someone Else), physical integrity (Yes Agree) and civil liberties (Yes there is a Problem). For economic power the Reference for type of earnings (Not Paid) and Woman working (No not working) Note that Reported Standard errors are Cluster robust.

Table 4.15: Effect of Women's Empowerment on Child Health- Sub-regional Estimates

Regions/Indicators	Height for Age		Weight for Height	
	Model I	Model II	Model I	Model II
West Africa				
Composite Women's Emp. Index		0.246** [0.101]		0.474*** [0.097]
Social Norms	0.166* [0.087]	0.165* [0.086]	0.457*** [0.079]	0.458*** [0.079]
Access to Resources		0.189** [0.088]		-0.167** [0.078]
All Other Covariates	Yes	Yes	Yes	Yes
Observations	19906	19906	19844	19844
East and Central Africa				
Composite Women's Emp. Index		0.346** [0.144]		-0.078 [0.126]
Social Norms	0.203* [0.119]	0.180 [0.119]	-0.045 [0.108]	-0.041 [0.109]
Access to Resources		0.325*** [0.124]		-0.062 [0.106]
All Other Covariates	Yes	Yes	Yes	Yes
Observations	8580	8580	8562	8562
Southern Africa				
Composite Women's Emp. Index		0.105 [0.134]		-0.349*** [0.133]
Social Norms	-0.006 [0.121]	-0.014 [0.121]	-0.247** [0.116]	-0.240** [0.116]
Access to Resources		0.206** [0.094]		-0.199** [0.080]
All Other Covariates	Yes	Yes	Yes	Yes
Observations	8600	8600	8581	8581

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. In these Models we also controlled for all other covariates but not reported

Table 4.16A: Policy Implications of Changes in Women's Empowerment on Child Health Status

Policy Indicators	Height for Age		Stunting		Weight for Height		Wasting	
	Fitted Mean	**% Change**	**Mean Prob.**	**% Change**	**Fitted Mean**	**% Change**	**Mean Prob.**	**% Change**
Comp. Empowerment Ind.								
Lowest 20%	-1.569		0.425		-0.443		0.153	
Middle 20%	-1.515	3.5	0.405	(4.8)	-0.237	46.4	0.120	(21.7)
Top 20%	-1.230	21.6	0.331	(22.2)	-0.016	96.3	0.091	(40.9)
Social Norms Index.								
Lowest 20%	-1.524		0.420		-0.465		0.156	
Middle 20%	-1.480	2.9	0.399	(35)	-0.248	46.7	0.122	(21.8)
Top 20%	-1.280	16	0.343	(18.3)	-0.017	96.3	0.086	(44.9)
Access to Resources Index.								
Lowest 20%	-1.600		0.429		-0.079		0.096	
Middle 20%	-1.510	5.6	0.410	(4.5)	-0.279	(254.3)	0.121	26.0
Top 20%	-1.460	8.7	0.403	(6.0)	-0.373	(373.8)	0.144	50.9

Source: Author's Calculation Based on DHS Data

Table 4.16B: Policy Implications of Changes in Components of Social Norms on Child Health Status

Policy Indicators	Height for Age		Stunting		Weight for Height		Wasting	
	Fitted Mean	**% Change**	**Mean Prob.**	**% Change**	**Fitted Mean**	**% Change**	**Mean Prob.**	**% Change**
Decision-Making								
Lowest 20%	-1.489		0.410		-0.446		0.161	
Middle 20%	-1.469	1.4	0.396	(3.5)	-0.245	45.0	0.120	(25.2)
Top 20%	-1.399	6.1	0.371	(9.4)	-0.071	84.2	0.089	(44.6)
Violence Perception								
Lowest 20%	-1.545		0.418		-0.411		0.142	
Middle 20%	-1.397	9.6	0.378	(9.5)	-0.136	67.0	0.110	(22.6)
Top 20%	-	-	-	-	-	-	-	-
Women's Autonomy								
Lowest 20%	-1.476		0.409		-0.330		0.139	
Middle 20%	-1.419	3.8	0.381	(7.0)	-0.205	38.0	0.116	(17.0)
Top 20%	-	-	-	-	-	-	-	-
Societal Preferences								
Lowest 20%	-1.526		0.419		-0.491		0.166	
Middle 20%	-1.467	3.8	0.396	(5.4)	-0.262	46.7	0.126	(24.3)
Top 20%	-1.278	16.3	0.345	(17.6)	-0.035	92.9	0.089	(46.3)

Source: Author's Calculation Based on DHS Data

Table 4.17: Policy Implications of Changes in Selected Policy Variables on Child Health Status

Policy Indicators	**Height for Age**		**Stunting**		**Weight for Height**		**Wasting**	
	Fitted Mean	**% Change**	**Mean Prob.**	**% Change**	**Fitted Mean**	**% Change**	**Mean Prob.**	**% Change**
Woman's Education								
No Education	-1.606		0.438		-0.506		0.168	
Primary	-1.525	5.0	0.393	(10.2)	-0.003	99.4	0.078	(53.9)
Secondary	-0.981	38.9	0.272	(37.8)	0.040	108.0	0.080	(52.2)
Tertiary	-0.533	66.8	0.176	(59.7)	0.225	144.5	0.067	(60.3)
Wealth Index								
Poorest	-1.704		0.457		-0.318		0.137	
Poorer	-1.639	3.8	0.440	(3.8)	-0.296	6.9	0.133	(2.9)
Middle	-1.533	10.0	0.410	(10.4)	-0.285	10.6	0.129	(5.5)
Richer	-1.336	21.6	0.356	(22.2)	-0.198	37.9	0.114	(16.8)
Richest	-0.921	46	0.252	(44.9)	-0.040	87.3	0.089	(34.8)
Residence								
Urban	-1.019		0.283		-0.072		0.096	
Rural	-1.590	(56.0)	0.424	50.1	-0.289	(301.5)	0.131	36.1
No. of Child 36 Months+								
1	-1.821		0.436		0.058		0.059	
2	-1.958	(7.5)	0.477	9.5	-0.043	(173.9)	0.071	20.9
3	-2.011	(10.4)	0.495	13.7	-0.237	(507.3)	0.094	59.0
4	-2.060	(13.1)	0.508	16.7	-0.370	(735.0)	0.108	83.7
5+	-2.212	(21.4)	0.538	23.4	-0.561	(1062.4	0.124	110.0
CA- Antenatal Serv.								
Lowest 20%	-1.724		0.468		-0.552		0.189	
Middle 20%	-1.472	14.6	0.392	(16.1)	-0.177	67.9	0.105	(44.1)
Top 20%	-1.162	32.6	0.314	(32.8)	-0.003	99.5	0.081	(56.9)
CA- Institutional Births								
Lowest 20%	-1.751		0.479		-0.459		0.171	
Middle 20%	-1.503	14.2	0.398	(16.9)	-0.197	57.0	0.110	(35.5)
Top 20%	-1.092	37.6	0.295	(38.3)	-0.083	81.8	0.095	(44.3)

Source: Author's Calculation Based on DHS Data

CHAPTER FIVE

EFFECT OF WOMEN'S EMPOWERMENT ON WOMEN'S HEALTH STATUS: EVIDENCE FROM SUB-SAHARAN AFRICA.

5.0 Introduction

This chapter extends the discussion in Chapter 4 by focusing on women's health status. The chapter pursues three main objectives by examining (1) the effect of women's empowerment on women's health status (reproductive health services use: health facility delivery, 4+ antenatal visits, use of modern contraceptives and nutrition: women's BMI). (2) Differential effect of social norms and women's access to resources on women's health status. (3) Age cohort specific effect of women's empowerment on women's health status. Women's empowerment is proxied by a composite index and related sub-indices (i.e. women's access to resources and the broader institutional context of norms – referred to as social norms). Social norms is further broken down into four sub-indices, representing 4 dimensions of social norms (women's participation in family decisions, women's perception of violent behaviour by their partners, women's autonomy and societal preferences). In effect, the composite index has 5 sub-indices representing 5 dimensions of women's empowerment.

The effect of the composite index and related sub-indices on women's health status is examined using bivariate and multivariate methods. The results suggest that the composite women's empowerment index together with its sub-indices are significantly positively correlated with the indicators of women's health status. Although the composite index is significantly correlated with all the outcome indicators, the sub-indices suggest that the violence perception and societal preference indices are not significantly correlated with 4+ antenatal visits. In addition, the societal preference sub-index is not significantly correlated with women's BMI. This implies that without the underlying sub-indices and indicators, composite indices may give results that could be misleading. More importantly, the results also suggest that the social norms dimension of women's empowerment is as important as women's access to resources in predicting the indicators of women's health status. Just as child health, the current results suggest that the effect of some covariates on the indicators of women's health status depends on the age of the woman.

5.1 Background and Motivation

A major concern for women's health globally has been the issue of maternal mortality. The latest WHO estimates of global maternal mortality rates (MMR) suggest that 358,000 maternal deaths occurred in 2008 alone (WHO, 2010). It is also estimated that developing countries accounts for 99% of these death, with SSA and South Asia accounting for 87%. The WHO estimates also indicates that SSA has the highest MMR of 640/100,000 among developing countries. To reduce the high levels of MMR in developing countries, the United Nations, through Millennium Development Goal 5 is targeting a three-quarters reduction of MMR between 1990 and 2015. Key among the set of interventions to achieve this target is access to quality reproductive health services to ensure safe passage to motherhood (WHO, 1994b; United Nations, 2010a). The safe motherhood programme of WHO has therefore emphasized reproductive health interventions such as delivery in a health facility/skilled attendant at birth, antenatal services uptake and family planning as being key to reducing the high levels of maternal mortality in developing countries such as SSA.

Other studies have also emphasized the importance of the use of reproductive health services to reducing and preventing maternal deaths (Bloom et al., 1999; Magadi et al., 2001; Goldani et al., 2004; Cleland et al., 2006; Stover and Ross, 2010; Ross and Blanc, 2012). The emphasis is on the basis that reproductive health services helps in the early detection and management of pregnancy related complications. Another area of concern to women's health and also seen as complimentary to the use of reproductive health services is women's nutrition. In the maternal health literature, women's nutrition is argued to be an important determinant of birth outcomes. This is because malnourished women are likely to be anaemic. Episodes of anaemia is likely to affect the health of the foetus in the utero, with negative implications for birth outcomes - birth weight, infections, small-for-gestational-age birth, still births, preterm births, neonatal deaths etc (Cohen et al., 2001; Fowles, 2004; Lawn et al., 2005; Lartey, 2008; Imdad and Bhutta, 2012).

To understand the factors that influence the use of reproductive health services and women's nutrition, researchers have focused on researching the determinants of women's use of reproductive health services and nutrition over the last two decades. Findings have consistently suggested education, household wealth, place of residence and access to health services as some of the key determinants (Higgins and Alderman, 1997; Addai, 2000; Puoane et al., 2002; Mekonnen and Mekonnen, 2003; Overbosch et al., 2004; Gage, 2007; Babalola and Fatusi, 2009; Dake et al., 2011). Other authors have also examined the effect of women's empowerment on women's nutrition and use of reproduction services (Beegle et al., 2001; Hindin, 2005a; 2005b; Furuta and Salway, 2006; Allendorf, 2007a).

However, in most of these studies, measurement of women's empowerment seem to have focused on a few dimensions, mainly women's access to resources. Considering that women's empowerment is argued to be multidimensional (Kabeer, 1999; Kishor, 2000a; Malhotra et al., 2002), a focus on a few dimensions may mean telling only one side of the women's empowerment story. Beside the fact that social norms has been argued to be an important dimension of women's empowerment (Kabeer, 1999; 2002; 2005; Morrisson and Jütting, 2004; Jütting and Morrisson, 2005; Narayan, 2005; Mabsout and van Staveren, 2010), it has not received as much attention as women's access to resources in studies examining the effect of women's empowerment on women's health. Thus, the focus of this chapter is to examine the effect of women's empowerment, focusing on the effect of social norms on women's health status.

5.2 Objectives

This chapter examines the effect of women's empowerment and its dimensions on women's health status, using DHS data from 20 countries in SSA. Specifically, this chapter examines

1. The effect of women's empowerment on selected indicators of women's health status (use of reproductive health services: delivery in a health facility, antenatal services uptake and use of modern contraceptive methods and nutrition: BMI)
2. The differential effect of social norms and access to resources on selected indicators of women's health status.
3. Age cohort specific effect of women's empowerment on indicators of women's health status.

4. Whether the use of a composite index, sub-indices, or individual variables making up such indices moderate the effect of women's empowerment on women's health status.

5.3 Data Source and Variable Definition

As in Chapter 4, Chapter 5 uses DHS datasets for 20 SSA countries (see Section 4.3 of Chapter 4 for detailed description of the dataset). Specifically, the chapter makes use of information on women's socioeconomic characteristics, reproductive histories and nutritional status indicators (i.e. women's BMI). In addition to women's characteristics, information on husbands/partners of the women interviewed is also used. Unlike Chapter 4, where women who did not have corresponding children in the children's dataset were dropped, the analysis in Chapter 5 makes use of the full sample of women. Definition and measurement of specific variables used are as below.

5.3.1 Indicators of Women's Health Status (Dependent Variables)

Consistent with the argument in Section 5.1, consumption of reproductive health services and women's nutritional status indicators are used as proxies for women's health status. To deal with the high levels of pregnancy related morbidity and mortality, especially in developing countries, WHO together with its partners have adopted and promoted a couple of interventions. Among them is the safe motherhood program, aimed at avoiding unwanted pregnancies, reducing and or effectively managing pregnancy related complications and improving the health and survival of women and children. According to WHO, (1994b), the 4 pillars of the safe motherhood program includes (1) Family Planning - to ensure that individuals and couples have the information and services to plan the timing, number and spacing of pregnancies. (2) Antenatal Care – to prevent complications where possible and ensure that pregnancy related complications are detected early and appropriately treated. (3) Clean/Safe Delivery – to ensure that all birth attendants have the knowledge, skills and equipments to perform a clean and safe delivery, together with postpartum care for mother and baby. (4) Essential Obstetric Care – to ensure that essential care for high-risk pregnancies and complications is made available to all women who need it.

Thus, the reproductive health indicators selected are those available in the DHS data and capture the issues espoused by the four pillars of the safe motherhood program. These include the use of modern contraceptive methods, antenatal services uptake and delivery in a health facility. The DHS data does not capture directly, clean and safe delivery as well as essential obstetric care. However, it has information on whether a woman delivered in a health facility. We assume that women who deliver in a health facility are likely to have access to clean/safe delivery, together with essential obstetric care if needed. In addition to the reproductive health care indicators, women's nutrition, which is also important for birth outcomes, is added. Specifically, we use women's BMI as an indicator for women's nutrition/health status. The four indicators are discussed below.

Use of Modern Contraceptive Methods - The effective and timely use of modern family planning methods such as modern contraceptives can help reduce fertility and avoid unwanted pregnancies. This can lead to a reduction in the number of women who suffer temporal and permanent injury as a result of pregnancy and in some instances death (Stover and Ross, 2010). For example, it is argued that global fertility decline is responsible for averting approximately 1.7 million maternal deaths between 1990 and 2008 (Ross and Blanc, 2012). Stover and Ross, (2010) also argue that family planning can help prevent high risk and high parity births and consequently deaths that may be associated with it. Using data from 146 DHS surveys from developing countries, Stover and Ross, (2010) estimate that over 1 million deaths were averted between 1990 and 2005 due to fertility decline.

From the same estimates, the authors argue that a country can reduce its MMR by some 450 points as a result of transiting from low to high levels of contraceptive usage. Other authors have also argued that improved family planning in countries with high birth rates have the potential of reducing poverty and hanger, preventing about 32% of all maternal deaths and 10% of deaths among children (Cleland et al., 2006). Thus, improved use of appropriate family planning methods can improve the health and wellbeing of women substantially. On the issue of family planning, emphasis has been laid on the use of modern contraceptives as the pathway to avoiding unwanted pregnancies and reducing maternal death. The question in the DHS survey asked respondents about the type of contraceptive method being used with answers being no method, folkloric, traditional and modern. We recode the answers into a dummy where modern method is 1 and all others is 0.

Antenatal Care - Periodic health check-ups during pregnancy establishes confidence between women and health care providers, and helps in the management of possible pregnancy related complications (WHO, 1994a; 1994b; 2010). For example, it may be difficult to prevent some pregnancy or labour related complications. Nonetheless regular antenatal visits may make it possible to detect such disorders and manage them effectively through the course of the pregnancy to the time of labour. In the same vein, counseling services given at antenatal centres can equip pregnant women with the requisite knowledge that helps to make pregnancy and child bearing a comfortable and worthwhile experience. Several authors have found that using antenatal services favorably influences birth outcomes, such as birth size, mature birth and safe delivery (Alexander and Korenbrot, 1995; Bloom et al., 1999; Magadi et al., 2001; Goldani et al., 2004). The World Health Organisation recommends at least 4 antenatal visits for a pregnant woman to be deemed protected from pregnancy-related risk and complications (WHO, 1994a; 1994b). Based on this recommendation, we assume that any number of antenatal visits less than 4 is as risky as not going at all. Thus, the variable is coded as 1 if a woman had 4+ visits, else 0.

Place of Delivery - This variable describes whether the last birth occurred at home or in a health care institution (public or private). Proper medical attention and hygienic conditions during childbirth reduces the risk of infection and increase the ability of health providers to intervene effectively in the event of any obstetric emergency (Navaneetham and Dharmalingam, 2002). It has equally been suggested that birth delivery assistance from a trained and well-equipped provider is essential in reducing maternal mortality (Maine and Rosenfield, 1999; Campbell and Graham, 2006; Seidell, 2000) and prevalence of low birth weight (Adetunji, 1994; Panis and Lillard, 1995; Lawn et al., 2005; Campbell and Graham, 2006). Considering that health care institutions are likely to have the requisite equipments as well as trained personnel for handling emergency obstetric complications, delivery in a health care institution is considered a safer option compared to delivery at home or with the help of a traditional birth attendant. On this basis, the variable is coded 1 if delivery took place in a health care institution (public or private) else 0.

Women's Body Mass Index (BMI) – This is the ratio of weight-to-height, calculated as weight/(height)^2. The index is believed to measure the stores of body fats (BF) – nutritional status (Seidell, 2000; Cole et al., 2000; Sahn and Younger, 2009). The index in its original form is continuous. However, WHO and the Centre for Disease Control and Prevention (CDCP), have introduced categorisations such that a BMI value <18.5 indicates Chronic Energy Deficiency (CED), whiles BMI ≥ 30 reflects excess reserves of body fats (i.e. Obesity) (WHO, 1995; WHO, 2004). Although there are other methods of measuring BF, such as under water weighing, deuterium oxide dilution and radioactive potassium counting (Deurenberg-Yap et al., 2000), such methods can be expensive and invasive (Eckhardt et al., 2003). In addition, these methods are population specific and so may not be appropriate for a cross-country context as in the current case. On the contrary, the use of BMI is devoid of complications, considering that the main inputs; weight and height are easy to obtain and available in the DHS dataset.

The choice of BMI as an indicator of women's health status lies in its supposed relationship with morbidity and mortality. In the maternal health literature, women's nutritional status is argued to be an important determinant of birth outcomes. Malnourished women are more likely to be anaemic and episodes of anaemia may also affect the health of the foetus in the utero and therefore birth outcomes - birth weight, infections, small-for-gestational-age birth, still births, preterm births, neonatal deaths etc (Cohen et al., 2001; Fowles, 2004; Lawn et al., 2005; Imdad and Bhutta, 2012). Besides the effect of women's nutritional status on birth outcomes, there is a large public health literature that discusses the effect of excess BF on women's health status (i.e. morbidity and mortality).

Existing research suggest that individuals with higher levels of excess BF (i.e. obese individuals) have higher risk exposure to diseases such as cardiovascular conditions (Sesso et al., 2000; Wannamethee and Shaper, 2002), non-insulin dependent diabetes (Fulton-Kehoe et al., 2001; Hu et al., 2001; Pfohl and Schatz, 2001), osteoporosis (Rubin et al., 1993; Nichols et al., 1994), depression (Weyerer, 1992; Paluska and Schwenk, 2000) and fall-related injuries (Cummings et al., 1990; Jaglal et al., 1993; 1995). In addition, women who have obesity related conditions such as non-insulin dependent diabetes, gestational hypertension and depression are also at risk of having adverse birth and neonatal outcomes such as spontaneous preterm births, small-for-gestational-age births, still births etc (Joy et al., 2009; Bodnar et al., 2010; Rasmussen and Galuska, 2010).

Although WHO and the CDCP recommend BMI as a fatness indicator across populations, it is not without challenges. The first challenge lies in the fact that BMI relies on weight and height as its inputs. This may create an erroneous impression of interpreting excess weight as being synonymous with accumulation of excess BF. Secondly, BMI assumes that percentage BF is independent of population sub-groups. However, research on the relationship between BMI and percentage BF suggest that individuals of different ethnic groups have significantly different BMI's at the same levels of BF, age and gender (Deurenberg-Yap et al., 2000; Wagner and Heyward, 2000; Eckhardt et al., 2003; Chang et al., 2003).

These findings suggest that BF estimates from anthropometric indicators such as BMI may contain systematic errors for individuals of different ethnic groups (Wells, 2001). Thirdly, the established thresholds for BMI cut-offs as recommended by WHO and CDCP are based on Western European and North American Societies. There is therefore the existence of some controversy in the use of BMI cut-offs as a measure of women's health and nutritional status (Deurenberg-Yap et al., 2000; Razak et al., 2007)). The main question raised is the difficulty in ascertaining the possible bias associated with the use of cut-offs. Uthman, (2009a) for example, argues that the cut-off point of <18.5 used to define CED can contain potentially healthy people leading to possible overestimation. Thus, the limitations of the use of BMI cut-offs should be taken into consideration in interpreting the results.

Notwithstanding the challenges associated with the use of BMI, it remains a relatively less expensive and easy means of assessing the nutrition and health of adults especially women. Unlike in some parts of Asia, where proposals for new BMI cut-offs that reflects the unique characteristics of their population have been put forth (Chang et al., 2003), we are not aware of any such proposals for SSA. Besides, BMI continues to be the recommended indicator for measuring BF and nutrition by WHO and CDCP. In this chapter, we use women's BMI both in its continuous form and via the standard WHO categorisations.[60] The rational for adding the cut-off categories, is on the basis that using BMI in its continuous form contains an implicit assumption that women with higher BMI are necessarily preferable. However, a BMI value ≥ 30 signifies obesity, a condition that may have adverse health implications.

5.3.2 Explanatory Variables

Explanatory variables include the main variable of interest; women's empowerment, other covariates controlled for and country fixed effects. Women's empowerment is measured via a composite index and related sub-indices. The specific variables and methods used in computing the women's empowerment indices (composite and sub) are discussed in Chapter 4 and Appendix 1. Apart from women's empowerment, other variables used in this chapter are contained in Table 5.1 and discussed in Chapter 3.

[60] WHO categorization of BMI is as follows: Women with BMI<18.5 are CED, BMI 18.5 – 24.9 are classified as normal weight, BMI 25 – 29.9 are classified as overweight and finally BMI≥30 are classified as Obese (WHO, 1995; WHO, 2004).

5.4 Method of Analysis

5.4.1 Econometric Model

The econometric model for estimating the effect of the composite women's empowerment index (CWEI), together with its sub-indices on the use of reproductive health services and women's BMI follows from the reduced form Equation in Chapter 3 (see Equation 3.4). Given that the reproductive health services variables (i.e. delivery in a health facility, 4+ antenatal visits and use of modern contraceptive methods) are in a binary choice form, the probability that a woman *i* in household *h*, community *k* and country *c* will use or not use any of the three reproductive health services conditioned on a set of exogenous covariates including women's empowerment can be estimated using Equation 5.1

$$\Pr(V_{ihkc} = 1) = \Pr\left(\beta_1 cwei\_index_{ihkc} + \beta_2 X_{ihkc} + \beta_3 X_{hc} + \beta_4 X_{kc} + \eta_c + \varepsilon_{ihkc} > 0\right) \text{ ….. (5.1)}$$

Where $V_{ihkc} = 1$ represent the choice form where the woman uses any of the 3 reproductive health services and $V_{ihkc} = 0$ is where she does not use. The parameter β_1, is a parameter for the composite women's empowerment index and its underlying dimensions (sub-indices). The parameters β_2, β_3, and β_4 are set of parameters for vectors of explanatory variables, X_{ihkc} at the **individual women's level**: woman's age in years, woman's age in years squared, birth order, woman and partner's education level, non-Christian women, X_{hc} at the **household level**: age and sex of head of household, wealth index and X_{kc} at the **community level**: rural residence, non-self cluster proportion of women visited by a family planning worker, non-self cluster proportion of children fully vaccinated and non-self cluster proportion of households with pipe water and flush toilet. The term η_c is a set of dummies for country fixed effect and ε_{ihkc} is a stochastic random error term where we assume that the errors are normally distributed (probit model). Equation 5.1 is used to estimate the effect of CWEI on the use of the three reproductive health services.

Given that the fourth indicator of women's health status, BMI is in a continuous form, an OLS model is used to estimate the effect of CWEI on women's BMI as in Equation 5.2 below.

$$BMI_{ihkc} = \beta_0 + \beta_1 cwei\_index_{ihkc} + \beta_2 X_{ihkc} + \beta_3 X_{hc} + \beta_4 X_{kc} + \eta_c + \varepsilon_{ihkc} \ldots\ldots.. \quad (5.2)$$

The β_1 is a parameter for the composite women's empowerment index and its underlying dimensions (sub-indices). The parameters β_2, β_3, and β_4 are set of parameters for vectors of explanatory variables, X_{ihkc} at the **individual women's level**: woman's age in years, woman's age in years squared, birth order, woman and partner's education level, woman is pregnant, X_{hc} at the **household level**: age and sex of head of household, wealth index and X_{kc} at the **community level**: rural residence, non-self cluster proportion of women visited by a family planning worker, non-self cluster proportion of children fully vaccinated and non-self cluster proportion of households with pipe water and flush toilet. The term η_c is a set of dummies for country fixed effect and ε_{ihkc} is a stochastic random error term.

Although Equation 5.2 will give consistent estimates of the effect of CWEI on BMI with the added advantage of simplicity, the challenge however is the implicit assumption that higher values of women's BMI are necessarily better than lower values. In the case of BMI, this assumption may not necessarily be true. For instance, women with BMI $\geq$ 30 (i.e. obesity) could be considered problematic just as those with BMI < 18.5 (CED).[61] To address this challenge, BMI is categorised via the standard WHO categorization as follows: BMI < 18.5. (CED). The second category refers to those with BMI between 18.5 and 24.9. (normal weight). The third category, overweight, represents those women with BMI between 25.0 and 29.9. The final category, obesity, refers to women with BMI $\geq$ 30. Women in the CED and obese categories are seen as being susceptible to higher levels of

[61] Women with chronic energy deficiency are deemed to be malnourished with low body fat reserves. Such a situation can make affected women more susceptible to health risk. For women in particular, being malnourished could mean giving birth to malnourished children, who may in turn have unstable health conditions. Obesity may equally be associated with adverse health implications just as CED. Women who are obese could be at risk of contracting other health related conditions such as high blood pressure, diabetes etc. with the possibility of complications in pregnancy and labour (Cogill, 2003; Sahn and Younger, 2009).

health risk exposures. This makes it possible to investigate the effect of CWEI on the different BMI categories, which represents different levels of women's health and nutrition. Given that women's BMI is now in a categorical form (i.e. in a multinomial choice form), the determinants of the probability P, of a woman *i*, in household *h*, community *k* and country *c*, belonging to any of the 4 BMI categories (CED, normal weight, overweight or obese) *j*, can be expressed as in Equation 5.3.[62]

$$P_{ihkcj} = \frac{\exp\left(\beta_j cwei\_index_{ihkc} + \beta_j X_{ihck} + \beta_j X_{hc} + \beta_j X_{kc} + \eta_c + \varepsilon_{ihkc}\right)}{\sum_{l=1}^{m} \exp\left(\beta_l cwei\_index_{ihkc} + \beta_l X_{ihck} + \beta_l X_{hc} + \beta_l X_{kc} + \eta_c + \varepsilon_{ihkc}\right)} \quad \ldots.. (5.3)$$

$$j = 1, \ldots.., m$$

The interpretation of the terms within the brackets is the same as in Equation 5.2. The effect of Equation 5.3 is for $0 < P_{ihkcj} < 1$ and $\sum_{j=1}^{m} P_{ihkcj} = 1$. To make this possible, the β's of one of the categories (normal weight) is set to zero (i.e. base category), such that the reported β's are interpreted with respect to the base. By setting the β's of normal weight to 0, the $\hat{\beta}$'s of the multinomial logit model can be interpreted as the parameters of a binary logit model (i.e. the probability of choosing alternative *j* compared to the base, conditioned on the regressors). This interpretation could change if the base category changes (Cameron and Trivedi, 2009). In each of the models above, we adjust for standard errors to take account of possible intra-cluster correlations resulting from the sampling design or the possibility of more than one woman in a household.

[62] We assume that all regressors used in this model are case-specific. The motivation behind this assumption includes: (1) the lack of any intuitive or theoretical appeal for one to conclude that some of the regressors are alternative-specific. (2) the survey did not collect alternative-specific variables on the different categories of BMI, neither is it possible to construct alternative-specific regressors from existing variables.

5.5 Descriptive Findings

This section discusses the dependent variables in the context of the countries studied, together with some bivariate association between the dependent variables, the main variable of interest (women's empowerment) and other selected covariates. Table 5.2 presents information on the percentage of health facility deliveries, women with 4+ antenatal visits, women using modern contraceptive methods and women who are CED or obese.

Before looking at the individual countries, we discuss the average values for the 20 countries. From Table 5.2, 48% of women from the 20 countries delivered in a health facility, 45% had 4+ antenatal visits, 16% used modern contraceptives, 12% are CED and 6% are obese.[63] These figures are not significantly different from the World Bank Health, Nutrition and Population Statistics for 2010, which put skilled birth attendance, 4+ antenatal visits and contraceptive prevalence for SSA at 46%, 44% and 22% respectively. The 22% contraceptive prevalence from the World Bank statistics is higher compared to the average for the 20 countries (16%). This is not surprising, considering that the World Bank figure capture overall contraceptives prevalence whiles Table 5.2 captures those using modern contraceptives. Thus, the World Bank figure of 22% for SSA could give a misleading impression. A comparison of the twenty-country average and the World Bank figures for SSA to that of South Asia's skilled birth attendance (48%), 4+ antenatal visits (46%) and contraceptive prevalence (51%), MENA's skilled birth attendance (83%) and contraceptive prevalence (58%), LAC's skilled birth attendance (90%), 4+ antenatal visits (87%) and contraceptive prevalence (75%), suggest that SSA is the worst performing region. It is therefore not surprising that SSA remains the region with the worse maternal mortality statistics and shows the least progress (1.7%) to achieving MDG 5 targets after Oceania (United Nations, 2010a; WHO, 2010).

[63] Documentation accompanying the DHS data advices the use of sample weights in the calculation of descriptive statistics (i.e. mean median percentages etc), but not regression coefficients (Rutstein and Rojas, 2006). Thus, all descriptive statistics are calculated using sample weights. On the calculation of regression coefficients, we estimated two sets of regressions, one with and the other without sample weights. The results suggested that the outcomes are not significantly different. Thus, the discussion in Section 5.6 is based on regression coefficients estimated without sample weights. The results with sample weights are not presented but are available upon request.

At the individual level, a couple of countries (Burkina Faso, Ethiopia, Guinea, Mali, Niger, Nigeria, Sierra Leone and Rwanda) fall below the twenty-country average for the three reproductive health care indicators. In the case of Ethiopia and Niger, the percentage of health facility deliveries, 4+ antenatal visits and use of modern contraceptives are exceptionally low. This perhaps emphasizes the need for the international community to focus extra attention on these countries if the use of reproductive health services is to improve and maternal morbidity and mortality reduce. On the contrary, countries such as Namibia and Swaziland show uptake of reproductive health services that are comparable to MENA. Besides Namibia and Swaziland, Ghana, Malawi and Zimbabwe perform better than the averages of SSA and South Asia, though not comparable to the average of MENA. The performance of Namibia, Swaziland, Malawi and Ghana shows that there are some success stories in SSA, which could become models for improving the use of reproductive health services in the rest of the continent.

In the case of BMI, we focus our discussion on the extreme ends of the BMI continuum (CED- < 18.5 and obesity- BMI$\geq$30), since that has implications for women's health. The twenty-country average CED of 12% is exactly the same as the average for all SSA countries (12%) as per available DHS statistics (see STATcompiler: IFC Macro, 2012). Using Measure DHS regional groupings, SSA's 12% CED is the next highest after South-East Asia's 24%. Comparing SSA to South-East Asia, one is likely to conclude that the 12% CED rate is low. However, if SSA's CED rate is compared to North Africa, West Asia and Europe (6%), Central Asia (9%) and LAC (5%), it becomes evident that SSA's CED rate is comparatively higher[64]. In addition, individual countries like Ethiopia, Niger, Burkina Faso and Senegal have CED rates far higher than the twenty-country average. What seems worrying about these countries is the fact that they are among those countries with the least percentage of health facility deliveries, 4+ antenatal visits and use of modern contraceptives. The high levels of malnutrition in these countries, coupled with poor access to and use of reproductive health services could increase pregnancy related complications and therefore adverse birth outcomes.

[64] The regional figures on CED and Obesity were calculated from country level figures retrieved from the STATcompiler of Measure DHS.

The twenty-country average obesity rate of 6% is exactly the same as the average for SSA using all SSA countries as per available DHS statistics (see STATcompiler: IFC Macro, 2012). The 6% is the second lowest obesity rate compared to North Africa, West Asia and Europe (15 %), Central Asia (6%), South and South-East Asia (3%) and LAC (13%). Looking at the regional averages for obesity alone, one is likely to conclude that obesity does not constitute a public health challenge in SSA. However, the relatively high values for Namibia and Swaziland suggest that such a conclusion may be simplistic. More importantly, phenomenal economic growth rates in SSA countries such as Ghana (13.5%), Botswana (6.2%), Equatorial Guinea (7.1%), Zambia (6.7%) and Lesotho (5.15) in recent times, coupled with reduction in poverty levels in some countries may imply movements into the middle class.[65] With more people entering the middle class, the risk of obesity and obesity related conditions could also increase. Perhaps SSA countries are currently in a better position and may be able to avoid some of the obesity related challenges confronting developed countries if bold and decisive actions can be taken now.

Besides the univariate discussion above, bivariate analyses between the dependent and selected independent variables are explored. The results in Figures 5.1 to 5.5 suggest a positive correlation between CWEI and health facility delivery, 4+ antenatal visits, use of modern contraceptives and obesity but a negative correlation with CED. There are a few countries that do not seem to conform to the general pattern. For example in Figure 5.1, Cameroon has a lower score on CWEI but a higher percentage of women delivering in a health facility (62%), with the reverse being true for Rwanda. In Figure 5.2, Guinea and Cameroon have a low score on CWEI but a relatively higher percentage of women with 4+ antenatal visits; 51% and 61% respectively.

The results of other bivariate relationships suggest that increasing birth order is associated with a reduction in the percentage of women delivering in a health facility or having 4+ antenatal visits (see Table 5.3). In addition, improving levels of education for women and their partners, household wealth, being a female household head and residing in an urban area reduces the percentage of women who are CED. The same independent variables are associated with increasing percentage of women delivering in a health facility, having 4+

[65] The growth figures were obtained from the 2011 Regional Economic Outlook for Sub-Saharan Africa report (IMF, 2011).

antenatal visits, using modern contraceptive methods and becoming obese. The bivariate findings are consistent with the literature. Women's empowerment as well as education, household wealth and place of residence have been found by prior research to be important determinants of use of reproductive health services and women's nutrition (Navaneetham and Dharmalingam, 2002; Mekonnen and Mekonnen, 2003; Smith et al., 2003; Amoah, 2003; Overbosch et al., 2004; Hindin, 2005a; Kabir et al., 2005; Uthman, 2009a; Bitew and Telake, 2010; Dake et al., 2011).

5.6 Multivariate Regression Results

Following from the objectives in Section 5.2, we estimate several multivariate regressions examining the effect of (1) CWEI (2) differential effect of social norms and women's access to resources and (3) age cohort specific effect of women's empowerment (4) dimensions of CWEI on indicators of women's health status.

5.6.1 The Effect of Women's Empowerment on Women's Health Status

First, we examine the effect of CWEI on the 4 indicators of women's health status (health facility delivery, 4+ antenatal visits, use of modern contraceptive and BMI). The results in Table 5.4 suggest that CWEI is significantly positively correlated with all the 4 indicators women's health status. This finding is consistent with other authors who have found a significant positive correlation between women's empowerment and women's health status (Gage, 1995; Abadian, 1996; Govindasamy and Malhotra, 1996; Hindin, 2000a; 2005a; 2005b; Furuta and Salway, 2006; Allendorf, 2007a).

Secondly, we examine the differential effect of social norms and women's access to resources (economic power) on the 4 indicators of women's health status. This is done by first, estimating the effect of social norms on women's health status as in model I in Table 5.5 and 5.6. The results suggest a significant positive correlation between the social norms index and all the 4 indicators of women's health status. The model is re-estimated but adding women's access to resources as an additional covariate (see model II in Table 5.5 and 5.6). As per the results, women's access to resources is significantly positively correlated with the 4 indicators of women's health status. With the introduction of women's access to resources, coefficients of the social norms index reduces, but remains significant.

This suggests that social norms is independently important for women's health status. Nonetheless, its effect on women's health status may be over-estimated in the absence of women's access to resources.

The coefficients on women's access to resources are also positive and significant, confirming that in the presence of social norms, women's access to resources remains an essential determinant of women's health status. This aspect of the result is very important, in that, it emphasizes the multidimensionality of women's empowerment and the fact that social norms is equally an important dimension of women's empowerment as women's access to resources (Folbre, 1994; Agarwal, 1997). The importance of social norms is based on the assertion that bargaining at the household level could be influenced by the broader institutional context of norms and beliefs prevailing at the community or even the national level. (Sen and Batliwala, 2000; Smith et al., 2003; Morrisson and Jütting, 2004; Jütting and Morrisson, 2005; Narayan, 2005; Mabsout and van Staveren, 2010). As a result, some authors have argued that measurement of women's empowerment/bargaining in the household without reflecting social norms could constitute an error and therefore bias results (Doss, 2011).

Additionally, we re-estimate the determinants of women's BMI using the standard WHO cut-offs instead of BMI in its continuous form. The results in Table 5.9 suggest that CWEI is significantly negatively correlated with CED but significantly positively correlated with Overweight and Obesity. The current result is very useful, in that it differentiate the effect of CWEI on CED and Obesity. Knowing that improvements in women's empowerment is more likely to reduce the number of women who are CED but at the same time more likely to lead to an increase the number of women who are obese, may help policy makers adopt the right kind of policies. For purposes of robustness as argued in Chapter 4, we replace the country dummies with real variables (i.e. log of 20 year average of health expenditure per capita and GNI per capita for each country). The results (see Table AP2-3 to AP2-8 in Appendix 2) suggest that whether health expenditure per capita or GNI per capita is used in place of country dummies, the results remain indifferent from when country dummies are used.

Fourthly, the effect of CWEI on the 4 indicators of women's health status is estimated using 6 age cohorts of women (i.e. 15-19, 20-24, 25-30, 31-35, 36-40 and 41+). The results in Table 5.8 suggest that CWEI is significantly positively correlated with place of delivery irrespective of the age cohort of the woman. For 4+ antenatal visits (see Table 5.9), CWEI remains positive but significant only for age cohorts 20-24, 25-30 and 31-35. In the case of modern contraceptives and women's BMI, the effect of CWEI is positive and significant for all age cohorts except 15-19 (see Table 5.10 and 5.11). An equally important observation is the fact that the effect of CWEI on the 3 reproductive health indicators increases consistently from age 20-24, 25-30 and 31-35. A possible explanation may be related to the extent of consumption of reproductive health services associated with the different age cohorts. For example, women in the 15-19 year cohort may be at the early stages of their reproductive cycle. However, reproductive activity may increase from age 20 and reduce after age 35 for most women. Alternatively, women are likely to gain exposure, experience and become aware of their rights with age. This may imply women having access to resources (employment, cash, education etc) and also being able to confront norms that work against their interest. The above explanation may account for the increasing effect of CWEI between ages 20 to35.

Given that women's empowerment is argued to be multi-dimensional (Kabeer, 1999; 2005; Kishor, 2000a; 2000b; Malhotra et al., 2002; Smith et al., 2003), we decompose CWEI into its dimensions (i.e. sub-indices) and estimate the effect of the individual dimensions on the 4 indicators of women's health status. Using the individual dimensions helps one to understand the importance of each of the dimensions as a determinant of women's health status. The results in Tables 5.12 to 5.16 suggest that participation in family decisions, women's perception of violent behaviour by partners, women's autonomy and women's access to resources are all significantly positively correlated with the 4 indicators of women's health status (health facility delivery, 4+ antenatal uptake, modern contraceptives and women's BMI). For the societal preferences sub-index, the effect is positive and significant only for place of delivery and use of modern contraceptives (see Table 5.15). Generally, the results suggest that all the 5 dimensions of CWEI are important determinants of women's health status, except that the effect of societal preferences on 4+ antenatal uptake and women's BMI is not significant. This also confirms the argument that different dimensions of women's empowerment affect the same or different outcome variables differently (Kabeer, 1999; 2002; 2005; Kishor, 2000a; 2000b; Malhotra et al., 2002; Smith et al., 2003).

Although a major aspect of this study is the construction of the CWEI, it is also the case that composite indices can in some instances mask the real effect of variables used to compute the index. Secondly, indices may not exist in reality and therefore augmenting the results of indices with underlying indicators in the current study could be important for policy purposes. Thus, we decompose each sub-index into its component indicators. The effect of each component indicator on the 4 indicators of women's health status is then estimated (see results in Table 5.17). The result for the indicators on participation in family decisions is set out in section A of Table 5.17. The effect of participation in any of the 5 household decisions on women's health status seems to depend on the type of decision and the women's health status indicator concerned. For example, only joint wife and husband/partner's decision on a woman's health is significantly more likely to lead to delivery in a health facility and 4+ antenatal visits. However, for large household purchases, joint decisions as well as decisions by the woman alone are both significantly more likely to lead to delivery in a health facility and 4+ antenatal visits. A similar trend is seen for decisions on daily household purchases and family visits. In the case of women's BMI, the decision-maker for the four decision areas seem irrelevant, as decisions made either by the husband/partner alone, woman alone or joint decisions are all significantly correlated with BMI.

However, a careful examination of the results shows that for the 4 household decisions, joint decisions by the woman and husband/partner are significantly positively correlated with all the four indicators of woman's health status. In addition, the coefficients for joint decisions seem to be higher, followed by decisions made by the woman alone and then by the husband/partner alone. This suggests that outcomes of joint decisions on women's health are better than if the decision was made by the woman or husband partner alone. The current results confirm prior findings (Allendorf, 2007a; Patel et al., 2007) and support the assertion that decisions that have men's support are likely to attract more household resources and therefore a higher likelihood of success. This is based on the notion that men are likely to be more efficient in investment decisions and also have access to more resources compared to women (De Mel et al., 2009; Fafchamps et al., 2011). Thus, household decisions that have the support of men are more likely to secure the needed resources for its implementation.

Section B of Table 5.17 presents results on indicators on women's perception of violent behaviour by their partners. The results suggest a positive correlation between women who disagree with wife beating and the 4 indicators of women's health status.[66] However, the significance of the coefficients depends on the reason for disagreement and the women's health status indicator. For example, a woman's disagreement with wife beating for any of the 5 reasons in section B of Table 5.17 is significantly positively correlated with women's BMI. However, only disagreement with wife beating on the basis that women argued with their husbands, refused sex or burnt food is significantly correlated with delivery in a health facility. With the exception of going out without permission, disagreement with wife beating arising from any of the remaining 4 reasons is also significantly correlated with the use of modern contraceptives. In the case of 4+ antenatal visits, only disagreement with wife beating on the basis of arguing with husband or refusing sex is significant. From the results, one can infer that the effect of bargaining power resulting from opposition to wife beating on women's health status depends on the health status indicator used (Kabeer, 1999; 2002; 2005; Malhotra et al., 2002).

Section C of Table 5.17, present results for the indicators on women's autonomy. The results suggest that women who do not have any problem seeking permission for medical help, going for medical help alone or seeking medical help from a female provider are significantly more likely to use the three reproductive health services and have a higher BMI. As indicated in Appendix 1, women who have fewer constraints on their rights and freedoms are more likely to have the capacity to make choices that protect their interest. It is therefore not surprising that women who do not have any problem seeking permission for medical help, going for medical help alone or seeking medical help from a female provider are significantly more likely to use the three reproductive health services and have a higher BMI.

[66] Note that disagreement with wife beating due to child neglect is negatively correlated with 4+ antenatal visits.

Section D of Table 5.17, present results of the indicators on societal preferences. The results suggest that number of wives is significantly negatively correlated with health facility delivery, use of modern contraceptives and women's BMI, but positively correlated with 4+ antenatal visits. A higher number of wives may be associated with household resource constraints as well as unhealthy rivalry and power struggle among co-wives. This may constrain women's access to resources to procure hospital and modern contraceptive services, hence the negative correlation. Although the positive correlation between number of wives and 4+ antenatal visits is strange, it is not entirely impossible. In countries where antenatal services are free as in some SSA countries, it is possible that higher number of wives and it associated resource constraints will not prevent women from accessing the service. Age at first marriage is positively correlated with health facility delivery and 4+ antenatal visits, but negatively correlated with women's BMI.

Couple's age difference is also significantly positively correlated with use of modern contraceptives but negatively correlated 4+ antenatal visits and women's BMI. Couple's age difference in favour of women, has been argued to be positively correlated with women's bargaining power (Thomas, 1994; Handa, 1999; Smith et al., 2003). It is therefore possible for women who are older than their husband/partners to rely on such bargaining power to improve their health status. This makes the negative correlation between couple's age difference, 4+ antenatal visits and women's BMI counterintuitive. However, as discussed in the literature, it is not implausible for women's empowerment to be negatively correlated with women's health status, especially if such empowerment results in household tension, power struggles and consequently dysfunctional behaviour from men (see Chapter 3).

Section E of Table 5.17, present results of indicators on women's access to resources. The results suggest that couple's education difference is significantly positively correlated with health facility delivery, use of modern contraceptives and women's BMI.[67] Compared to women who are not paid or have their earnings in kind, those who have a combination of cash and in-kind or cash only are more likely to deliver in a health facility and use modern contraceptives. In addition, women earning cash only, are more likely to have 4+ antenatal

[67] Couples education difference is calculated in such a way that the difference is in favour of the woman/wife (i.e. woman's education minus the husband/partner's education).

visits and higher BMI. Lastly, working women are more likely to deliver in a health facility, have 4+ antenatal visits, use modern contraceptives and have a higher BMI. Given the indicators used to capture women's access to resources, the positive correlation with the indicators of women's health status is not surprising.

A major reason for decomposing the sub-indices into underlying indicators was to find out if the indices had the tendency of masking the real effect of the individual variables used. A comparison of the results in Tables 5.12 to 5.16 and Table 5.17, suggest that there are instances where the sub-indices tell a story different from the individual indicators. For example, the results in Table 5.15 suggest that societal preferences is not significantly correlated with 4+ antenatal visits and women's BMI. However, in Table 5.17, the indicators of societal preferences (number of wives, age at first marriage and couple's age difference) are individually significantly correlated with 4+ antenatal visits and women's BMI. In addition, the results in Table 5.13 suggest women's disagreement with violent behaviour by their husband/partners is entirely not significantly correlated with 4+ antenatal visits. However, the results in Table 5.17 suggest that two components of the violence perception index (arguing with husband and refusing sex) are significantly correlated with 4+ antenatal visits. The results therefore confirm the earlier assertion that in some instances, indices are capable of masking the real effect of individual variables used to compute an index.

As argued in Chapter 4, the sub-regional trends exhibited by CWEI and its two dimensions (social norms and women's access to resources – see Appendix 1) may mean sub-regional differences in effect on outcome variables.[68] Thus we re-estimate the effect of both CWEI and its two dimensions on women's health status using data pooled on sub-regional basis.[69] The results in Table 5.18 is not entirely different from the results based on the 20 country pooled data. The CWEI is significantly positively correlated with all the 4 indicators of

[68] We additionally estimated the effect of women's empowerment on women's health using country level data. Though it reveals inter-country differences the trend is not entirely different from the results based on sub-regional data. Given that the trend in the country level estimations is not entirely different from the sub-regional estimates and that the focus of he chapter is not exploring inter-country differences, we have not included the results of the country level estimations. The results are however available on request.

[69] The 20 countries are divided into three sub-regions; **West Africa** (Burkina Faso, Ghana, Guinea, Mali, Niger, Nigeria, Sierra Leone and Senegal) , **East and Central Africa** (Cameroon, Democratic Republic of Congo-DRC, Ethiopia, Rwanda, Tanzania, Uganda) and **Sothern Africa** (Malawi, Mozambique, Namibia, Swaziland, Zambia and Zimbabwe)

women's health status in all the 3 sub-regions, except 4+ antenatal visits in Southern Africa. Both social norms and women's access to resources are positively correlated with women's health status, except in Southern Africa where access to resources is negatively correlated health facility delivery, though not significant. The coefficients are mostly significant except in a few cases.[70] Just as in the case of child health in Chapter 4, the West African estimates have more significant coefficients compared to East and Central Africa and Southern Africa. This may be an indication that women's empowerment constitute an important determinant of women's health in West Africa compared to East and Central Africa and Southern Africa.

Generally, the results suggest that women's empowerment, whether through a composite index, a sub-index or individual indicators is associated with women's health status. As discussed in Chapter 3, women's empowerment may influence women's health through it correlation with women's access to care resources (control of time and income, social support, knowledge and beliefs, confidence and self esteem etc) and consequently care for women and women's nutrition and health status. This assertion is supported by several research findings across different geographical and social settings. For example, Gage analysed the 1988 DHS for Togo and found that women's control over choice of spouse and access to cash, increases the use contraceptives (Gage, 1995). Evidence from Egypt indicates that women's mobility is strongly positively correlated with the use of contraceptives (Govindasamy and Malhotra, 1996). Findings based on data from Zimbabwe, Zambia and Malawi suggest that women's decision-making power or inputs into household decisions is negatively correlated with low BMI (Hindin, 2000a; 2005a). Evidence from India and Nepal also suggest that women's empowerment (control over finances, decision-making power, spousal discussion of family planning and women's autonomy) is positively correlated with the use of antenatal care and health facility delivery (Bloom et al., 2001; Furuta and Salway, 2006; Allendorf, 2007a). The current results confirm findings of existing studies and as well strengthen the argument that social norms are equally as important as women's access to resources in the women's empowerment discourse.

[70] The effect of women's access to resources on BMI in West Africa and East and Central Africa, health facility delivery in East and Central Africa and Southern Africa and 4+ antenatal visits in Southern Africa are not significant. In addition, the effect of social norms on health facility delivery in East and Central Africa, 4+ antenatal visits and BMI in Southern Africa is not significant.

5.6.2 Effect of Other Independent Variables on Women's Health Status

In this sub-section, we discuss the effect of other covariates adjusted for in our models on women's health status. The discussion is based on the results in Table 5.4. In addition, we also discuss the differential effect of each of the covariates based on different age cohorts (see Tables 5.8 and 5.11). In the case of women's BMI, the effect of each covariate is discussed to cover both the OLS results in Table 5.4 and the multinomial logit results in Table 5.7. The rest of the discussions are as follows:

Age of the Woman- Age of the woman has an inverted U-shaped relationship with health facility delivery, 4+ antenatal visits and women's BMI. In the case of BMI, the quadratic term is not significant in the OLS estimation but significant in the multinomial logit estimation in Table 5.7. In addition, the inverted U-shaped relationship changes to a U-shaped relationship in the multinomial logit model. The inverted U-shaped relationship implies that health facility delivery, 4+ antenatal services and women's BMI increases as age increase till an optimum point when woman's health status begins to deteriorate. The direct opposite is the case in the U-shaped relationship. Age could be associated with pregnancy related biological risk factors (Glei et al., 2003; Burgard, 2004). Others have also argued age to be a proxy for experience and accumulation of health related knowledge (Elo, 1992; Glei et al., 2003; Burgard, 2004). Such experience and pregnancy related risk factors which increases with age may be responsible for the positive correlation between age, health facility delivery and 4+ antenatal visits.

The negative correlation on the quadratic term may be due to the fact that at a certain age, reproductive activity would have reduced among women. It is also possible that at older ages, women may have wealth of experience or possibly belong to traditional groups that may be opposed to modern medicine (Navaneetham and Dharmalingam, 2002). This can influence negatively, the use of modern medicine and therefore reproductive health services. As already discussed, older women are also more likely to have been married, began reproductive life or working and earning income. Thus, socioeconomic support that comes with marriage and physiological changes associated with reproduction may all work together to contribute to weight gains. Evidence from a couple of SSA countries (Ghana, Nigeria, Ethiopia and Zimbabwe) suggests a positive relationship between age and women's BMI (Hindin, 2000a; 2005a; Amoah, 2003; Uthman, 2009a; Bitew and Telake, 2010; Dake et al., 2011).

Birth Order- Compared to lower birth order, higher birth order is negatively correlated with health facility delivery and 4+ antenatal visits, but positively correlated with use of modern contraceptives and women's BMI. Using the multinomial logit results in Table 5.7, the results remain consistent, except that birth order does not seem to be an important determinant of CED compared to overweight, obesity, health facility delivery and 4+ antenatal visits. Using the age cohorts (see Tables 5.8 to 5.11), the results remain consistent but mainly for women between the ages of 20 to 35. This is not surprising, considering that this is the prime age range for reproductive activity. The positive correlation between birth order and women's BMI may be related to local obsogenic culture associated with pregnancy and childbirth. Some authors have suggested that in many developing countries, feeding practices of women change drastically after childbirth and may be responsible for weight increases (Holdsworth et al., 2004; de-Graft, 2010; Dake et al., 2011).

Religion- The results in Table 5.4 suggest that compared to Christians, non-Christian women are significantly less likely to deliver in a health facility, have 4+ antenatal visits and use modern contraceptives. With the exception of 15-19 and 41+ age cohorts, non-Christian women are significantly less likely to use the three reproductive health services at all other ages. The insignificance of religion at the extremes of the age continuum may be due to the fact that between 15 and 19, most women will be at the early stages of reproduction, whiles after 41, reproductive activities would have declined considerably. Religion has been argued to be a socio-cultural space for practicing and upholding one's faith beliefs and values. Thus, it is possible that where such faith, values and beliefs contradict the demands of modern medicine, a choice could be made not to use reproductive health services irrespective of the consequences. For example, beliefs among some groups in Africa that obstructed labour is caused by infidelity hinder women's care seeking behaviour (Mrisho et al., 2007). Evidence from Ghana, Nigeria and Ethiopia suggest that compared to Christians, non Christian women are less likely to use reproductive health services (Addai, 2000; Ikeako et al., 2006; Dagne, 2010; Abor et al., 2011).

Woman and Partners Education- From the results in Table 5.4, both women and partner's education are significantly positively correlated with all the four indicators of women's health status. However a comparison of the coefficients on women and partner's education reveals that at each level of education and for each of the women's health status indicators, the effect of the woman's education on women's health is stronger than that of the partner. Turning to the multinomial logit estimates for BMI (see Table 5.7), the results suggest that improvement in women's education is associated with a reduction in CED, but an increase in overweight and obesity. In the case of the partner, having primary and secondary education reduces CED and increase overweight but not obesity. Tertiary education of the partner seems to have no significant effect on either CED, overweight or obesity. Using the results in Tables 5.8 to 5.10, the effect of education on health facility delivery, 4+ antenatal visits and use of modern contraceptives does not differ, especially for women between the ages of 20-40. In some instances, either the coefficient on the woman or partner's education is not significant for women between the ages of 15-19 and 41+. Although the cohort effect of education on women's BMI follows a similar trend, it is the women's education that tends to be significant compared to the partner.

It has long been argued that educated couples especially the woman, is more likely to have increased knowledge of the benefits of preventive medicine, aware of the existence of health services, receptive to new health related information, interact outside of their homes to have access to improved health producing technologies and familiar with modern healthcare culture (Gabrysch and Campbell, 2009). Others have also argued that education may be capturing contextual factors. An example buttressing this point is that educated women are more likely to live in communities where social amenities like health facilities and good water and sanitation is available. Thus, making availability and accessibility to health services relatively easy. Studies from Ghana, Nigeria, Ethiopia, Mali, Turkey and India have found a positive significant correlation between women's education and use of reproductive health services (Addai, 2000; Navaneetham and Dharmalingam, 2002; Mekonnen and Mekonnen, 2003; Overbosch et al., 2004; Kabir et al., 2005; Gage, 2007). Education could also be a path to socioeconomic progress and therefore make it relatively easy to afford the requirements of household nutrition. This may account for the reason why education is positively correlated with BMI, overweight and obesity but negatively correlated with CED. Several studies have found significant correlations between couples education and different thresholds of women's BMI (Hindin, 2000a; 2005a; Amoah, 2003; Smith et al., 2003; Uthman, 2009a; Bitew and Telake, 2010; Dake et al., 2011).

Number of Adult women in the Household- The results in Table 5.4 and the cohort results in Table 5.10 (20-25 cohort) suggest that the number of adult women in the household is significantly negatively correlated with the use of modern contraceptives. Although the main results in Table 5.4 shows that number of adult women is not significantly correlated with health facility delivery, the results in Table 5.8 (see age cohort 31-35) suggest a positive significant correlation with health facility delivery. The positive correlation with health facility delivery is straightforward. Additional women in the household could substitute for household production and childcare, thereby freeing up time and making it possible for women with younger children to visit the health facility for delivery (Hou and Ma, 2012). On the contrary, additional women in the household could constitute additional cost. In societies where modern contraception is not free, as in many SSA countries, constraints to the household budget, resulting from additional mouths to feed, may mean cutting down on items such as modern contraception (Wong et al., 1987). In instances where traditional alternatives exist, users may shift to such alternatives and thereby reduce the use of modern contraceptives.

Age and Sex of Household Head- Age and sex (female) of head of household is positively correlated with health facility delivery and women's BMI but negatively correlated with the use of modern contraceptives. Being a female household head is also significantly positively correlated with overweight. The cohort result shows basically the same trend. However, in Table 5.8, age and sex of head of household is significantly correlated with health facility delivery, mostly for women within 3 age cohorts (20-24, 25-30 and 31-35). Additionally, the effect of age and sex (female) of household head on use of modern contraceptives is mostly significant for women in the 20-24, 25-30 and 36-40 age cohorts.

Both the negative and positive effects are plausible. Considering that in many traditional societies, men constitute breadwinners, the absence of a male household head may mean constraints on household resources. This may have negative implications on the use of reproductive services such as modern contraceptives. On the contrary, a female household head could mean more autonomy and increased household decision-making power, which may lead to increased use of reproductive health services and improved women's nutrition (Hindin, 2000a; 2005a; Matsumura and Gubhaju, 2001; Gebreselassie, 2008; Jayaraman et al., 2008; Hou and Ma, 2012). Age of head of household could also be a proxy for experience, employability and consequently access to resources, which could influence reproductive health services use and or women's nutrition.

Wealth Index- Wealth index is significantly positively correlated with all the 4 indicators of women's health status. As expected, it is significantly negatively correlated with CED but positively correlated with overweight and obesity. At all age cohorts, wealth index is significantly positively correlated with all the 4 indicators of women's health status. Wealth index measures household welfare, which is argued to be positively correlated with household health status. Different authors have used different proxies of household welfare. For example, poor living standards measured by household consumption is negatively correlated with antenatal care in Ghana (Overbosch et al., 2004). In addition, household wealth and socioeconomic status measured by car ownership in Turkey (Celik and Hotchkiss, 2000), high value possessions in India (Mathews and Gubhaju, 2004), income in Pakistan (Nisar and White, 2003) and asset index in several other countries (Ahmed et al., 2010; Zere et al., 2010; Rahman et al., 2011; Abor et al., 2011) showed a positive correlation with the use of reproductive health services.

The positive correlation between BMI and wealth index is also straightforward. Higher levels of wealth may mean availability of resources to make available household nutrition requirements. Such households are also more likely to afford ostentatious and sedentary life styles, which may increase the risk of being overweight or obese. Existing studies have found a positive correlation between household wealth and obesity in Ghana (Amoah, 2003; Dake et al., 2011), Nigeria (Uthman, 2009a) and Ethiopia (Bitew and Telake, 2010).

Availability and Access to Health Services- Non-self cluster proportion of women visited by family planning workers and non-self cluster proportion of children fully vaccinated are used as proxies for the availability and accessibility of health services. The results in Table

5.4 suggest that the two proxies are significantly positively correlated with health facility delivery, 4+ antenatal visits and use of modern contraceptives. Using the age cohorts (see Table 5.8 to 5.11), the results consistently suggest that non-self cluster proportion of women visited by family planning workers and children fully vaccinated are positively correlated with health facility delivery, 4+ antenatal visits and use of modern contraceptives.[71] In addition, non-self cluster proportion of households with pipe water and flush toilets are used as proxies for the availability of social infrastructure such as hospitals and schools. From the results in Table 5.4, pipe water is significantly positively correlated with health facility delivery and 4+ antenatal visits, whiles flush toilet is significantly negatively correlated with place of delivery and use of modern contraceptives.

The negative correlation between flush toilets in the neighbhourhood, health facility delivery and use of modern contraceptives is surprising. It may be the case that in SSA, the number of households with access to good sanitation such as flush toilet is very low.[72] Thus changes in the number of households with flush toilet may not necessarily be related with the provision of social infrastructure such as hospitals. The positive correlation between the health accessibility/availability proxies and use of reproductive health services are not unexpected. The current results confirm the results of other authors who have found a positive correlation between health services availability/accessibility proxies and indicators of health status (Sahn, 1994; Lavy et al., 1996; Thomas et al., 1996). There are also instances in the literature where health accessibility/availability proxies have been found to be negatively correlated with health status indicators (Lavy et al., 1996; Thomas et al., 1996).[73] In Kenya, non-self cluster proportions of children vaccinated and tetanus toxoid vaccine uptake by expectant mothers were negatively correlated with child height for age (Kabubo-Mariara et al., 2009).

[71] Note that non-self cluster proportion of women visited by family planning workers is not significantly correlated with any of the three reproductive services within the 15-19 age cohort.

[72] As per the World Development Indicators Database for 2012, SSA has the smallest percentage of urban population with access to good sanitation (protected pit latrines to flush toilets with a sewerage connection) compared to LAC, Middle East and North Africa and South Asia (World Bank, 2012).

[73] In Lavy et al., (1996) and Thomas et al., (1996), health services availability proxies such as nurses and nursing staff, hospital support staff, were negatively correlated with child height for age z-scores.

Place of Residence- From the results in Table 5.4 and 5.7, rural women are significantly less likely to deliver in a health facility, have 4+ antenatal visits, use modern contraceptives and become overweight or obese. Generally, place of residence may be capturing other effects that have socio-economic relevance. In developing countries, the distribution of public infrastructure such as health facilities, roads etc, may be skewed toward urban centres. This may have consequences for reduced use of reproductive health services (Addai, 2000; Celik and Hotchkiss, 2000; Allendorf, 2010; Abor et al., 2011). In addition, rural women may have income constraints and are also more likely to be engaged in manual agricultural work. This may imply heavy demands on body stores of energy and yet reduced capacity to afford daily nutritional requirements. Such situations can compromise the nutritional status of women as found in several other studies (Amoah, 2003; Mohan et al., 2004; Xu et al., 2005; Malik and Bakir, 2007).

5.6.3 Robustness Checks

As indicated in Chapter 4, Section 4.7.3, one suspects that CWEI may be endogenous. Although the results of the robustness checks in Chapter 4 suggest that CWEI is not endogenous, we have decided to repeat the tests for our models estimating the effect of CWEI on women's health status. To do this, we compute three variables (couple's age ratio, non-self cluster differences in deaths among boys and girls and non-self cluster differences in preference for a girl or a boy child) from the DHS data to be used as instruments. First, we check that the instruments are correlated with CWEI but not with the women's health status indicators. The results in Table AP2-12 suggest that the instruments correlated with CWEI but not with the women's health status indicators are (1) couple age ratio and non-self cluster differences in deaths among boys and girls for the health facility delivery model, (2) non-self cluster differences in deaths among boys and girls for the 4+ antenatal visits model and (3) non-self cluster differences in preference for a girl or a boy child and non-self cluster differences in deaths among girls and boys for the BMI model. From the results in Table AP2-12, none of the 3 variables can be used as valid instruments in the modern contraceptive usage model.

Using the valid instruments identified above, we use an IV probit estimator (i.e. for health facility delivery and 4+ antenatal visits models) and a two-step GMM estimator (i.e. for the

BMI model) to run 3 tests to ascertain whether CWEI is endogenous or not.[74] From the results of the tests (see Table AP2-11), the first-stage F-statistic and overidentification test suggest that the instruments used are valid and as well not weak (see Table AP2-11). However, the Durbin-Wu Hausman test of the null hypothesis that CWEI is exogenous is not rejected in all the specifications (health facility delivery, 4+ antenatal visits and women's BMI). As discussed in Chapter 4, this means that CWEI may not be endogenous. In addition, the failure to reject the null of exogeneity supports the use of the probit and OLS models to estimate the effect of CWEI on the indicators of women's health status, as the results are largely consistent with the existing literature. Even where the 3 instruments are used via an IV procedure to estimate the effect of CWEI on the 3 indicators of women's health status (i.e. IV probit for health facility delivery and 4+ antenatal visits and two-stage GMM for BMI), the results do not change substantially from the probit and OLS results. As suggested in Chapter 4, this is further support for the use of the probit, multinomial logit and OLS models given that they are simpler and more efficient than corresponding IV estimators, especially where the supposed endogenous regressor is not endogenous (Cameron and Trivedi, 2009) .[75]

5.7 Policy Implications

The current results confirms the results in Chapter 4, in that social norms is suggested to be equally as important as women's access to resources in determining women's health status. Additionally, the effect of women's empowerment is dependent on the age of the woman, as the results suggest that interventions to improve women's health are likely to have a higher effect among women in the reproductive age range compared to those at the extremes of the age continuum (15-20 and 41+). Thus, it is important that in using women's empowerment as a policy intervention, social norms receive as much emphasis as access to resources, which seem to be the focus of a large section of the women's

[74] Although the use of two-step instrumental variable probit is quiet common in the literature, we use the ivprobit estimator due to its efficiency and simplicity. Besides, the ivprobit estimator makes it easy to adjust the standard errors to cater for intra-cluster correlation arising from the sampling strategy of the DHS. The advantages of using a two-step GMM estimator has been discussed in Section 4.7.3 of Chapter 4.

[75] Documentation accompanying the DHS data advices the use of sample weights in the calculation of descriptive statistics (i.e. mean median percentages etc), but not regression coefficients (Rutstein and Rojas, 2006). Thus, all descriptive statistics are calculated using sample weights. On the calculation of regression coefficients, we estimated two sets of regressions, one with and the other without sample weights. The results suggested that the outcomes are not significantly different. Thus, the discussion in section 4.6 is based on regression coefficients estimated without sample weights. The results with sample weights are not presented but are available upon request.

empowerment/bargaining literature. However, as indicated in Chapter 4, the challenge policy makers face is the issue of how to seek a balance between interventions that addresses social norms, women's access to resources and other determinants of women's health such as education, household wealth, access to and availability of health services. Thus in this section, we extend the simulation exercise in Chapter 4 to cover indicators of women's health status.

The same assumptions and method used in estimating the policy implications of movements in selected independent variables on child health in Section 4.8 of Chapter 4 is applicable in this section. The main difference is that in this section, we focus on indicators of women's health status (health facility delivery, 4+ antenatal services visits, use of modern contraceptives and women's BMI). The results of the analysis is presented in Table 5.19A and 5.19B (use of reproductive services) and Table 5.20 (women's BMI). As suggested in Section 4.8, it must be emphasised that this exercise does not seek to suggest causality from the selected policy variables to the dependent variables used.

Assuming that SSA governments are able to implement policies to bridge the gender inequality gap and improve women's empowerment, such that there is substantial upward movement of women from the lowest to the middle 20% of the CWEI distribution, what will the effect be on women's health status? The results in Table 5.19A suggest that the percentage change in the probability of using reproductive health services between women in the lowest 20% and middle 20% of the CWEI distribution is 50% for health facility delivery, 30% for 4+ antenatal visits and 86% for use of modern contraceptives. In the case of women's nutrition (BMI) (see Table 5.20), a movement from the lowest to the middle 20% of the CWEI distribution is associated with 23% and 4% reduction in the probability of a woman becoming CED or having normal weight respectively. For the same level of movement in the CWEI distribution, the probability of becoming overweight or obese increases by 30% and 86% respectively.

We also compare the effect of improvement in social norms and women's access to resources. The results (see Table 5.19A) suggest that a movement from the lowest 20% to the middle 20% of the social norms distribution is associated 52.3%, 37%, and 101% improvement in the probability of delivering in a health facility, having 4+ antenatal visits and use of modern contraceptives respectively. On the contrary, the same level of movement in the distribution of women's access to resources is associated with relatively lower percentage improvements in the probability of delivering in a health facility (13.8%), having 4+ antenatal visits (17%) and use of modern contraceptives (13.7%). Consistent with the results in Chapter 4, interventions that improve social norms are more likely to lead to improved use of women's reproductive health services compared to women's access to resources.

In the women's empowerment literature, the centrality of social norms/institutions to the ability of women to negotiate rights and freedoms has been emphahsised (Kabeer, 2005; Narayan, 2005; Allendorf, 2007b; Goldstein and Udry, 2008; Wahhaj and Kanzianga, 2010). It is therefore reasonable from a policy perspective, that a lot more attention is focused on addressing social norms/institutions that constrain the rights and freedoms of women. This may help improve the success of policies aimed at empowering women economically and consequently improving their health outcomes. Besides, there is evidence in the literature to suggest that access to resources is not a sufficient condition for the exercise of agency (Lokshin and Ravallion, 2005) and the fact that the impact of access to resources on agency is often lower than variables denoting social norms (Roy and Niranjan, 2004; Kamal and Zunaid, 2006; Allendorf, 2007b).

Besides women's empowerment, we also examine the policy implications of changes in couple's education, household wealth and place of residence (see Table 5.19A). The percentage increase in the mean probability of delivering in a health facility, having 4+ antenatal visits and using modern contraceptives is 82%, 67% and 200% respectively between women with no education and primary education. For the same level of upward movement in partner's education, the mean probability of delivering in a health facility, having 4+ antenatal visits and using modern contraceptives increases by 63%, 73% and 206% respectively. In addition, the mean probability of delivering in a health facility having 4+ antenatal visits and using modern contraceptives also increases by 52%, 22% and 33% respectively for movements from the poorest to the middle wealth quintile. This trend is basically the same for difference between women in rural and urban areas.

The effect of women's education on women's nutrition is not different from the effect of women's education on the use of reproductive health services (see Table 5.20). For example, the percentage reduction in the mean probability of a woman becoming CED or having normal weight is 42% and 2% respectively for an upward movement from no education to primary education. On the contrary, an upward movement from no education to primary education is associated with an increase in the mean probability of becoming overweight or obese by 59% and 102% respectively. In addition, an upward movement from the poorest to the middle wealth quintile is associated with a reduction in the mean probability of becoming CED (16%), having normal weight (3%), but an increase in the mean probability of becoming overweight or obese by 38% and 81% respectively. Living in a rural area also increases the mean probability of becoming CED or having normal weight, but on the contrary, associated with a reduction in the mean probability of being overweight or obese.

From the discussions above, two policy options are plausible for SSA governments. As in the case of child health (see Section 4.8 in Chapter 4), SSA governments can pursue a two-prong policy approach in other to improve women's health. Policies to bridge the gender inequality gap and improve women's empowerment (e.g. policies to increases women's access to resources as well as dealing with the negative effect of social norms on women status) will be an option to pursue. However, as discussed in Chapter 4, social norms take time to change. Thus, the impact of such policies may be realised in the long-term rather than the short-term. In addition to women's empowerment, governments can pursue aggressive strategies that increase the number of women with basic education (primary and secondary) as well reducing poverty and improving household incomes.

5.8 Conclusion

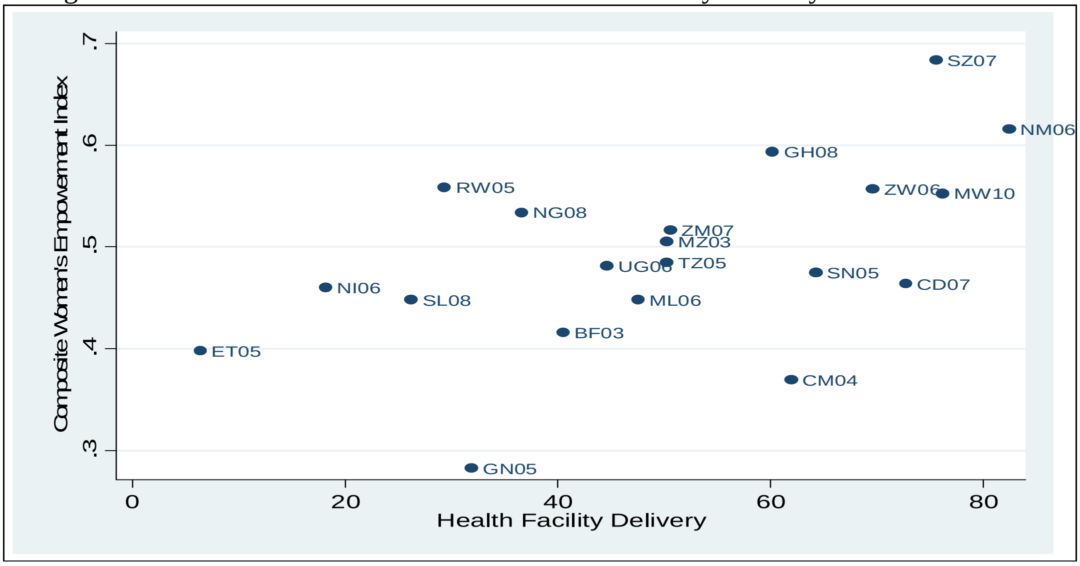
The findings of this chapter suggest that women's empowerment is positively correlated with women's health status. More importantly, the results suggest that social norms, a dimension of women's empowerment, is an important determinant of women's health status. The results also suggest that in some instances, the effect of some covariates on women's health status depends on the age of the woman. The current results therefore confirm the results in Chapter 4 and reiterate the argument that other dimensions of women’s empowerment such as social norms are important both to the women’s empowerment discourse and the women’s health literature.

Another important finding from this chapter is the fact that the composite index (CWEI) is significantly correlated with all the indicators of women’s health status, but the results of the sub-indices suggest otherwise. Some of the sub-indices are not significantly correlated with some of the women’s health status indicators. This confirms the discussion in Chapter 3 that women’s empowerment is multi-dimensional and that different dimensions may have different relationships with different outcome variables. Knowing which dimension of women’s empowerment is important for particular health status indicators makes it relatively easy for policy makers to develop appropriate and suitable interventions.

An equally important finding that reflects the findings in Chapter 4 is the fact that the effect of household decision-making on women’s health status is higher when such decisions are jointly made by couples, compared to when such decisions are made solely by women or their husband/partners. This confirms the findings of prior research as already discussed. This may be an indication that joint decisions by a couple, has a higher return on household health compared to individual decisions. This finding could have profound implications on policy interventions, given that a large section of the existing literature emphasise the importance of individual decisions, especially by the woman. As indicated in Chapter 4, the use of equal weights in computing the composite women’s empowerment index as well a possible identification issues in our models could constitute limitations. Notwithstanding these limitations, we believe that the robust methods used throughout the chapter makes the results sufficiently reliable.

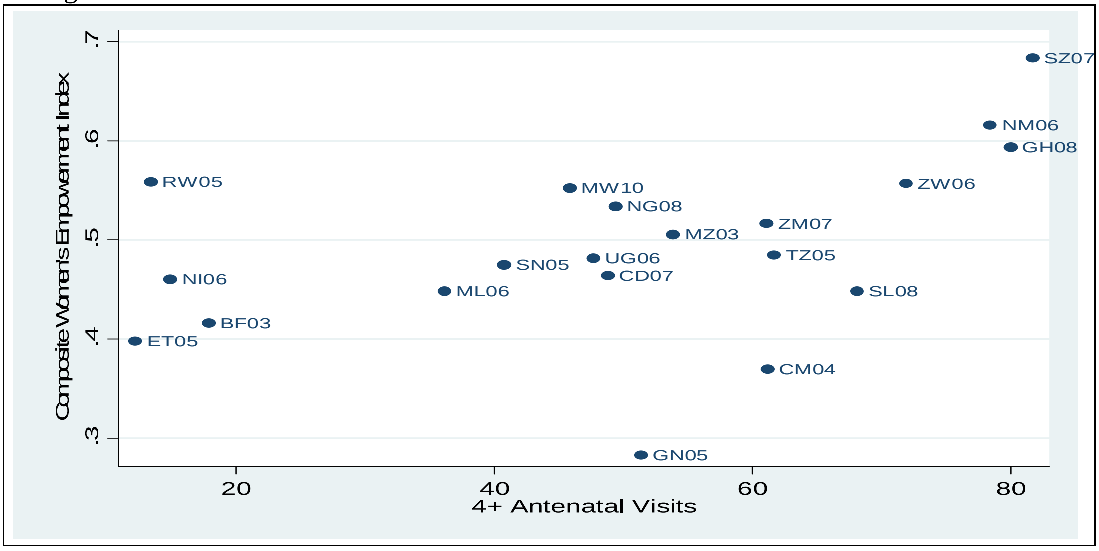
LIST OF FIGURES AND TABLES TO CHAPTER 5

Figure 5.1: Correlation Between CWEI and Health Facility Delivery



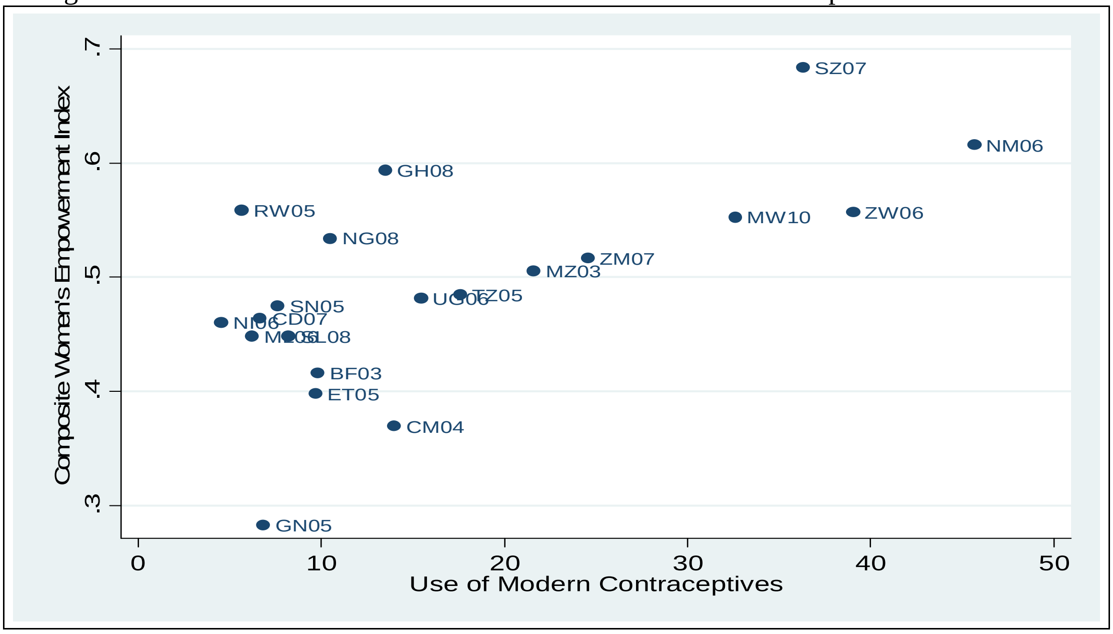
Source: Author's Computation via DHS

Figure 5.2: Correlation Between CWEI and 4+ Antenatal Visits



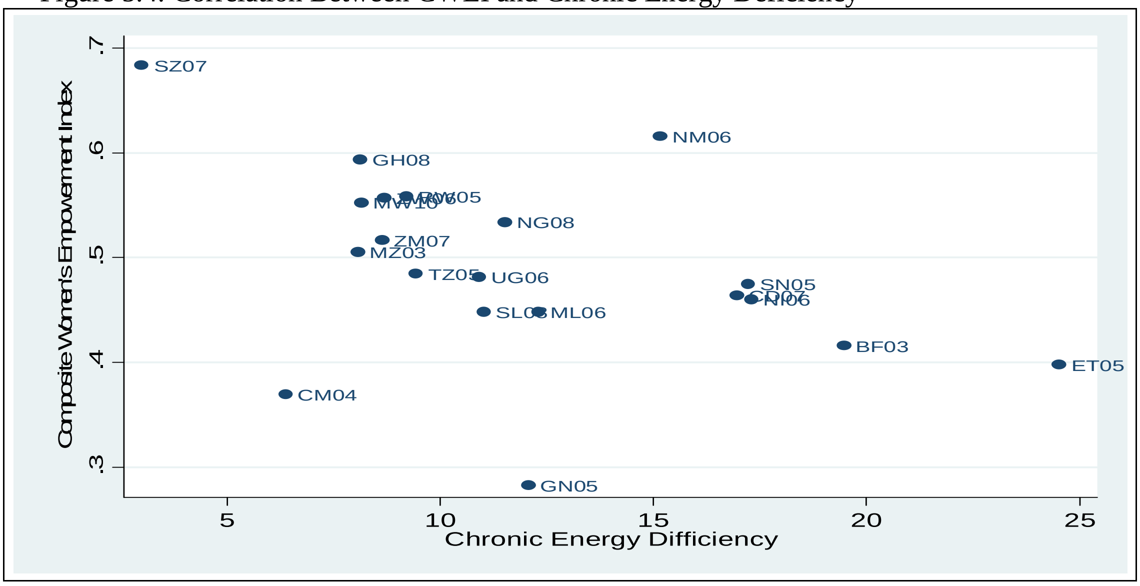
Source: Author's Computation via DHS

Figure 5.3: Correlation Between CWEI and Use of Modern Contraceptives



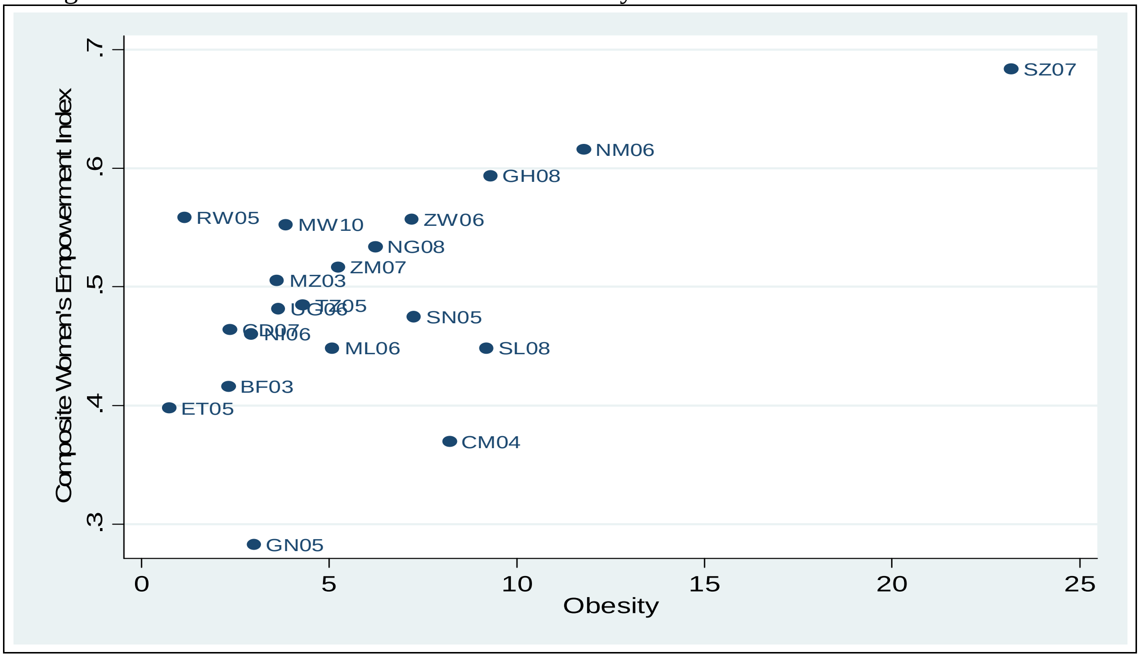
Source: Author's Computation via DHS

Figure 5.4: Correlation Between CWEI and Chronic Energy Deficiency



Source: Author's Computation via DHS

Figure 5.5: Correlation Between CWEI and Obesity



Source: Author's Computation via DHS

Table 5.1: Summary Statistics of Variables Used

Variables	Observ.	Mean	SD	Variable Type
Health Facility Delivery	42,966	0.461	0.498	Dummy
Composite Empowerment Index	42,966	0.483	0.157	Dummy
Social Norms Index	42,966	0.475	0.177	Dummy
Access to Resources Index	42,966	0.683	0.220	Continuous
Woman' Age	42,966	29.703	7.158	Continuous
Woman's Age Square	42,966	933.530	449.064	Continuous
Birth Order				
1st Order Birth **(References)**	42,966	0.139	0.346	Dummy
2nd Order Birth	42,966	0.170	0.376	Dummy
3rd Order Birth	42,966	0.160	0.366	Dummy
4th Order Birth	42,966	0.531	0.499	Dummy
Non-Christian Women[76]	42,966	0.422	0.494	Dummy
Woman's Education				
No Education **(Reference)**	42,966	0.484	0.500	Dummy
Primary Education	42,966	0.334	0.472	Dummy
Secondary Education	42,966	0.155	0.362	Dummy
Tertiary Education	42,966	0.027	0.162	Dummy
Partner's Education				
No Education **(Reference)**	42,966	0.411	0.492	Dummy
Primary Education	42,966	0.324	0.468	Dummy
Secondary Education	42,966	0.213	0.410	Dummy
Tertiary Education	42,966	0.052	0.222	Dummy
No. of Adult women in Household	42,966	1.581	1.019	Ordered
Female Household Head	42,966	0.115	0.319	Dummy
Age of Head of Household	42,966	40.382	12.377	Continuous
Wealth Index	42,966	-0.114	0.916	Continuous
NSCPW- Family Planning Visits	42,966	0.067	0.088	Continuous
NSCPC- Fully Vaccinated	42,966	0.766	0.188	Continuous
NSCPH- Pipe Water	42,966	0.444	0.148	Continuous
NSCPH- Flush Toilet	42,966	0.107	0.108	Continuous
Rural Residence	42,966	0.769	0.422	Dummy
Woman is Pregnant	42,944	0.127	0.333	Dummy
Sample Dummy				
4+ Antenatal Visits	41,705	0.480	0.500	
Modern Family Planning Model	43012	0.195	6.396	
Women's BMI Model	42,944	22.334	3.881	

Source: Author's Calculations via DHS Data. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women and NSCPC is non-self cluster proportion of children. Note that the summary statistics given above refers mainly to the main model for the health facility specifications. The same variables are used in the 4+ antenatal visits, modern family planning and women's BMI specifications but with a slightly different sample as indicated by the sample dummy variable. Note also that other specifications (based on the sub-indices and individual indicators used in computing the sub-indices) used different samples as indicated in the tables containing the respective results. Note, the summary statistics for the instruments used for the robustness checks are not reported**.**

[76] Non-Christian women are made up of Muslims, traditional religion and others.

Table 5.2: Percentage of Women Using Reproductive Health Services, and Women's Nutrition by Country

Countries	Health. Facility Delivery (%)	Antenatal Visits ≥ 4 (%)	Use Modern FP (%)	CED (%)	Obese (%)
Ghana – 2008	60.19	80	13.49	8.12	9.3
Burkina Faso - 2003	40.48	17.87	9.82	19.47	2.31
Cameroon - 2004	61.95	61.17	13.98	6.37	8.2
Dem Rep of Congo - 2007	72.71	48.78	6.65	16.95	2.36
Ethiopia - 2005	6.39	12.2	9.68	24.52	0.73
Guinea - 2005	31.87	51.39	6.83	12.06	2.99
Malawi - 2010	76.19	45.84	32.62	8.14	3.85
Mali – 2006	47.54	36.14	6.23	12.3	5.09
Mozambique - 2003	50.25	53.85	21.61	8.06	3.61
Namibia - 2006	82.42	78.43	45.66	15.16	11.78
Niger – 2006	18.16	14.9	4.54	17.3	2.93
Nigeria - 2008	36.57	49.38	10.49	11.51	6.23
Sierra Leone - 2008	26.19	68.12	8.19	11.02	9.19
Rwanda - 2005	29.33	13.37	5.65	9.2	1.14
Senegal - 2005	64.24	40.77	7.62	17.22	7.26
Swaziland - 2007	75.57	81.69	36.31	2.99	23.18
Tanzania - 2005	50.25	61.69	17.59	9.43	4.3
Uganda - 2006	44.6	47.7	15.44	10.91	3.64
Zambia - 2007	50.57	61.09	24.56	8.63	5.24
Zimbabwe - 2006	69.6	71.91	39.05	8.68	7.2
Average for the 20 Ctries	**48.17**	**44.98**	**16.11**	**11.98**	**5.77**

Source: Author's Calculations via DHS Data[77]

[77] The figures in Table 5.2 are compared with the official DHS reports for the respective countries to check for their accuracies. For health facility delivery and 4+ antenatal visits, figures from the official DHS reports are Ghana (58%, 78.2%), Ethiopia (6%, 12.2%), Malawi (75%, 45.5%), Sierra Leone (25%, 56%), Swaziland (74%, 79.3%), Tanzania (47%, 61.5%), Uganda (41%, 47.2%), Zambia (48%, 60.3%) and Zimbabwe (68%, 71.1%). The differences between the figures from the official reports and those in Table 5.2 are due to missing data. In our analysis we do not include missing data whiles in the official reports they are included. For example in Sierra Leone and Swaziland, the extent of missing data is 17.6% and 3% respectively for women who have 4+ antenatal visits.

Table 5.3: Bivariate Relationship Between Women's Health Status and Selected Independent Variables

Variables	**Health Facility Delivery**		**Antenatal Visits ≥ 4 (%)**		**Use Modern Contracep (%)**		**Women's BMI**	
	No	**Yes**	**No**	**Yes**	**No**	**Yes**	**CED**	**Obese**
Birth Order								
1st Order Birth	37.18	62.82	47.88	52.12	80.44	19.56	10.12	4.89
2nd Order Birth	46.23	53.77	50.42	49.58	78.05	21.95	9.53	6.78
3rd Order Birth	50.21	49.79	53.03	46.97	78.47	21.53	9.03	7.79
4th Order Birth	60.25	39.75	60.16	39.84	82.59	17.41	10.92	7.44
Woman's Education								
No Education	71.53	28.47	69.92	30.08	93.13	6.87	15.31	2.92
Primary Education	43.47	56.53	49.83	50.17	80.93	19.07	10.7	5.39
Secondary Education	20.15	79.85	28.98	71.02	74.72	25.28	9.47	8.94
Tertiary Education	7.11	92.89	10.9	89.1	67.65	32.35	4.82	17.68
Partner's Education								
No Education	72.31	27.69	72.23	27.77	93.47	6.53	14.84	3.42
Primary Education	50.35	49.65	53.2	46.8	78.47	21.53	8.26	5.23
Secondary Education	29.87	70.13	36.78	63.22	72	28	6.76	10.74
Tertiary Education	19.77	80.23	20.91	79.09	69.57	30.43	4.08	19.2
Sex of Household Head								
Male	54.01	45.99	56.92	43.08	84.52	15.48	12.39	5.23
Female	42.06	57.94	46.47	53.53	81.93	18.07	10.73	7.42
Wealth Index								
Poorest	71.98	28.02	66.99	33.01	90.53	9.47	15.45	1.76
Poorer	64.88	35.12	62.09	37.91	88.33	11.67	14.49	2.27
Middle	55.44	44.56	56.9	43.1	86.05	13.95	12.86	3.7
Richer	40.78	59.22	50.02	49.98	81.14	18.86	10.32	6.65
Richest	19.44	80.56	34.69	65.31	75.81	24.19	7.99	12.61
Residence								
Urban	22.01	77.99	35.66	64.34	77.51	22.49	8.78	10.91
Rural	62.22	37.78	61.64	38.36	80.44	19.56	13.58	3.2

Source: Author's Calculations via DHS Data. Notes 1st birth order, no education, male household head, poorest wealth quantile and urban residence are used as the references

Table 5.4: Effect of Women's Empowerment on Women's Health Status

Variables	**Place of Delivery**		**4+ Antenatal Visits**		**Modern Contraceptives**		**Women's BMI**	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**
Composite Index (CWEI)	0.246	[0.023]***	0.133	[0.021]***	0.121	[0.015]***	1.091	[0.139]***
Woman's Age in Years	0.018	[0.004]***	0.023	[0.003]***	-0.004	[0.002]	0.070	[0.021]***
Woman's Age in Years Sq	-0.000	[0.000]***	-0.000	[0.000]***	0.000	[0.000]	-0.000	[0.000]
Birth Order								
2nd Order Birth	-0.111	[0.011]***	-0.049	[0.011]***	0.046	[0.008]***	0.186	[0.052]***
3rd Order Birth	-0.138	[0.011]***	-0.079	[0.012]***	0.055	[0.008]***	0.446	[0.066]***
4th Order Birth	-0.201	[0.013]***	-0.113	[0.013]***	0.069	[0.007]***	0.481	[0.072]***
Woman's Education								
Primary	0.115	[0.009]***	0.063	[0.008]***	0.059	[0.006]***	0.389	[0.045]***
Secondary	0.189	[0.010]***	0.122	[0.010]***	0.094	[0.009]***	0.714	[0.082]***
Tertiary	0.288	[0.026]***	0.186	[0.025]***	0.091	[0.017]***	1.047	[0.172]***
Partner's Education								
Primary	0.069	[0.008]***	0.077	[0.008]***	0.043	[0.007]***	0.158	[0.049]***
Secondary	0.085	[0.009]***	0.099	[0.011]***	0.057	[0.008]***	0.166	[0.065]**
Tertiary	0.087	[0.017]***	0.164	[0.017]***	0.062	[0.014]***	0.299	[0.114]***
No. of Adult women in HH	0.005	[0.004]	-0.002	[0.003]	-0.006	[0.002]***	-0.022	[0.019]
Sex of Head of Household	0.027	[0.008]***	0.005	[0.009]	-0.028	[0.005]***	0.097	[0.052]*
Age of Head of Household	0.001	[0.000]***	0.000	[0.000]	-0.001	[0.000]***	0.003	[0.002]*
Wealth Index	0.154	[0.005]***	0.079	[0.005]***	0.045	[0.003]***	1.095	[0.037]***
NSCPW- Family Planning Wker	0.213	[0.035]***	0.231	[0.036]***	0.137	[0.024]***	-0.292	[0.208]
NSCPC- Fully Vaccinated	0.567	[0.022]***	0.494	[0.020]***	0.091	[0.012]***	0.040	[0.103]
NSCPH- Pipe Water	0.161	[0.027]***	0.125	[0.024]***	-0.019	[0.015]	0.198	[0.149]
NSCPH- Flush Toilet	-0.154	[0.037]***	-0.028	[0.041]	-0.050	[0.022]**	0.169	[0.250]
Rural Residence	-0.172	[0.008]***	-0.035	[0.009]***	-0.043	[0.006]***	-0.288	[0.059]***
Non-Christian Women	-0.043	[0.006]***	-0.032	[0.006]***	-0.015	[0.004]***		
Woman is Pregnant							0.948	[0.049]***
Country Fixed Effects	Yes		Yes		Yes		Yes	
Observations	42966		41705		43012		42944	
R^2 /pseudo R^2	0.271		0.198		0.211		0.198	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Country fixed effects are controlled for but not report. Reported standard errors are based on a cluster robust covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women and NSCPC is non-self cluster proportion of children. Note that place of delivery, antenatal and family planning estimates are marginal effects.

Table 5.5: Differential Effect of Social Norms and Women's Access to Resources on Women's Health Status

Variables	Place of Delivery				4+ Antenatal Visits			
	Model I		Model II		Model I		Model II	
	Beta	SE	Beta	SE	Beta	SE	Beta	SE
Social Norms Index	0.182	[0.019]***	0.178	[0.019]***	0.107	[0.019]***	0.106	[0.019]***
Access to Resources Index			0.092	[0.013]***			0.035	[0.015]**
Woman's Age in Years	0.018	[0.004]***	0.018	[0.004]***	0.023	[0.003]***	0.023	[0.003]***
Woman's Age in Years Sq	-0.000	[0.000]***	-0.000	[0.000]***	-0.000	[0.000]***	-0.000	[0.000]***
Birth Order								
2nd Order Birth	-0.111	[0.011]***	-0.111	[0.011]***	-0.049	[0.011]***	-0.049	[0.011]***
3rd Order Birth	-0.137	[0.011]***	-0.138	[0.011]***	-0.078	[0.012]***	-0.079	[0.012]***
4th Order Birth	-0.201	[0.013]***	-0.201	[0.013]***	-0.113	[0.013]***	-0.114	[0.013]***
Woman's Education								
Primary	0.114	[0.009]***	0.115	[0.009]***	0.062	[0.008]***	0.063	[0.008]***
Secondary	0.188	[0.010]***	0.191	[0.010]***	0.120	[0.010]***	0.122	[0.010]***
Tertiary	0.288	[0.026]***	0.288	[0.026]***	0.185	[0.025]***	0.185	[0.025]***
Partner's Education								
Primary	0.070	[0.008]***	0.068	[0.008]***	0.078	[0.008]***	0.077	[0.008]***
Secondary	0.088	[0.009]***	0.084	[0.009]***	0.101	[0.011]***	0.100	[0.011]***
Tertiary	0.091	[0.017]***	0.086	[0.017]***	0.165	[0.017]***	0.164	[0.017]***
No. of Adult women in HH	0.004	[0.004]	0.004	[0.004]	-0.002	[0.003]	-0.002	[0.003]
Sex of Head of Household	0.028	[0.008]***	0.028	[0.008]***	0.006	[0.009]	0.005	[0.009]
Age of Head of Household	0.001	[0.000]***	0.001	[0.000]***	0.000	[0.000]	0.000	[0.000]
Wealth Index	0.158	[0.005]***	0.153	[0.005]***	0.081	[0.005]***	0.079	[0.005]***
NSCPW- Family Plan Worker	0.214	[0.035]***	0.214	[0.035]***	0.231	[0.036]***	0.231	[0.036]***
NSCPC- Fully Vaccinated	0.566	[0.022]***	0.568	[0.022]***	0.493	[0.020]***	0.494	[0.020]***
NSCPH- Pipe Water	0.162	[0.027]***	0.162	[0.027]***	0.124	[0.024]***	0.125	[0.024]***
NSCPH- Flush Toilet	-0.152	[0.037]***	-0.153	[0.037]***	-0.027	[0.041]	-0.028	[0.041]
Rural Residence	-0.176	[0.008]***	-0.172	[0.008]***	-0.037	[0.009]***	-0.035	[0.009]***
Non-Christian Women	-0.042	[0.006]***	-0.044	[0.006]***	-0.031	[0.006]***	-0.032	[0.006]***
Country Fixed Effects	Yes		Yes		Yes		Yes	
Observations	42966		42966		41705		41705	
R^2 /pseudo R^2	0.271		0.272		0.198		0.198	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Country fixed effects are controlled for but not report. Reported standard errors are based on a cluster robust covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women and NSCPC is non-self cluster proportion of children. Note that estimates are marginal effects.

Table 5.6: Differential Effect of Social Norms and Women's Access to Resources on Women's Health Status- Cont.

Variables	Modern Contraceptives				Women's BMI			
	Model I		Model II		Model I		Model II	
	Beta	SE	Beta	SE	Beta	SE	Beta	SE
Social Norms Index	0.074	[0.013]***	0.070	[0.013]***	0.897	[0.119]***	0.890	[0.119]***
Access to Resources Index			0.068	[0.010]***			0.207	[0.092]**
Woman's Age in Years	-0.003	[0.002]	-0.003	[0.002]	0.071	[0.021]***	0.070	[0.021]***
Woman's Age in Years Sq	0.000	[0.000]	0.000	[0.000]	-0.000	[0.000]	-0.000	[0.000]
Birth Order								
2nd Order Birth	0.046	[0.008]***	0.046	[0.008]***	0.187	[0.052]***	0.186	[0.052]***
3rd Order Birth	0.055	[0.008]***	0.054	[0.008]***	0.448	[0.066]***	0.447	[0.066]***
4th Order Birth	0.068	[0.007]***	0.068	[0.007]***	0.483	[0.072]***	0.482	[0.072]***
Woman's Education								
Primary	0.059	[0.006]***	0.059	[0.006]***	0.383	[0.045]***	0.387	[0.045]***
Secondary	0.094	[0.009]***	0.096	[0.009]***	0.702	[0.082]***	0.710	[0.082]***
Tertiary	0.093	[0.017]***	0.093	[0.017]***	1.038	[0.172]***	1.042	[0.172]***
Partner's Education								
Primary	0.044	[0.007]***	0.043	[0.007]***	0.163	[0.049]***	0.159	[0.049]***
Secondary	0.059	[0.008]***	0.055	[0.008]***	0.179	[0.065]***	0.170	[0.065]***
Tertiary	0.065	[0.014]***	0.060	[0.014]***	0.314	[0.114]***	0.305	[0.114]***
No. of Adult women in HH	-0.006	[0.002]***	-0.006	[0.002]***	-0.022	[0.019]	-0.022	[0.019]
Sex of Head of Household	-0.027	[0.005]***	-0.027	[0.005]***	0.097	[0.052]*	0.097	[0.052]*
Age of Head of Household	-0.001	[0.000]***	-0.001	[0.000]***	0.003	[0.002]*	0.003	[0.002]*
Wealth Index	0.047	[0.003]***	0.043	[0.003]***	1.110	[0.037]***	1.100	[0.037]***
NSCPW- Family Plan Worker	0.137	[0.024]***	0.137	[0.024]***	-0.294	[0.209]	-0.294	[0.208]
NSCPC- Fully Vaccinated	0.092	[0.012]***	0.093	[0.012]***	0.029	[0.103]	0.036	[0.103]
NSCPH- Pipe Water	-0.018	[0.015]	-0.019	[0.015]	0.194	[0.149]	0.196	[0.149]
NSCPH- Flush Toilet	-0.050	[0.022]**	-0.049	[0.022]**	0.170	[0.250]	0.168	[0.250]
Rural Residence	-0.045	[0.006]***	-0.041	[0.006]***	-0.305	[0.059]***	-0.294	[0.058]***
Non-Christain Women	-0.014	[0.004]***	-0.016	[0.004]***				
Woman is Pregnant					0.945	[0.049]***	0.947	[0.049]***
Country Fixed Effects	Yes		Yes		Yes		Yes	
Observations	43012		43012		42944		42944	
R^2 /pseudo R^2	0.210		0.212		0.198		0.198	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Country fixed effects are controlled for but not report. Reported standard errors are based on a cluster robust covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women and NSCPC is non-self cluster proportion of children. Note that estimates of family planning are marginal effects.

Table 5.7: Effect of Women's Empowerment of on Women's Nutrition – Multinomial Logit Estimates

Variables	**CED**		**Over Weight**		**Obese**	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**
Composite Index (CWEI)	-0.035	[0.008]***	0.067	[0.012]***	0.024	[0.005]***
Woman's Age in Years	-0.004	[0.002]**	0.009	[0.002]***	0.004	[0.001]***
Woman's Age in Years Sq	0.000	[0.000]**	-0.000	[0.000]***	-0.000	[0.000]***
Birth Order						
2nd Order Birth	-0.004	[0.005]	0.015	[0.006]**	0.003	[0.003]
3rd Order Birth	-0.009	[0.005]*	0.016	[0.006]**	0.011	[0.004]***
4th Order Birth	-0.005	[0.006]	0.022	[0.007]***	0.013	[0.003]***
Woman's Education						
Primary	-0.017	[0.003]***	0.025	[0.005]***	0.011	[0.002]***
Secondary	-0.017	[0.005]***	0.032	[0.007]***	0.016	[0.003]***
Tertiary	-0.025	[0.010]**	0.049	[0.012]***	0.015	[0.005]***
Partner's Education						
Primary	-0.015	[0.004]***	0.014	[0.005]***	-0.002	[0.002]
Secondary	-0.017	[0.004]***	0.010	[0.005]**	0.000	[0.002]
Tertiary	-0.013	[0.008]	0.012	[0.008]	-0.000	[0.003]
No. of Adult women in HH	-0.004	[0.001]***	-0.001	[0.002]	-0.001	[0.001]
Sex of Head of Household	-0.003	[0.004]	0.015	[0.005]***	0.000	[0.002]
Age of Head of Household	0.000	[0.000]	0.000	[0.000]	0.000	[0.000]
Wealth Index	-0.020	[0.003]***	0.047	[0.003]***	0.018	[0.001]***
NSCPW- Family Planning Worker	0.007	[0.017]	-0.033	[0.024]	0.006	[0.008]
NSCPC- Fully Vaccinated	-0.028	[0.007]***	0.000	[0.011]	-0.001	[0.004]
NSCPH- Pipe Water	-0.011	[0.010]	0.034	[0.013]***	0.002	[0.005]
NSCPH- Flush Toilet	0.036	[0.018]**	-0.044	[0.016]***	0.001	[0.006]
Rural Residence	-0.002	[0.004]	-0.025	[0.005]***	-0.007	[0.002]***
Woman is Pregnant	-0.050	[0.003]***	0.055	[0.005]***	0.006	[0.002]***
Country Fixed Effects	Yes		Yes		Yes	
Observations	42944		42944		42944	
R^2 /pseudo R^2	0.106		0.106		0.106	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and is significant at p< 0.1. Country fixed effects are controlled for but not report. Reported standard errors are based on a cluster robust covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women and NSCPC is non-self cluster proportion of children.

Table 5.8: The Effect of Women's Empowerment on Place of Delivery: Age-Based Marginal Effect Estimates

Variables	15 - 19		20 - 24		25 - 30		31 - 35		36 - 40		41Above	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**
Composite Index (CWEI)	0.314	[0.092]***	0.189	[0.042]***	0.223	[0.046]***	0.344	[0.049]***	0.259	[0.058]***	0.203	[0.072]***
Woman's Age in Years	-0.088	[0.341]	0.029	[0.091]	-0.037	[0.197]	-0.409	[0.270]	0.018	[0.323]	-0.256	[0.163]
Woman's Age in Years Sq	0.003	[0.010]	-0.000	[0.002]	0.001	[0.004]	0.006	[0.004]	-0.000	[0.004]	0.003	[0.002]
2^{nd} Order Birth	-0.110	[0.031]***	-0.119	[0.013]***	-0.087	[0.027]***	-0.100	[0.063]	-0.015	[0.098]	-0.202	[0.141]
3^{rd} Order Birth	-0.133	[0.072]*	-0.146	[0.014]***	-0.110	[0.028]***	-0.169	[0.059]***	-0.082	[0.080]	-0.290	[0.091]***
4^{th} Order Birth	0.223	[0.157]	-0.197	[0.017]***	-0.177	[0.026]***	-0.214	[0.055]***	-0.164	[0.078]**	-0.329	[0.153]**
Women Educ: Primary	0.077	[0.031]**	0.129	[0.015]***	0.105	[0.016]***	0.093	[0.020]***	0.152	[0.022]***	0.111	[0.027]***
Women Educ: Secondary	0.162	[0.051]***	0.193	[0.023]***	0.196	[0.023]***	0.152	[0.026]***	0.237	[0.029]***	0.199	[0.047]***
Women Educ: Tertiary			0.243	[0.068]***	0.322	[0.045]***	0.214	[0.045]***	0.374	[0.046]***	0.246	[0.095]***
Partner Educ: Primary	0.027	[0.036]	0.055	[0.015]***	0.077	[0.017]***	0.082	[0.019]***	0.060	[0.024]**	0.089	[0.026]***
Partner Educ: Secondary	0.040	[0.048]	0.110	[0.018]***	0.080	[0.021]***	0.108	[0.024]***	0.047	[0.029]	0.019	[0.038]
Partner Educ: Tertiary	0.178	[0.112]	0.068	[0.031]**	0.059	[0.034]*	0.092	[0.041]**	0.133	[0.045]***	0.098	[0.069]
No. of Adult women in HH	0.003	[0.013]	0.005	[0.006]	-0.006	[0.007]	0.015	[0.007]**	0.009	[0.006]	0.003	[0.008]
Sex of Head of Household	0.031	[0.039]	0.014	[0.018]	0.032	[0.015]**	0.042	[0.019]**	0.021	[0.024]	0.033	[0.030]
Age of Head of Household	0.000	[0.001]	0.001	[0.000]**	0.001	[0.001]**	0.002	[0.001]**	0.000	[0.001]	-0.001	[0.001]
Wealth Index	0.147	[0.028]***	0.148	[0.011]***	0.174	[0.010]***	0.146	[0.013]***	0.149	[0.012]***	0.156	[0.019]***
NSCPW- Family Plan Worker	0.194	[0.156]	0.151	[0.065]**	0.227	[0.063]***	0.292	[0.077]***	0.186	[0.095]**	0.227	[0.099]**
NSCPC- Fully Vaccinated	0.671	[0.096]***	0.653	[0.037]***	0.480	[0.041]***	0.540	[0.042]***	0.574	[0.056]***	0.536	[0.068]***
NSCPH- Pipe Water	0.148	[0.132]	0.104	[0.044]**	0.207	[0.049]***	0.212	[0.063]***	0.027	[0.064]	0.324	[0.091]***
NSCPH- Flush Toilet	-0.135	[0.174]	-0.110	[0.070]	-0.148	[0.072]**	-0.225	[0.073]***	-0.046	[0.111]	-0.336	[0.133]**
Rural Residence	-0.211	[0.036]***	-0.164	[0.016]***	-0.186	[0.015]***	-0.169	[0.018]***	-0.162	[0.021]***	-0.148	[0.031]***
Non-Christian Woman	-0.030	[0.023]	-0.036	[0.011]***	-0.046	[0.012]***	-0.070	[0.014]***	-0.031	[0.015]**	-0.022	[0.019]
Country Fixed Effects	Yes		Yes		Yes		Yes		Yes		Yes	
Observations	2247		11657		11272		8217		6058		3514	
R^2 /pseudo R^2	0.247		0.260		0.296		0.293		0.272		0.240	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1.
Country fixed effects are controlled for but not report.

Table 5.9: The Effect of Women's Empowerment on 4+ Antenatal Visits: Age-Based Marginal Effect Estimates

Variables	**15 - 19**		**20 - 24**		**25 - 30**		**31 - 35**		**36 - 40**		**41Above**	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**
Composite Index (CWEI)	0.027	[0.089]	0.133	[0.038]***	0.149	[0.042]***	0.207	[0.050]***	0.075	[0.052]	0.061	[0.076]
Woman's Age in Years	-0.216	[0.305]	0.046	[0.091]	-0.049	[0.185]	0.355	[0.221]	-0.019	[0.338]	-0.288	[0.155]*
Woman's Age in Years Sq	0.007	[0.009]	-0.001	[0.002]	0.001	[0.003]	-0.005	[0.003]	0.000	[0.004]	0.003	[0.002]*
2^{nd} Order Birth	-0.028	[0.027]	-0.065	[0.015]***	-0.036	[0.026]	0.007	[0.046]	-0.016	[0.096]	-0.203	[0.167]
3^{rd} Order Birth	-0.196	[0.058]***	-0.097	[0.018]***	-0.057	[0.025]**	-0.047	[0.040]	-0.007	[0.079]	-0.246	[0.144]*
4^{th} Order Birth	-0.019	[0.154]	-0.116	[0.018]***	-0.096	[0.025]***	-0.079	[0.041]*	-0.056	[0.075]	-0.346	[0.147]**
Women Educ: Primary	0.038	[0.029]	0.059	[0.014]***	0.093	[0.016]***	0.058	[0.017]***	0.050	[0.019]***	0.046	[0.026]*
Women Educ: Secondary	0.035	[0.050]	0.082	[0.020]***	0.165	[0.020]***	0.123	[0.024]***	0.128	[0.027]***	0.211	[0.045]***
Women Educ: Tertiary			0.222	[0.074]***	0.249	[0.042]***	0.123	[0.043]***	0.130	[0.063]**	0.370	[0.090]***
Partner Educ: Primary	0.076	[0.036]**	0.072	[0.016]***	0.071	[0.017]***	0.095	[0.021]***	0.079	[0.021]***	0.077	[0.028]***
Partner Educ: Secondary	0.159	[0.044]***	0.096	[0.017]***	0.084	[0.019]***	0.126	[0.024]***	0.068	[0.029]**	0.129	[0.040]***
Partner Educ: Tertiary	0.023	[0.102]	0.184	[0.036]***	0.134	[0.032]***	0.184	[0.032]***	0.196	[0.042]***	0.107	[0.064]*
No. of Adult women in HH	-0.011	[0.012]	0.000	[0.006]	-0.008	[0.006]	-0.002	[0.007]	-0.001	[0.007]	0.009	[0.008]
Sex of Head of Household	0.004	[0.032]	0.007	[0.017]	0.003	[0.020]	-0.017	[0.022]	0.036	[0.024]	0.042	[0.032]
Age of Head of Household	0.000	[0.001]	-0.000	[0.000]	0.001	[0.001]	0.001	[0.001]*	0.001	[0.001]	-0.001	[0.001]
Wealth Index	0.071	[0.025]***	0.086	[0.008]***	0.064	[0.008]***	0.077	[0.012]***	0.095	[0.012]***	0.074	[0.017]***
NSCPW- Family Plan Worker	0.079	[0.138]	0.234	[0.065]***	0.156	[0.064]**	0.289	[0.077]***	0.303	[0.087]***	0.211	[0.114]*
NSCPC- Fully Vaccinated	0.334	[0.072]***	0.498	[0.033]***	0.526	[0.034]***	0.456	[0.042]***	0.519	[0.048]***	0.506	[0.067]***
NSCPH- Pipe Water	-0.031	[0.096]	0.106	[0.042]**	0.186	[0.041]***	0.185	[0.060]***	0.041	[0.067]	0.042	[0.084]
NSCPH- Flush Toilet	-0.151	[0.180]	-0.059	[0.068]	0.033	[0.074]	-0.124	[0.067]*	-0.051	[0.104]	0.201	[0.132]
Rural Residence	-0.044	[0.035]	-0.037	[0.015]**	-0.062	[0.017]***	-0.024	[0.021]	-0.012	[0.020]	0.006	[0.030]
Non-Christian Woman	-0.025	[0.023]	-0.029	[0.010]***	-0.012	[0.011]	-0.047	[0.014]***	-0.039	[0.017]**	-0.050	[0.019]***
Country Fixed Effects	Yes		Yes		Yes		Yes		Yes		Yes	
Observations	2199		11349		10904		7948		5877		3413	
R^2 /pseudo R^2	0.136		0.178		0.214		0.221		0.207		0.211	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1.
Country fixed effects are controlled for but not report.

Table 5.10: The Effect of Women's Empowerment on Modern Contraceptives: Age-Based Marginal Effect Estimates

Variables	15 - 19		20 - 24		25 - 30		31 - 35		36 - 40		41Above	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**
Composite Index (CWEI)	0.021	[0.055]	0.101	[0.025]***	0.138	[0.030]***	0.154	[0.035]***	0.158	[0.043]***	0.117	[0.042]***
Woman's Age in Years	0.094	[0.200]	0.029	[0.055]	0.066	[0.118]	-0.086	[0.164]	0.306	[0.225]	0.159	[0.106]
Woman's Age in Years Sq	-0.003	[0.006]	-0.001	[0.001]	-0.001	[0.002]	0.001	[0.002]	-0.004	[0.003]	-0.002	[0.001]
2^{nd} Order Birth	0.038	[0.017]**	0.039	[0.009]***	0.070	[0.021]***	0.172	[0.046]***	0.007	[0.071]	-0.075	[0.046]
3^{rd} Order Birth	0.103	[0.060]*	0.033	[0.011]***	0.089	[0.020]***	0.215	[0.049]***	0.075	[0.070]	-0.015	[0.078]
4^{th} Order Birth	0.001	[0.105]	0.045	[0.014]***	0.084	[0.017]***	0.158	[0.019]***	0.086	[0.036]**	0.002	[0.074]
Women Educ: Primary	0.042	[0.019]**	0.047	[0.010]***	0.064	[0.011]***	0.073	[0.016]***	0.071	[0.017]***	0.039	[0.019]**
Women Educ: Secondary	0.153	[0.044]***	0.112	[0.017]***	0.106	[0.017]***	0.094	[0.022]***	0.067	[0.024]***	0.022	[0.027]
Women Educ: Tertiary			0.055	[0.041]	0.134	[0.035]***	0.109	[0.037]***	0.044	[0.041]	0.089	[0.053]*
Partner Educ: Primary	0.031	[0.021]	0.047	[0.012]***	0.043	[0.013]***	0.045	[0.016]***	0.038	[0.017]**	0.035	[0.020]*
Partner Educ: Secondary	0.046	[0.029]	0.062	[0.015]***	0.048	[0.014]***	0.060	[0.017]***	0.047	[0.022]**	0.060	[0.028]**
Partner Educ: Tertiary	-0.035	[0.039]	0.073	[0.032]**	0.040	[0.023]*	0.063	[0.026]**	0.084	[0.036]**	0.108	[0.043]**
No. of Adult women in HH	-0.009	[0.007]	-0.002	[0.004]	-0.011	[0.004]**	-0.009	[0.006]	-0.004	[0.005]	-0.004	[0.005]
Sex of Head of Household	-0.010	[0.019]	-0.039	[0.009]***	-0.020	[0.011]*	-0.019	[0.014]	-0.036	[0.013]***	-0.020	[0.017]
Age of Head of Household	0.000	[0.001]	-0.001	[0.000]***	-0.000	[0.000]	-0.000	[0.001]	-0.001	[0.001]**	-0.000	[0.001]
Wealth Index	0.026	[0.011]**	0.038	[0.005]***	0.053	[0.005]***	0.052	[0.006]***	0.047	[0.008]***	0.036	[0.011]***
NSCPW- Family Plan Worker	-0.039	[0.088]	0.127	[0.042]***	0.093	[0.049]*	0.112	[0.057]**	0.227	[0.055]***	0.242	[0.066]***
NSCPC- Fully Vaccinated	0.110	[0.056]**	0.058	[0.024]**	0.115	[0.025]***	0.075	[0.029]***	0.088	[0.031]***	0.117	[0.039]***
NSCPH- Pipe Water	-0.008	[0.056]	-0.004	[0.030]	-0.021	[0.029]	-0.053	[0.033]	0.014	[0.041]	-0.061	[0.045]
NSCPH- Flush Toilet	-0.092	[0.083]	0.009	[0.044]	-0.083	[0.040]**	-0.042	[0.048]	-0.086	[0.063]	-0.026	[0.069]
Rural Residence	-0.066	[0.027]**	-0.036	[0.010]***	-0.031	[0.011]***	-0.056	[0.017]***	-0.051	[0.017]***	-0.053	[0.019]***
Non-Christian Woman	0.005	[0.013]	-0.013	[0.007]**	-0.019	[0.008]**	-0.015	[0.009]*	-0.021	[0.010]**	-0.003	[0.012]
Country Fixed Effects	Yes		Yes		Yes		Yes		Yes		Yes	
Observations	2187		11665		11282		8228		6068		3518	
R^2 /pseudo R^2	0.235		0.226		0.221		0.217		0.194		0.184	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Country fixed effects are controlled for but not report.

Table 5.11: The Effect of Women's Empowerment on Women's BMI: Age-Based Estimates

Variables	15 - 19		20 - 24		25 - 30		31 - 35		36 - 40		41Above	
	Beta	SE	Beta	SE	Beta	SE	Beta	SE	Beta	SE	Beta	SE
Composite Index (CWEI)	0.161	[0.437]	0.746	[0.212]***	0.834	[0.233]***	1.346	[0.321]***	1.775	[0.364]***	1.147	[0.540]**
Woman's Age in Years	-2.648	[2.557]	-0.695	[0.447]	0.130	[1.079]	-0.503	[1.620]	3.525	[2.592]	-0.334	[1.129]
Woman's Age in Years Sq	0.080	[0.072]	0.017	[0.010]*	-0.002	[0.019]	0.008	[0.024]	-0.046	[0.034]	0.004	[0.013]
2nd Order Birth	-0.092	[0.121]	0.047	[0.066]	0.555	[0.164]***	0.312	[0.300]	0.235	[0.707]	-0.573	[1.887]
3rd Order Birth	0.926	[0.470]**	0.159	[0.079]**	0.809	[0.159]***	0.623	[0.296]**	0.718	[0.599]	0.070	[1.774]
4th Order Birth	-0.275	[0.702]	0.117	[0.096]	0.860	[0.157]***	0.846	[0.287]***	0.967	[0.527]*	-0.189	[1.774]
Women Educ: Primary	0.355	[0.144]**	0.309	[0.069]***	0.399	[0.093]***	0.539	[0.094]***	0.294	[0.117]**	0.141	[0.191]
Women Educ: Secondary	0.432	[0.269]	0.537	[0.125]***	0.909	[0.166]***	0.921	[0.185]***	0.612	[0.246]**	0.657	[0.328]**
Women Educ: Tertiary	3.076	[0.516]***	0.686	[0.422]	1.199	[0.332]***	0.776	[0.328]**	0.806	[0.459]*	0.551	[0.682]
Partner Educ: Primary	0.289	[0.179]	0.045	[0.080]	0.343	[0.088]***	-0.084	[0.108]	0.136	[0.158]	0.381	[0.184]**
Partner Educ: Secondary	0.340	[0.292]	0.142	[0.104]	0.421	[0.130]***	-0.023	[0.149]	0.209	[0.186]	0.176	[0.299]
Partner Educ: Tertiary	0.819	[0.382]**	-0.129	[0.214]	0.056	[0.241]	0.424	[0.264]	0.495	[0.323]	0.420	[0.466]
No. of Adult women in HH	-0.041	[0.060]	-0.036	[0.037]	-0.036	[0.036]	-0.030	[0.053]	-0.042	[0.049]	0.049	[0.055]
Sex of Head of Household	0.102	[0.208]	0.102	[0.080]	0.126	[0.112]	0.061	[0.145]	0.152	[0.169]	0.287	[0.208]
Age of Head of Household	0.006	[0.005]	0.002	[0.002]	0.005	[0.003]*	0.005	[0.005]	0.011	[0.006]*	0.007	[0.008]
Wealth Index	0.510	[0.113]***	0.807	[0.062]***	0.946	[0.065]***	1.316	[0.071]***	1.308	[0.101]***	1.539	[0.144]***
NSCPW- Family Plan Worker	0.019	[0.772]	-0.498	[0.333]	-0.272	[0.418]	-0.335	[0.487]	0.161	[0.602]	-0.225	[0.826]
NSCPC- Fully Vaccinated	-0.227	[0.443]	0.487	[0.201]**	-0.171	[0.197]	0.129	[0.254]	-0.079	[0.342]	-0.787	[0.414]*
NSCPH- Pipe Water	0.595	[0.533]	0.027	[0.239]	0.512	[0.299]*	-0.028	[0.372]	-0.162	[0.383]	0.152	[0.611]
NSCPH- Flush Toilet	-1.279	[0.692]*	-0.030	[0.428]	-0.550	[0.471]	0.770	[0.494]	0.775	[0.745]	0.181	[0.990]
Rural Residence	0.114	[0.191]	-0.037	[0.093]	-0.574	[0.124]***	-0.178	[0.137]	-0.669	[0.177]***	-0.383	[0.254]
Woman is Pregnant	1.078	[0.191]***	1.010	[0.073]***	0.811	[0.082]***	0.920	[0.124]***	1.094	[0.141]***	1.119	[0.234]***
Country Fixed Effects	Yes		Yes		Yes		Yes		Yes		Yes	
Constant	43.394	[22.836]*	28.182	[5.047]***	19.165	[15.082]	29.947	[26.808]	-44.864	[49.300]	30.257	[24.600]
Observations	2258		11676		11237		8212		6035		3526	
R^2	0.085		0.121		0.178		0.232		0.258		0.232	
Adj. R^2	0.068		0.118		0.175		0.228		0.253		0.223	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Country fixed effects are controlled for but not report.

Table 5.12: Effect of Participation in Family Decisions on Women's Health Status

Variables	**Place of Delivery**		**4+ Antenatal Visits**		**M Contraceptives**		**Women's BMI**	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**
Family Decisions Index	0.061	[0.012]***	0.049	[0.012]***	0.054	[0.007]***	0.678	[0.080]***
Woman's Age in Years	0.020	[0.003]***	0.022	[0.003]***	-0.002	[0.002]	0.117	[0.016]***
Woman's Age in Years Sq	-0.000	[0.000]***	-0.000	[0.000]***	0.000	[0.000]	-0.001	[0.000]***
Birth Order								
2nd Order Birth	-0.107	[0.008]***	-0.050	[0.008]***	0.033	[0.006]***	0.223	[0.041]***
3rd Order Birth	-0.142	[0.009]***	-0.073	[0.008]***	0.043	[0.006]***	0.466	[0.052]***
4th Order Birth	-0.197	[0.010]***	-0.104	[0.010]***	0.054	[0.006]***	0.482	[0.055]***
Woman's Education								
Primary	0.120	[0.007]***	0.071	[0.006]***	0.062	[0.005]***	0.393	[0.036]***
Secondary	0.206	[0.008]***	0.116	[0.007]***	0.102	[0.006]***	0.666	[0.056]***
Tertiary	0.314	[0.021]***	0.218	[0.021]***	0.104	[0.013]***	1.008	[0.150]***
Partner's Education								
Primary	0.078	[0.006]***	0.091	[0.006]***	0.045	[0.005]***	0.208	[0.039]***
Secondary	0.103	[0.007]***	0.112	[0.008]***	0.056	[0.006]***	0.233	[0.049]***
Tertiary	0.087	[0.014]***	0.174	[0.013]***	0.062	[0.011]***	0.394	[0.090]***
No. of Adult women in HH	0.003	[0.003]	-0.004	[0.002]*	-0.005	[0.001]***	-0.033	[0.015]**
Sex of Head of Household	0.025	[0.006]***	0.010	[0.006]	-0.029	[0.004]***	0.016	[0.038]
Age of Head of Household	0.001	[0.000]***	0.000	[0.000]	-0.001	[0.000]***	0.002	[0.001]*
Wealth Index	0.159	[0.005]***	0.084	[0.004]***	0.046	[0.002]***	1.071	[0.027]***
NSCPW- Family Planning Wker	0.237	[0.026]***	0.275	[0.028]***	0.119	[0.016]***	-0.120	[0.175]
NSCPC- Fully Vaccinated	0.526	[0.017]***	0.472	[0.015]***	0.101	[0.009]***	-0.074	[0.078]
NSCPH- Pipe Water	0.121	[0.021]***	0.112	[0.018]***	-0.019	[0.012]	0.279	[0.122]**
NSCPH- Flush Toilet	-0.095	[0.027]***	-0.081	[0.027]***	-0.015	[0.015]	0.231	[0.200]
Rural Residence	-0.187	[0.007]***	-0.040	[0.007]***	-0.039	[0.004]***	-0.343	[0.046]***
Non-Christian Woman	-0.054	[0.004]***	-0.039	[0.005]***	-0.022	[0.003]***		
Woman is Pregnant							1.002	[0.036]***
Country Fixed Effects	Yes		Yes		Yes		Yes	
Observations	69955		67830		70039		69593	
R^2 /pseudo R^2	0.301		0.209		0.230		0.196	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Country fixed effects are controlled for but not report. Reported standard errors are based on a cluster robust covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women and NSCPC is non-self cluster proportion of children. Note that place of delivery, antenatal and family planning estimates are marginal effects.

Table 5.13: Effect of Perception of Violence by Partners on Women's Health Status

Variables	Place of Delivery		4+ Antenatal Visits		Modern Contraceptives		Women's BMI	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**
Violence Perception Index	0.017	[0.006]***	0.009	[0.006]	0.015	[0.005]***	0.249	[0.040]***
Woman's Age in Years	0.020	[0.003]***	0.022	[0.003]***	-0.002	[0.002]	0.116	[0.016]***
Woman's Age in Years Sq	-0.000	[0.000]***	-0.000	[0.000]***	0.000	[0.000]	-0.001	[0.000]***
Birth Order								
2nd Order Birth	-0.110	[0.008]***	-0.052	[0.008]***	0.038	[0.006]***	0.256	[0.040]***
3rd Order Birth	-0.139	[0.009]***	-0.071	[0.008]***	0.047	[0.006]***	0.502	[0.051]***
4th Order Birth	-0.196	[0.010]***	-0.102	[0.010]***	0.060	[0.006]***	0.518	[0.055]***
Woman's Education								
Primary	0.120	[0.007]***	0.070	[0.006]***	0.063	[0.005]***	0.417	[0.037]***
Secondary	0.208	[0.009]***	0.117	[0.008]***	0.104	[0.007]***	0.640	[0.056]***
Tertiary	0.311	[0.021]***	0.217	[0.020]***	0.110	[0.014]***	1.004	[0.145]***
Partner's Education								
Primary	0.077	[0.006]***	0.092	[0.006]***	0.046	[0.005]***	0.194	[0.040]***
Secondary	0.103	[0.007]***	0.112	[0.008]***	0.057	[0.006]***	0.236	[0.048]***
Tertiary	0.089	[0.013]***	0.175	[0.013]***	0.063	[0.011]***	0.432	[0.091]***
No. of Adult women in HH	0.003	[0.003]	-0.004	[0.002]*	-0.005	[0.001]***	-0.037	[0.015]**
Sex of Head of Household	0.030	[0.006]***	0.016	[0.006]***	-0.035	[0.003]***	0.075	[0.036]**
Age of Head of Household	0.000	[0.000]**	-0.000	[0.000]	-0.001	[0.000]***	0.002	[0.001]
Wealth Index	0.159	[0.005]***	0.084	[0.004]***	0.046	[0.002]***	1.066	[0.028]***
NSCPW- Family Planning Wker	0.230	[0.027]***	0.278	[0.028]***	0.121	[0.017]***	-0.062	[0.182]
NSCPC- Fully Vaccinated	0.520	[0.017]***	0.465	[0.015]***	0.109	[0.009]***	0.025	[0.081]
NSCPH- Pipe Water	0.128	[0.021]***	0.114	[0.017]***	-0.019	[0.011]*	0.231	[0.122]*
NSCPH- Flush Toilet	-0.100	[0.028]***	-0.077	[0.026]***	-0.025	[0.015]*	0.188	[0.186]
Rural Residence	-0.183	[0.007]***	-0.041	[0.007]***	-0.038	[0.004]***	-0.332	[0.046]***
Non-Christian Woman	-0.056	[0.004]***	-0.037	[0.005]***	-0.021	[0.003]***		
Woman is Pregnant							1.008	[0.036]***
Country Fixed Effects	Yes		Yes		Yes		Yes	
Observations	70324		68275		70409		69953	
R^2 /pseudo R^2	0.299		0.207		0.220		0.193	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Country fixed effects are controlled for but not report. Reported standard errors are based on a cluster robust covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women and NSCPC is non-self cluster proportion of children. Note that place of delivery, antenatal and family planning estimates are marginal effects.

Table 5.14: Effect of Women's Autonomy on Women's Health Status

Variables	Place of Delivery		4+ Antenatal Visits		Use of Modern Contraceptives		Women's BMI	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**
Women's Autonomy Index	0.128	[0.010]***	0.078	[0.008]***	0.041	[0.006]***	0.340	[0.047]***
Woman's Age in Years	0.019	[0.003]***	0.022	[0.003]***	-0.002	[0.002]	0.120	[0.016]***
Woman's Age in Years Sq	-0.000	[0.000]***	-0.000	[0.000]***	0.000	[0.000]	-0.001	[0.000]***
Birth Order								
2nd Order Birth	-0.109	[0.008]***	-0.052	[0.008]***	0.035	[0.006]***	0.243	[0.041]***
3rd Order Birth	-0.139	[0.009]***	-0.073	[0.008]***	0.045	[0.006]***	0.475	[0.050]***
4th Order Birth	-0.195	[0.010]***	-0.104	[0.010]***	0.058	[0.005]***	0.506	[0.054]***
Woman's Education								
Primary	0.120	[0.007]***	0.071	[0.006]***	0.063	[0.005]***	0.405	[0.036]***
Secondary	0.206	[0.008]***	0.117	[0.007]***	0.103	[0.006]***	0.638	[0.055]***
Tertiary	0.315	[0.021]***	0.214	[0.020]***	0.108	[0.013]***	1.020	[0.143]***
Partner's Education								
Primary	0.076	[0.006]***	0.091	[0.006]***	0.045	[0.005]***	0.191	[0.040]***
Secondary	0.102	[0.007]***	0.110	[0.008]***	0.056	[0.006]***	0.235	[0.046]***
Tertiary	0.089	[0.013]***	0.173	[0.012]***	0.061	[0.010]***	0.435	[0.091]***
No. of Adult women in HH	0.003	[0.003]	-0.004	[0.002]*	-0.005	[0.001]***	-0.038	[0.015]**
Sex of Head of Household	0.028	[0.006]***	0.015	[0.006]**	-0.035	[0.003]***	0.078	[0.035]**
Age of Head of Household	0.000	[0.000]**	-0.000	[0.000]	-0.001	[0.000]***	0.002	[0.001]
Wealth Index	0.156	[0.005]***	0.082	[0.004]***	0.046	[0.002]***	1.069	[0.027]***
NSCPW- Family Planning Wker	0.235	[0.026]***	0.275	[0.027]***	0.121	[0.016]***	-0.105	[0.176]
NSCPC- Fully Vaccinated	0.509	[0.017]***	0.459	[0.014]***	0.102	[0.009]***	-0.071	[0.077]
NSCPH- Pipe Water	0.121	[0.020]***	0.116	[0.017]***	-0.016	[0.011]	0.252	[0.121]**
NSCPH- Flush Toilet	-0.103	[0.027]***	-0.084	[0.026]***	-0.024	[0.014]*	0.205	[0.190]
Rural Residence	-0.182	[0.007]***	-0.039	[0.007]***	-0.037	[0.004]***	-0.332	[0.044]***
Non-Christian Women	-0.054	[0.004]***	-0.037	[0.005]***	-0.021	[0.003]***		
Woman is Pregnant							1.007	[0.035]***
Country Fixed Effects	Yes		Yes		Yes		Yes	
Observations	72789		70567		72875		72367	
R^2 /pseudo R^2	0.301		0.208		0.221		0.194	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Country fixed effects are controlled for but not report. Reported standard errors are based on a cluster robust covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women and NSCPC is non-self cluster proportion of children. Note that place of delivery, antenatal and family planning estimates are marginal effects.

Table 5.15: Effect of Societal Preferences on Women's Health Status

Variables	Place of Delivery		4+ Antenatal Visits		Modern Contraceptives		Women's BMI	
	Beta	SE	Beta	SE	Beta	SE	Beta	SE
Societal Preference Index	0.269	[0.048]***	-0.068	[0.051]	0.152	[0.035]***	-0.136	[0.292]
Woman's Age in Years	0.017	[0.003]***	0.023	[0.003]***	-0.003	[0.002]*	0.122	[0.018]***
Woman's Age in Years Sq	-0.000	[0.000]***	-0.000	[0.000]***	0.000	[0.000]	-0.001	[0.000]***
Birth Order								
2nd Order Birth	-0.101	[0.009]***	-0.051	[0.008]***	0.038	[0.006]***	0.224	[0.042]***
3rd Order Birth	-0.133	[0.010]***	-0.077	[0.009]***	0.049	[0.006]***	0.478	[0.057]***
4th Order Birth	-0.182	[0.010]***	-0.109	[0.011]***	0.065	[0.006]***	0.495	[0.060]***
Woman's Education								
Primary	0.120	[0.007]***	0.071	[0.006]***	0.061	[0.005]***	0.422	[0.038]***
Secondary	0.203	[0.009]***	0.120	[0.008]***	0.102	[0.007]***	0.712	[0.058]***
Tertiary	0.307	[0.023]***	0.220	[0.020]***	0.102	[0.013]***	1.048	[0.142]***
Partner's Education								
Primary	0.074	[0.006]***	0.092	[0.007]***	0.044	[0.005]***	0.210	[0.041]***
Secondary	0.100	[0.007]***	0.114	[0.008]***	0.055	[0.006]***	0.237	[0.050]***
Tertiary	0.084	[0.014]***	0.176	[0.013]***	0.060	[0.011]***	0.391	[0.090]***
No. of Adult women in HH	0.006	[0.003]**	-0.005	[0.002]**	-0.003	[0.002]**	-0.044	[0.016]***
Sex of Head of Household	0.034	[0.007]***	0.013	[0.007]*	-0.025	[0.004]***	0.072	[0.041]*
Age of Head of Household	0.001	[0.000]***	0.000	[0.000]	-0.000	[0.000]***	0.002	[0.001]
Wealth Index	0.159	[0.005]***	0.085	[0.004]***	0.046	[0.002]***	1.094	[0.029]***
NSCPW- Family Planning Wker	0.239	[0.027]***	0.286	[0.030]***	0.122	[0.018]***	-0.078	[0.177]
NSCPC- Fully Vaccinated	0.530	[0.017]***	0.475	[0.015]***	0.103	[0.010]***	-0.072	[0.079]
NSCPH- Pipe Water	0.136	[0.022]***	0.124	[0.019]***	-0.020	[0.011]*	0.313	[0.124]**
NSCPH- Flush Toilet	-0.112	[0.027]***	-0.091	[0.028]***	-0.027	[0.015]*	0.199	[0.203]
Rural Residence	-0.188	[0.007]***	-0.043	[0.007]***	-0.041	[0.005]***	-0.343	[0.046]***
Non-Christian Women	-0.047	[0.005]***	-0.041	[0.005]***	-0.022	[0.003]***		
Woman is Pregnant							0.986	[0.037]***
Country Fixed Effects	Yes		Yes		Yes		Yes	
Observations	65934		63921		66011		65558	
R^2 /pseudo R^2	0.302		0.208		0.231		0.195	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Country fixed effects are controlled for but not report. Reported standard errors are based on a cluster robust covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women and NSCPC is non-self cluster proportion of children. Note that place of delivery, antenatal and family planning estimates are marginal effects.

Table 5.16: Effect of Women's Access to Resources on Women's Health Status

Variables	**Place of Delivery**		**4+ Antenatal Visits**		**Modern Contraceptives**		**Women's BMI**	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**
Access to Resources Index	0.093	[0.012]***	0.036	[0.014]***	0.056	[0.009]***	0.197	[0.087]**
Woman's Age in Years	0.020	[0.003]***	0.025	[0.003]***	-0.003	[0.002]	0.087	[0.019]***
Woman's Age in Years Sq	-0.000	[0.000]***	-0.000	[0.000]***	0.000	[0.000]	-0.001	[0.000]**
Birth Order								
2nd Order Birth	-0.115	[0.010]***	-0.054	[0.010]***	0.040	[0.007]***	0.169	[0.050]***
3rd Order Birth	-0.144	[0.010]***	-0.076	[0.011]***	0.054	[0.007]***	0.404	[0.060]***
4th Order Birth	-0.208	[0.012]***	-0.114	[0.011]***	0.065	[0.006]***	0.434	[0.064]***
Woman's Education								
Primary	0.118	[0.008]***	0.069	[0.007]***	0.062	[0.006]***	0.390	[0.041]***
Secondary	0.198	[0.010]***	0.126	[0.010]***	0.098	[0.008]***	0.656	[0.071]***
Tertiary	0.305	[0.024]***	0.201	[0.024]***	0.096	[0.016]***	1.031	[0.165]***
Partner's Education								
Primary	0.068	[0.007]***	0.080	[0.007]***	0.038	[0.006]***	0.162	[0.045]***
Secondary	0.088	[0.009]***	0.101	[0.009]***	0.049	[0.007]***	0.186	[0.057]***
Tertiary	0.088	[0.015]***	0.166	[0.015]***	0.056	[0.012]***	0.444	[0.111]***
No. of Adult women in HH	0.001	[0.003]	-0.003	[0.003]	-0.007	[0.002]***	-0.030	[0.017]*
Sex of Head of Household	0.025	[0.007]***	0.006	[0.008]	-0.034	[0.004]***	0.119	[0.040]***
Age of Head of Household	0.000	[0.000]*	-0.000	[0.000]	-0.001	[0.000]***	0.002	[0.001]*
Wealth Index	0.154	[0.005]***	0.079	[0.005]***	0.047	[0.003]***	1.103	[0.035]***
NSCPW- Family Planning Wker	0.222	[0.032]***	0.208	[0.032]***	0.126	[0.022]***	-0.219	[0.212]
NSCPC- Fully Vaccinated	0.561	[0.020]***	0.487	[0.019]***	0.091	[0.011]***	0.092	[0.099]
NSCPH- Pipe Water	0.144	[0.025]***	0.123	[0.021]***	-0.015	[0.014]	0.222	[0.140]
NSCPH- Flush Toilet	-0.133	[0.034]***	-0.042	[0.036]	-0.045	[0.019]**	0.223	[0.234]
Rural Residence	-0.169	[0.008]***	-0.037	[0.008]***	-0.039	[0.005]***	-0.325	[0.053]***
Non-Christian Women	-0.053	[0.005]***	-0.035	[0.006]***	-0.017	[0.004]***		
Woman is Pregnant							0.963	[0.045]***
Country Fixed Effects	Yes		Yes		Yes		Yes	
Observations	50195		48641		50254		50136	
R^2 /pseudo R^2	0.267		0.197		0.202		0.197	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Country fixed effects are controlled for but not report. Reported standard errors are based on a cluster robust covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women and NSCPC is non-self cluster proportion of children. Note that place of delivery, antenatal and family planning estimates are marginal effects.

Table 5.17: Effect of Indicators of Women's Empowerment and Women's Health Status

Variables	Place of Delivery		4+ Antenatal Visits		Modern Contraceptives		Women's BMI	
	Beta	SE	Beta	SE	Beta	SE	Beta	SE
Section A: Participation in Family Decisions – Who makes Decisions on the Following: Reference is Someone else								
Woman's Own Health								
Husband Alone	-0.004	[0.012]	-0.003	[0.012]	0.007	[0.010]	0.159	[0.071]**
Woman/Husband	0.030	[0.012]**	0.025	[0.012]**	0.041	[0.011]***	0.422	[0.072]***
Woman Alone	0.004	[0.013]	0.005	[0.013]	0.027	[0.010]***	0.270	[0.068]***
Large Household Purchases								
Husband Alone	0.004	[0.012]	0.024	[0.012]**	-0.004	[0.007]	0.177	[0.070]**
Woman/Husband	0.037	[0.013]***	0.059	[0.012]***	0.019	[0.008]**	0.468	[0.076]***
Woman Alone	0.025	[0.013]*	0.030	[0.013]**	0.006	[0.008]	0.421	[0.086]***
Daily Household Purchases								
Husband Alone	-0.010	[0.011]	0.021	[0.012]*	0.005	[0.008]	0.112	[0.069]
Woman/Husband	0.029	[0.012]**	0.058	[0.013]***	0.029	[0.009]***	0.334	[0.077]***
Woman Alone	0.026	[0.011]**	0.030	[0.012]**	0.027	[0.009]***	0.379	[0.071]***
Family Visits								
Husband Alone	0.010	[0.012]	0.021	[0.012]*	0.020	[0.009]**	0.144	[0.069]**
Woman/Husband	0.037	[0.013]***	0.041	[0.013]***	0.045	[0.010]***	0.363	[0.080]***
Woman Alone	0.021	[0.013]	0.040	[0.013]***	0.036	[0.010]***	0.309	[0.084]***
All Other Covariates	Yes		Yes		Yes		Yes	
Observations	69955		678830		70039		69953	
Section B: Perception of Violence - Wife Beating justified for any of the Following: Reference is Yes								
Go Out without Permission	0.003	[0.005]	0.005	[0.004]	0.005	[0.003]	0.145	[0.028]***
Neglecting Children	0.004	[0.004]	-0.002	[0.004]	0.006	[0.003]*	0.090	[0.029]***
Arguing with Husband	0.012	[0.005]***	0.008	[0.005]*	0.006	[0.003]*	0.192	[0.028]***
Refusing Sex	0.017	[0.005]***	0.012	[0.005]***	0.012	[0.003]***	0.100	[0.030]***
Burning Food	0.017	[0.005]***	0.007	[0.005]	0.018	[0.004]***	0.209	[0.033]***
All Other Covariates	Yes		Yes		Yes		Yes	
Observations	70324		68275		70409		69953	
Section C: Women's Autonomy – Do You Have A Problem Seeking Any of the Following: Reference is Big Problem								
Permission for Medical Help	0.065	[0.007]***	0.053	[0.007]***	0.023	[0.005]***	0.193	[0.040]***
Medical Help Alone	0.070	[0.006]***	0.034	[0.005]***	0.017	[0.004]***	0.170	[0.032]***
Care from Female Med Care	0.061	[0.007]***	0.037	[0.006]***	0.022	[0.004]***	0.164	[0.032]***
All Other Covariates	Yes		Yes		Yes		Yes	
Observations	72789		70567		72875		72367	
Section D: Societal Preferences								
No. of Wives	-0.018	[0.004]***	0.006	[0.003]*	-0.014	[0.003]***	-0.180	[0.019]***
Age at first Marriage	0.004	[0.001]***	0.001	[0.001]**	-0.000	[0.000]	-0.010	[0.005]**
Couple Age Difference	0.000	[0.000]	-0.001	[0.000]**	0.001	[0.000]***	-0.009	[0.001]***
All Other Covariates	Yes		Yes		Yes		Yes	
Observations	65934		63921		66011		65558	
Section E: Women's Access to Resources. Reference for Type of earnings is Not Paid, Woman is Working is No								
Couple Education Difference	0.006	[0.001]***	-0.002	[0.001]	0.003	[0.001]***	0.029	[0.009]***
Type of Earnings								
In-kind Only	-0.010	[0.010]	0.011	[0.011]	0.012	[0.007]*	-0.017	[0.052]
In-kind and Cash	0.026	[0.009]***	0.005	[0.009]	0.026	[0.006]***	0.004	[0.051]
Cash Only	0.049	[0.006]***	0.012	[0.007]*	0.028	[0.005]***	0.124	[0.048]***
Woman is Working	0.034	[0.005]***	0.044	[0.005]***	0.027	[0.003]***	0.099	[0.028]***
All Other Covariates	Yes		Yes		Yes		Yes	
Observations	50195		48641		50254		50136	

Source: Author's calculations. Note that *** is significant at $p<0.01$, ** is significant at $p<0.05$ and * is significant at $p< 0.1$. Country fixed effects are controlled for but not report. Reported standard errors are based on a cluster robust covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women and NSCPC is non-self cluster proportion of children. Note that place of delivery, antenatal and family planning estimates are marginal effects.

Table 5.18: The Effect of Women’s Empowerment on Women’s Health Status- Sub-Regional Estimates

Regions/Indicators	**Health Facility Delivery**		**4+ Antenatal Visits**		**Use of Modern Contraceptives**		**Women’s BMI**	
	Model I	**Model II**	**Model I**	**Model II**	**Model I**	**Model II**	**Model I**	**Model II**
West Africa								
Composite Women’s Emp Index		0.340***		0.143***		0.101***		1.345***
		[0.030]		[0.030]		[0.014]		[0.213]
Social Norms	0.234***	0.228***	0.114***	0.113***	0.061***		1.168***	1.166***
	[0.026]	[0.026]	[0.025]	[0.025]	[0.012]	[0.012]***	[0.179]	[0.178]
Access to Resources		0.180***		0.051**		0.068***		0.164
		[0.019]		[0.022]		[0.012]		[0.130]
All Other Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	24069	24069	23024	23024	24102	24102	23772	23772
East and Central Africa								
Composite Women’s Emp Index		0.077*		0.193***		0.078***		0.781***
		[0.046]		[0.042]		[0.027]		[0.260]
Social Norms	0.058	0.055	0.154***	0.148***	0.048*	0.042*	0.691***	0.687***
	[0.040]	[0.040]	[0.037]	[0.037]	[0.025]	[0.025]	[0.224]	[0.225]
Access to Resources		0.037		0.058*		0.056***		0.040
		[0.030]		[0.029]		[0.019]		[0.185]
All Other Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9296	9296	9235	9235	9302	9302	9211	9211
Sothern Africa								
Composite Women’s Emp Index		0.107**		0.058		0.181***		0.781***
		[0.044]		[0.045]		[0.044]		[0.274]
Social Norms	0.117***	0.117***	0.040	0.039	0.107***	0.102**	0.323	0.299
	[0.038]	[0.038]	[0.039]	[0.039]	[0.041]	[0.041]	[0.231]	[0.230]
Access to Resources		-0.012		0.013		0.088***		0.488***
		[0.024]		[0.022]		[0.025]		[0.176]
All Other Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9601	9601	9446	9446	9608	9608	9961	9961

Source: Author’s calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Country fixed effects are controlled for but not reported. Note that place of delivery, antenatal and family planning estimates are marginal effects.

Table 5.19A: Policy Implications of Changes in Selected Variables on Women's Reproductive Health

Policy Indicators	**Health Facility Delivery**		**4 + Antenatal Visits**		**Modern Contraceptive**	
	Mean Prob.	**% Change**	**Mean Prob.**	**% Change**	**Mean Prob.**	**% Change**
Comp. Empowerment						
Lowest 20%	0.303		0.354		0.097	
Middle 20%	0.454	49.7	0.460	30.0	0.180	86.3
Top 20%	0.686	126.6	0.670	89.4	0.325	235.3
Social Norms						
Lowest 20%	0.298		0.338		0.099	
Middle 20%	0.454	52.3	0.463	37	0.199	101
Top 20%	0.645	116.4	0.630	86.4	0.337	240.4
Access to Resources						
Lowest 20%	0.372		0.389		0.163	
Middle 20%	0.423	13.8	0.455	17.0	0.141	(13.7)
Top 20%	0.667	79.4	0.660	69.8	0.303	86.1
Woman's Education						
No Education	0.292		0.323		0.084	
Primary	0.527	80.2	0.538	66.6	0.253	200.4
Secondary	0.769	163.1	0.760	135.3	0.362	329.1
Tertiary	0.931	218.3	0.918	184.4	0.417	394.8
Partner's Education						
No Education	0.292		0.299		0.076	
Primary	0.478	63.3	0.515	72.5	0.234	206.7
Secondary	0.681	132.9	0.680	127.8	0.316	313.8
Tertiary	0.806	175.5	0.837	180.5	0.350	358.3
Wealth Index						
Poorest	0.272		0.359		0.123	
Poorer	0.322	18.5	0.390	8.6	0.138	12.0
Middle	0.413	52.0	0.438	22.0	0.164	33.0
Richer	0.585	115.0	0.552	53.8	0.230	86.7
Richest	0.837	207.8	0.728	102.8	0.358	190.5
Residence						
Urban	0.787		0.706		0.318	
Rural	0.364	(53.7)	0.409	(42.1)	0.155	(51.2)

Source: Author's Calculation Based on DHS Data

Table 5.19B: Policy Implications of Change in Components of Social Norms Index on Women's Reproductive Health

Policy Indicators	**Health Facility Delivery**		**4 + Antenatal Visits**		**Modern Contraceptive**	
	Mean Prob.	**% Change**	**Mean Prob.**	**% Change**	**Mean Prob.**	**% Change**
Decision-Making						
Lowest 20%	0.383		0.362		0.109	
Middle 20%	0.446	16.3	0.441	21.7	0.184	69.1
Top 20%	0.557	45.4	0.555	53.3	0.293	169.7
Violence Perception						
Lowest 20%	0.355		0.385		0.132	
Middle 20%	0.532	50.0	0.519	34.8	0.249	89.3
Top 20%						
Women's Autonomy						
Lowest 20%	0.333		0.377		0.123	
Middle 20%	0.525	57.8	0.508	34.8	0.226	84.3
Top 20%						
Societal Preferences						
Lowest 20%	0.311		0.343		0.087	
Middle 20%	0.450	44.5	0.451	31.3	0.197	126.6
Top 20%	0.617	98.0	0.593	72.7	0.301	245.1

Source: Author's Calculation Based on DHS Data

Table 5.20: Policy Implications of Changes in Selected Variables on Women's Nutrition

Policy Indicators	**CED**		**Normal**		**Overweight**		**Obesity**	
	Mean Prob.	**% Chnge**	**Mean Prob.**	**% Chnge**	**Mean Prob.**	**% Chnge**	**Mean Prob.**	**% Chnge**
Comp. Empowerment								
Lowest 20%	0.133		0.766		0.082		0.018	
Middle 20%	0.102	(23)	0.734	(4.1)	0.124	52.6	0.039	113.7
Top 20%	0.066	(50)	0.604	(21.1)	0.218	166.8	0.114	527.6
Woman's Education								
No Education	0.136		0.758		0.086		0.021	
Primary	0.078	(42.4)	0.744	(1.8)	0.136	58.6	0.041	102.0
Secondary	0.062	(54.3)	0.594	(21.6)	0.226	163.4	0.118	474.8
Tertiary	0.034	(75)	0.413	(45.5)	0.337	293.1	0.215	949.6
Partner's Education								
No Education	0.140		0.752		0.085		0.023	
Primary	0.084	(40)	0.759	0.9	0.124	46.3	0.033	43.1
Secondary	0.070	(49.7)	0.649	(13.7)	0.192	126.2	0.088	281.8
Tertiary	0.050	(64.4)	0.498	(33.8)	0.283	232.8	0.169	633.0
Wealth Index								
Poorest	0.129		0.779		0.077		0.015	
Poorer	0.119	(7.7)	0.771	(1)	0.090	16.7	0.019	33.0
Middle	0.109	(15.5)	0.758	(2.7)	0.106	37.7	0.026	80.9
Richer	0.086	(33.5)	0.698	(10.3)	0.159	105.8	0.056	287.7
Richest	0.051	(60.5)	0.536	(31.2)	0.262	238.7	0.151	939.3
Residence								
Urban	0.064		0.577		0.238		0.122	
Rural	0.114	79.4	0.761	31.9	0.099	(58.3)	0.026	(79)

Source: Author's Calculation Based on DHS Data

CHAPTER SIX

WOMEN'S EMPOWERMENT AND POOR CHILD HEALTH STATUS INEQUALITY IN SUB-SAHARAN AFRICA

6.0 Introduction

This chapter examines the level of socioeconomic inequality in poor child health status in 20 SSA countries and whether women's empowerment in any way contributes to such inequality. The chapter uses DHS data from 20 SSA countries. The link between women's empowerment and poor child health status inequality is based on the idea that women's empowerment is correlated with access to resources. This implies that women who are empowered are more likely to have access to resources compared to those who are less empowered. Given that those who have access to resources are more likely to have access to health services, we argue that women's empowerment can influence socioeconomic inequality in poor child health status indirectly through access to resources.

Socioeconomic inequality in poor child health status is examined using concentration indices, whiles women's empowerment's contribution to poor child health status inequality is examined through a decomposition of the concentration index over the determinants of poor child health status. The results suggest that in almost all the 20 SSA countries examined, socioeconomic inequality in poor child health status exist to the disadvantage of the poor. Secondly, the results suggest that in SSA, poor child health status inequality is not just a challenge in its own right, but also tend to worsen mean outcomes in child health. Although the results suggest that women's empowerment has an important influence on poor child health status inequality, the phenomenon is not pervasive, but restricted to specific countries. In addition to women's empowerment, the results equally suggest that child health determinants such as education, household wealth, access to good water and sanitation, access to health services and regional/provincial differences, have the most important influence on both long-term (negative height for age) and short-term (negative weight for height) poor child health status inequality.

The rest of the Chapter discusses motivation and background in Section 6.1. This is followed by objectives and methodology in Sections 6.2 and 6.3 respectively. In Section 6.4, we comment on the source of data and the variables used, with the results presented in Section 6.5. The chapter concludes in Section 6.6, suggesting that governments take the necessary steps to reduce the levels of socioeconomic inequality in child health, since that may also result in improving mean child health outcomes as well.

6.1 Background and Motivation

Women's empowerment has often been emphasised as an essential ingredient of social development, not only for its intrinsic good, but also its instrumental value (Kabeer, 1999). The core argument underlying the instrumental importance of women's empowerment is to the effect that, empowered women are more likely to reflect their preferences in household resource allocation and thereby gain access to resources needed to improve their life outcomes and that of their family (Kabeer, 1999; 2005; Kishor, 2000a; Smith et al., 2003; Narayan, 2005). In other words, empowerment constitutes some form of capability, the presence of which enable women to bargain for household resources and consequently, the effect of such resources on their life outcomes and that of their family members (Sen, 1999; Kabeer, 1999).

This hypothesis has been the focus of a large section of the empirical literature on women's empowerment. The discussion in Chapter 3, together with the results in Chapter 4 and 5, confirm this assertion. Indeed, the women's empowerment literature has been crucial in shaping and improving our understanding of the effect of women's empowerment on mean outcomes in areas such as health status, agricultural production and household welfare (Haddad and Hoddinott, 1994; Hoddinott and Haddad, 1995; Hindin, 2000a; 2005a; Smith et al., 2003; Zhan and Sherraden, 2003; Allendorf, 2007a; 2007b; Fafchamps et al., 2009). This notwithstanding, it is equally important to emphasise that policy makers are not only interested in mean outcomes, but also, the distribution of outcomes in the population based on socioeconomic conditions (inequality). Thus, the women's empowerment – development outcomes nexus, could be extended to cover inequality. Thus, the intuition underlying the instrumental argument could equally be used to support this extension. That is, women who are empowered are more likely to reflect their preferences in household resource allocation and therefore have access to more resources (Kabeer, 1999; 2005; Kishor, 2000a; 2000b; Smith et al., 2003; Narayan, 2005). Access to more resources is also likely to secure for women and their children, better health outcomes compared to women with lesser resources. This may result in health status disparities on grounds of socioeconomic differences.

In addition to the aforementioned argument, van de Poel et al., (2007) argues that a variable's (child health determinant) contribution to socioeconomic inequality in a health status indicator, may come through the relationship between the variable (child health determinant) and the health status indicator in question and the extent of inequality in the child health determinant. From the discussion in Chapter 3, 4 and 5, it can be argued that some form of relationship exist between women’s empowerment and development outcomes (for example, children and women’s health status, agriculture, education etc). In addition, the results in Appendix 1, suggest that women’s empowerment is correlated with socioeconomic status. That is, women in the richer and richest (upper two) quintiles are more likely to be empowered compared to those from the poorer and poorest (lower two) quintiles (see Table AP1-18). Juxtaposing this on the argument of van de Poel et al., (2007), one can argue that women’s empowerment, a determinant of children’s health status can equally be an important contributor to socioeconomic inequality in children’s health status.

The importance of inequality in this discourse is based on the assumption that it can compromise gains in development outcomes (UNDP, 2010; 2011; Ferreira and Ravallion, 2008). Although SSA is deemed to have some of the worse child health statistics in the world, it is also the case that most SSA countries have recorded improved child health outcomes (MDGs 4) over the last two decades. However, these improvements have not meant a reduction in inequality (UNDP, 2010; 2011). Using data from 130 countries, Ferreira and Ravallion, (2008) suggest that LAC and SSA are the world’s most unequal regions. The assertion that SSA is one of the most unequal regions in the world is also supported by a review of empirical research on inequality in SSA (Okojie and Shimeles, 2006). On the basis of high levels of inequality in SSA, it is possible that concentrating on mean outcomes alone may result in misleading conclusions and therefore inappropriate policy interventions. It is on this basis that this chapter examines the contribution of women’s empowerment to socioeconomic inequality in poor child health status in SSA. Unlike Chapter 4 and 5, the focus of Chapter 6 is on examining country-level inequality in poor child health status in SSA.

6.2 Objectives

The objective of this chapter is to examine the extent to which women’s empowerment contributes to socioeconomic inequality in poor child health status in SSA. Specifically, the chapter examines

1. The degree of socioeconomic inequality in long-term poor child health status (negative height for age) and short-term poor child health status (negative weight for height) for 20 SSA countries.

2. The influence of inequality on mean child health outcomes
3. The comparative contribution of social norms and access to resources to levels of socioeconomic inequality in poor child health status

6.3 Methods

6.3.1 Computing Socioeconomic Inequality in Poor Child Health Status

Concentration curves are commonly used in the health literature to measure health related socioeconomic inequality (Kakwani, 1977; Kakwani et al., 1997; Wagstaff et al., 1991; Sahn and Younger, 2000; O'Donnell et al., 2007). The concentration curve plots the cumulative proportion of a health variable accounted for by individuals in the population (i.e. on the y axis) and ranked by a living standard variable (i.e. on the x axis) from poorest to the richest as in Figure 6.1 below.

Figure 6.1: Concentration Curves

Source: Constructed by Author Based on Senegal DHS Data[78]

Figure 6.1 above contains concentration curves for stunting (blue line) and wasting (red line) in Senegal.[79] If every individual irrespective of their living standard has the same level of stunting and wasting, the concentration curves will lie everywhere on the line of equality (45-degree line). Where the curves lie everywhere above the line of equality as in Figure 6.1, the health variables concerned are deemed to be concentrated among the

[78] The concentration curve above was constructed using ADePT software from the World Bank.
[79] Note that the concentration curve above is merely for the purpose of explaining the intuition/concept behind a concentration curve. In addition the choice of Senegal is merely random and not for any special reason. Nonetheless the concentration curves for the remaining 19 countries are attached at the end of the chapter.

poor. On the contrary, if the concentration curves lie everywhere below the line of equality, the health variables concerned are deemed to be concentrated among the rich. The further the curves are above or below the line of equality, the more concentrated the health variables are among the poor or the rich (O'Donnell et al., 2008).

Although an important measure of inequality, concentration curves have inherent drawbacks, especially if the aim of the analyst is ascertaining the magnitude of inequality and comparing inequality across many countries or time periods. Considering that the focus of this chapter includes ascertaining the magnitude of inequality and inter-country comparison, we use an alternative- the concentration index. The concentration index is directly related to the concentration curve and allows for computing both the magnitude of inequality and inter-country comparison (Kakwani, 1977). Within the health literature, the concentration index has been used to measure and compare the degree of socioeconomic inequality in child malnutrition (Wagstaff and Watanabe, 2000; Wagstaff et al., 2003; Van de Poel et al., 2007), child immunization (Gwatkin et al., 2003) and health services utilisation (Lindelow, 2006;van Doorslaer et al., 2006). Admittedly, other measures of inequality such as the Gini could have been used in computing inequality in poor child health status. The choice of the concentration index is based on the fact that it reflects the experiences of the entire population and sensitive to the distribution of the entire population across socioeconomic groups. Secondly, since the concentration index ranks the health variable by a socioeconomic status variable and not the health variable itself as in the case of the Gini, it ensures that socioeconomic dimension to inequality in health is taken into consideration (Wagstaff, et al., 1991).

Formally, the concentration index is defined as 2 times the area between the concentration curve and the line of equality (45-degree line). Theoretically, the concentration index lies between -1 and 1. A negative value of the concentration index is synonymous with the concentration curve lying above the line of equality and a positive value being the direct opposite. Assuming h is some form of health associated with an individual i, the concentration index (CI) can be defined as in Equation 6.1 below.

$$CI = 1 - 2\int_0^1 CC_h(p)dp \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (6.1)$$

Where CC_h is the concentration curve for h. For individual level data as in the current case, the concentration index can be calculated as in Equation 6.2.

$$CI = \frac{2}{N\mu}\sum_{i=1}^{N} w_i h_i r_i - 1 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (6.2)$$

Where

$$\mu = \frac{1}{N}\sum_{i=1}^{N} w_i h_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (6.3)$$

is the weighted mean of the health variable in the sample, N is the sample size, w_i is the sample weight, where the sum of w_i is equal to N and r_i is the fractional rank of the ith individual in the living standard's distribution. For weighted data, r_i can be defined as in Equation 6.4, where $w_0 = 0$

$$r_i = \frac{1}{N}\sum_{j=1}^{i-1} w_j + \frac{1}{2} w_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (6.4)$$

Alternatively, the concentration index can be computed via the covariance between the health variable and the fractional rank of the living standard variable, often referred to as the convenience method (Jenkins, 1988;Lerman and Yitzhaki, 1989;Kakwani et al., 1997) as in Equation 6.5 below, where cov_w is the weighted covariance. From Equation 6.5, the concentration index of the health variable can be estimated via an OLS regression as in Equation 6.6.

$$CI = \frac{2}{\mu}\mathrm{cov}_w(h, r) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (6.5)$$

$$2\sigma_r^2\left(\frac{h_i}{\mu}\right) = \alpha + \beta r_i + \varepsilon_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (6.6)$$

Where σ_r^2 is the variance of the fractional rank and β is an estimate of the concentration index of h, which is equivalent to the concentration index calculated using Equation 6.2. Considering that Equation 6.6 can be estimated using an OLS regression method, normal or robust standard errors can equally be estimated from it. As in Chapter 4 and 5, the living standard variable used for computing the poor child health status concentration index is an asset index.[80]

The concentration index is mainly a measure of inequality (Kakwani, 1977; Wagstaff and Watanabe, 2000; Wagstaff et al., 2003; Van de Poel et al., 2007). Thus, using it alone may be misleading just as using mean outcomes alone (Uthman, 2009b). In practice, policy makers may not only be interested in reducing the level of inequality but also improving mean outcomes of a variable of interest. Indeed, policy makers may be willing to trade-off aspect of inequality, for improvement in mean outcomes. The balance between mean outcomes and inequality in a health variable is known as health achievement and could be measured by a health achievement index (Wagstaff, 2002).

The achievement index is defined as "a weighted average of the health levels of the various individuals in the sample, in which higher weights are attached to poorer people than to better-off people" (O'Donnell et al., 2008: 112). The index can be computed as in Equation 6.7

$$I(v) = \frac{1}{n}\sum_{i=1}^{n} h_i v(1-r)^{(v-1)} \text{ ……………………. (6.7)}$$

Where v is an inequality aversion parameter (Wagstaff, 2002) and $I(v)$ is equal to μ when there is no aversion to inequality (i.e. $v=1$). Thus when $v>1$, measured inequality increases the more, such that for a poor child health variable like h, $I(v)$ rises further above μ, meaning that increasing inequality in poor child health increases the mean of poor child health over and above what it would have been without inequality (i.e. increasing levels of disachievement). Equation 6.7 can be shown to be equal to Equation 6.8 as used by Wagestaff, (2002).

$$I(v) = \mu(1 - CI(v)) \text{ ……………………….. (6.8)}$$

[80] Lindelow, (2006) argues that the concentration index could be sensitive to the living standard variable. For example a different living standard variable such as consumption per capita could produce slightly different results compared to an asset index. As indicated in Chapter 3, the DHS data does not have information on consumption but an asset index. Thus, the estimates are based on an asset index and should be interpreted in the light of this caveat.

Considering that h is a measure of poor health, high values of $I(v)$ are considered bad and the presence of inequality raises the value of $I(v)$ above the mean of the health variable. This makes achievement worse than it would appear if one looks at only the mean. The survey nature of the DHS data (intra-cluster correlations resulting from cluster sampling) is taken into consideration in computing standard errors for the concentration and achievement indices. The standard errors are obtained using the bootstrap method via 500 replications.[81]

6.3.2 Decomposition of the Concentration Index

In this section, we decompose the computed poor child health status concentration index into contributions of the underlying determinants of poor child health status. It has been shown that the concentration index can be decomposed into contributions of the determinants of the health variable, where each contribution is the product of the sensitivity of the health variable in question with respect to determinants of the health variable and the extent of socioeconomic inequality in the health determinants (Wagstaff et al., 2003). For a continuous health variable h, such as the negative of height for age and negative of weight for height, an additive linear regression model (Equation 6.9) can be used to estimate the determinants of h.

$$h = \alpha + \sum_k \beta_k x_k + \varepsilon, \; \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots. \; (6.9)$$

Where β_k is a parameter for a vector of child health determinants x_k (defined in Section 6.4), with ε being the error term. The concentration index for h, CI, can be estimated using Equation 6.10

$$CI = \sum k(\beta_k \bar{x}_k / \mu) CI_k + GCI_\varepsilon / \mu, \; \ldots\ldots\ldots\ldots\ldots\ldots\ldots. \; (6.10)$$

Where μ is the mean of h, $\bar{x}_k$ is the mean of x_k, CI_k being the concentration index for x_k and GCI_ε the generalised concentration index for the error term, ε. From Equation 6.10, CI can be said to be a weighted sum of the concentration indices of the determinants of h, where the weights for the determinants, x_k is the elasticity of h

[81] It has been suggested that 400 replications will be adequate for a bootstrap procedure (Cameron and Trivedi, 2009). There are others who have used 500 replications for calculating the standard errors for achievement indices (Uthman, 2009b). 500 was chosen on the basis that replications above 500 did not change the standard errors significantly.

with respect to $x_k \left(\eta_k = \beta_k \frac{\bar{x}_k}{\mu} \right)$. The last term in Equation 6.10, which captures the error term is an estimate of the level of inequality in h not explained by systematic variation in the x_k by the living standard variable (asset index). From Equation 6.10, the contribution of each of the determinants of h, x_k can be computed via the product of the elasticity and CI of each of the determinants.

6.4 Data and Variables

This chapter uses DHS data for 20 SSA countries. The dataset has been discussed in detail in Chapter 4. The chapter uses the same dependent and independent variables used in Chapter 4 (height for age and weight for height). Both the dependent and independent variables have been discussed in detail in Chapter 4.[82] We use the negative of height for age and weight for height as indicators of poor long-term and short-term child health status respectively.[83] The reason for not using the original height for age and weight for height z-score is due to the fact that interpretation could be difficult. To deal with the interpretation challenge, the common approach in the literature has been the use the negative of the relevant anthropometric indices multiplied by negative one (-1) (Wagstaff and Watanabe, 2000; Van de Poel et al., 2007). In this way, a higher value is interpreted to mean poor child health with the reverse being true for lower values. Secondly, our measure of socioeconomic inequality in child health (concentration index) is inconsistent with the use of a healthcare variable such as HAZ and WHZ that contains negative and positive values due to standardization.[84]

Alternatively, height for age and weight for height z-score could be dichotomised (stunting and wasting) and used to compute the concentration index. However, the use of the negative of height for age or weight for height (i.e. a continuous variable) is favoured on the basis that (1) it conveys information on the depth of poor health (malnutrition) compared to a simple determination of whether a child is stunted/wasted

[82] The independent variables include: social norms, women's access to resources, child age, gender and size at birth, parental education, mother's height, age at first birth, sex of head of household, number of children in household, number of women in household, asset index, type of residence, non-self cluster proportion of households with pipe water and flush toilets and non-self cluster proportion of women who had the minimum of 4 antenatal visits and delivered in a health facility. Note that country level decompositions include regional/provincial dummies compared to country dummies for the SSA decomposition.

[83] Note that limits of the anthropometric indices are -6 to 6 and -5 to 5 for height for age and weight for height respectively.

[84] The concentration index of a health variable containing both negative and positives values is not bounded within the range of -1 and 1 (Wagstaff, 2005).

or not. (2) The continuous nature of the negative of height for age and weight for height makes them amenable to linear regression analysis (Wagstaff et al., 2003). The importance of a linear regression is on the basis that it gives unique results for the decomposition of the concentration index compared to a non-linear approximation in the case of a binary variable (Wagstaff et al., 2003; Hosseinpoor et al., 2006; O'Donnell et al., 2008).

Notwithstanding the advantages associated with the use of a continuous variable in computing the concentration index, we alternatively compute the concentration index using binary variables (stunting and wasting). This takes into consideration the on-going debate on the sensitivity of the concentration index of a binary variable to its mean. Thus, in addition to the standard concentration index of a binary variable, we also compute the normalisations proposed by Wagstaff, (2005; 2009) and Erregyers, (2009a; 2009b) to deal with the supposed sensitivity of the concentration index of a binary variable to its mean. The independent variables are used mainly to decompose the concentration index of poor child health status into the contributions of its determinants.

6.5 Results

Table 6.1 contains summary statistics for the dependent variables used to compute the concentration index. The summary statistics for the independent variables are not reported because they are the same as those used in Chapter 4. From Table 6.1, Senegal, Ghana, Namibia and Zimbabwe have a relatively lower mean negative height for age, with Swaziland, Tanzania, Zambia and Malawi having relatively lower negative weight for height z-scores. The percentage stunted and wasted also follows the same pattern.

6.5.1 Inequality in Poor Child Health Status

Table 6.2 presents results on the level of socioeconomic inequality in poor child health status (negative of height for age and weight for height). The results (Columns 3 and 6) show negative concentration indices for both negative height for age and negative weight for height in all countries. This suggests a concentration of poor child health status among the poor. This is not surprising considering that developing countries tend to have higher levels of inequality, for which SSA is no exception (Okojie and Shimeles, 2006; Ferreira and Ravallion, 2008; UNDP, 2010; 2011). Using the t-values (columns 4), the concentration indices of negative height for age are all significant with the exception of Niger and Zimbabwe. This implies that inequality in poor child health status in these countries is systematic and not just due to chance. Out of the 20 countries, Senegal, Nigeria and Cameroon occupy the bottom 3 (i.e. have the highest level of inequality), whiles Niger, Zimbabwe and Uganda occupy the top 3 (i.e. have the lowest levels of inequality). Using the SSA average as a benchmark, 8 countries (Niger, Zimbabwe, Zambia, Sierra Leone, Rwanda, Mali, Malawi, Ethiopia and DRC) can be suggested to have lower levels of inequality in poor child health status, as their respective CIs are lower than the SSA average.

With respect to negative weight for height, Malawi, Swaziland and Nigeria occupy the bottom 3 positions, whiles Zimbabwe, Sierra Leone and Ghana occupy the top 3. In all, 10 countries (Zimbabwe, Uganda, Tanzania, Sierra Leone, Senegal, Rwanda, Mali, Ghana, DRC and Burkina Faso) have CIs for negative weight for height below the SSA average. The country rankings of negative height for age and negative weight for height tend to differ, except Nigeria and Rwanda, which retained the same positions and Zimbabwe, DRC, Guinea, Mozambique, and Namibia with slight changes. The difference is not entirely implausible, considering that children who are stunted are rarely wasted at the same time (Wagstaff and Watanabe, 2000).

The concentration indices are then standardised by age and sex of the children in the sample to account for unequal health needs of children due to age and sex. This is done by subtracting the contributions of child sex and age to the overall CI of poor child health status from the value of the CI for poor child health status (see Wagstaff and van Doorslaer, 2000;van Doorslaer and Koolman, 2004). The results of the standardized CI's (see columns 7 – 13 of Table 6.2) are basically the same as that of the unstandardised CI's except DRC, Ethiopia, Ghana, Guinea and Swaziland where the rankings change slightly. This may be an indication of age and gender bias in children's health status in these countries. Ironically, a comparison of Table 6.2 and 6.3 reveals that the countries with the highest GNI per capita and health expenditure per capita have higher levels of inequality in poor child health status. A possible explanation to this is straightforward. Extra resources by means of income from productive activities or investment in healthcare, tends to benefit the rich rather than the poor. This intuitive explanation conforms to the argument that rich individuals account for a disproportionate share of health subsidies and public expenditure on hospital care in many countries (Castro-Leal et al., 2000; Sahn and Younger, 2000; Akazili et al., 2011).

Alternatively, stunting and wasting is used to compute the CIs for poor child health status (see Table 6.3). Besides the standard concentration index, we also show the normalisation proposed by Wagstaff and Errergyers (Wagstaff, 2005; 2009; Erreygers, 2009a; 2009b). The results are generally close to CI's based on the negative of height for age and negative of weight for height. Using the Wagstaff normalisation, we compare the CIs of stunting and wasting to the percentage of children stunted and wasted. The results in Figure 6.2 and 6.3 suggest a negative relationship between inequality and stunting/wasting. In other words, countries with lower levels of stunting/wasting tend to have higher levels of inequality in poor child health status. For example in Figure 6.2, Senegal with the highest CI for stunting has the lowest percentage of children with stunted growth, with the reverse being true for Niger.

In Figure 6.3, Swaziland, Malawi, Namibia and Cameroon are 4 countries with the highest CI for wasting but the lowest percentage of children wasted. The current results corroborate the findings of existing studies (Wagstaff and Watanabe, 2000; Van de Poel et al., 2007) where a negative relationship is found between inequality and average outcome in child anthropometrics.[85] A possible explanation could be that in these countries, relatively few children from richer households benefit from extra investment in child health as argued in prior studies (Castro-Leal et al., 2000; Sahn and Younger, 2000; Akazili et al., 2011), which results in better average outcomes but high levels of inequality. This is a confirmation of the discussion in the previous paragraph. The current results also confirm the findings of existing studies, suggesting socioeconomic inequality in child and adult health in favour of the rich in South Africa (Zere and McIntyre, 2003;Ataguba et al., 2011;Nkonki et al., 2011), Mozambique (Lindelow, 2006), Nigeria (Uthman, 2009b), Ghana (Van de Poel et al., 2007; Zere et al., 2012) and Namibia (Zere et al., 2011). Besides confirming the results of existing country level studies in SSA, an important aspect of the current results lies in the suggestion that countries with higher GNI and health expenditure per capita tend to have the highest levels of inequality in poor child health. In addition, the results also reiterate the fact that poor child health status inequality is not a phenomnon limited to only a few countries, but most of SSA as the results suggest that socioeconomic inequality in poor child health status exist in all the 20 countries studied.

6.5.2 Achievement in Child Health Status

Generally, the results in Table 6.5 suggest that for different inequality aversion parameters, the presence of inequality compromises average outcomes as evidenced by higher achievement values compared to mean outcomes. For example, inequality in negative height for age meant a 7.8%, 7.8%, 7.6%, 6.7%, 6.3, 6.2% and 6.1% deterioration in the mean outcomes in negative height for age for Senegal, Nigeria, Cameroon, Mozambique, Tanzania, Burkina Faso and Namibia respectively. In other words, the presence of inequality means deterioration in mean outcomes in negative height for age compared to what it would have been without inequality. The achievement index for negative height for age deteriorates even further when a higher weight is placed on inequality in poor child health status (i.e. as the inequality aversion parameter, v, increases – see Table 6.5). The story is generally the same for negative weight for height, except that the extent of deterioration in mean outcomes due to inequality is lower in negative weight for height compared to negative height for age. In Sierra Leone however, the presence of inequality calculated at $v = 2$ (which is also the

[85] The study by van de Poel et al, (2007) used DHS data from 24 SSA countries whiles Wagstaff and Watanabe, (2000) used data from 20 countries made up of 15 developing countries in addition to Brazil, Russia, China, Romania and South Africa.

same as the standard inequality index) meant mean outcomes improved compared to what it would have been without inequality. However, as the inequality aversion parameter v increased beyond 2, mean outcomes deteriorated compared to what it would have been without inequality.

The implications of the results in Table 6.5 is that a policy of allowing for some form of inequality with the aim of improving mean outcomes may be counter-productive in SSA countries. This is because inequality based on different weights successively leads to deterioration in mean outcomes. This may not be surprising, considering that in developing countries like SSA, poverty could be pervasive. Thus, deliberate policies to allow a certain extent of inequality may end up crowding out the poor (who in most instances are in the majority) from access to food resources and health services. The consequence of this may be deterioration in mean outcomes in child health. The result is consistent with findings from Nigeria (Uthman, 2009b), where it was found that the presence of inequality (calculated at different inequality aversion parameters – 2, 3, 4 and 5) in childhood malnutrition meant deterioration in mean childhood malnutrition outcomes.

6.5.3 Contributions of Child Health Determinants to Inequalities in Poor Child Health Status

In this section, inequality in poor child health status (negative of height for age and weight for height) is decomposed across the determinants of child health, specified in section 6.4. In the first stage, pooled data for SSA is used with the results presented in Table 6.6A and Table 6.6B – showing the elasticity, concentration index and contribution of each determinant to poor child health status inequality.[86]

The positive concentration index (CI) of women's access to resources and social norms suggest that women with access to resources and the capacity to contest social norms inimical to their wellbeing are concentrated among the rich. In addition, primary to tertiary levels of women's education, secondary to tertiary levels of husband/partner's education, access to good water and sanitation (flush toilet and pipe water), access to health services (+4 cluster level antenatal visits and cluster level health facility delivery) etc. are all concentrated among the rich. Most importantly, the CI of assets index, which

[86] We do not comment on the elasticity since that is largely part of the discussion in Chapter 4. It is also important to indicate that the CIs of the determinants of negative height for age and weight for height are the same because as per the formula in Section 6.4.2, it does not depend on the outcome variable.

is synonymous with the Gini, is positive and therefore indicative of a pro-rich distribution of assets/resources.

The percentage contribution reflects the extent to which the determinants of child health contribute to the reported inequality in poor child health status. A negative value, suggest that the respective determinant is lowering socioeconomic inequality and vice versa. From Table 6.6A, the respective contributions of women's access to resources and social norms are 2% and 1.4% for negative height for age and -9.5% and -6% for negative weight for height. Notwithstanding, the contributions of women's access to resources and social norms are small compared to other determinants such as household wealth, education and access to health services. For example, household wealth (58.6% and 50%), access to health services (28.2% and 56.6%) and women's education (14% and 20.3%) have the highest contribution to long-term and short-term poor child health status respectively. In the case of poor short-term child health, partner education and rural residence are equally important contributors to socioeconomic inequality.

These findings may be attributed to the fact that household wealth, education and access to health services are considered important determinants of child health status. Invariably, these factors, as per the CIs of the determinants are concentrated among the rich. Juxtaposing this on the assertion that additional income from productive activities and investment in health services benefit the rich more than the poor (as already discussed above), it may not be surprising that they tend to contribute the most to the level of socioeconomic inequality in poor child health status. The result is also consistent with the existing literature, where household consumption/wealth, education, access to health services and place of residence are seen as the main drivers of socioeconomic related inequality in child and adult health in SSA (Van de Poel et al., 2007; Nkonki et al., 2011; Zere et al., 2011), and outside of SSA (Wagstaff et al., 2003; van Doorslaer et al., 2004; van Doorslaer and Koolman, 2004; Hosseinpoor et al., 2006; Morasae et al., 2012).

In the second stage, we repeat the decomposition exercise for individual countries with the results presented in Tables 6.7 to 6.11. Table 6.7 presents the concentration indices of the determinants of poor child health status for each country. On women's empowerment, women's access to resources and social norms (ability to contest social norms inimical to women's wellbeing) seem to be concentrated among the rich.

However, for women in Guinea, social norms index has higher a score among the poor, whiles in Burkina Faso, Cameroon, Mali, Mozambique, Swaziland, Tanzania and Zimbabwe, women's access to resources is higher among the poor. The pro-poor nature of women's access to resources in these countries is surprising. This may be the effect of specific country-level affirmative action to improve the economic circumstances of women, especially the poor.

Although primary education is pro-poor in about half of the countries studied, as expected, secondary and tertiary education, access to good water and sanitation, access to health services and household wealth are concentrated among the rich in almost all countries (see Table 6.7). The pro-poor nature of primary education in many of these countries may be due to the implementation of Free Compulsory Universal Basic Education (FCUBE) in many SSA countries.[87] Notice however, that access to good pipe water is pro-poor in Uganda, whiles 4+ cluster antenatal care is also pro-poor in Swaziland.

Contributions of child health determinants to poor child health status inequality at the country level are presented in Tables 6.8 (negative height for age) and 6.9 (negative weight for height). Unlike the SSA average, women's empowerment's contribution to socioeconomic inequality in long-term poor child health status is considerably high in several countries. For example, the contribution of social norms is relatively high in Namibia (-10.8%), Niger (33.4%), Sierra Leone (14.4%) and Zimbabwe (19.5%) compared to the other countries. Women's access to resources records equally higher contribution in DRC (15.3%), Ethiopia (-11.3%), Namibia (15.9%), Niger (148.7%), Senegal (14%), Sierra Leone (-57.5%), Swaziland (-24.5%) and Zambia (-21%). In DRC, Namibia, Niger and Senegal, women's access to resources increases the level of socioeconomic inequality in poor child health status, whiles in Ethiopia, Sierra Leone, Swaziland and Zambia it reduces inequality.

The importance of social norms and women's access to resources to socioeconomic inequality in poor child health status remains important even with short-term child

[87] For example, countries such as Ghana, Kenya, Malawi, Nigeria, Tanzania, Uganda, Zambia, Benin, Burkina Faso, Cameroon, Madagascar, Mali, Niger, Senegal DRC, Gambia, Gabon, Mali, Namibia, Niger, Nigeria Rwanda, Swaziland etc have extensive programs for free compulsory primary education (Tilak, 2009; Lewin and Sabates, 2011)

health (negative weight for height). For example, social norms reduces inequality in short-term poor child health status by 79.6% in DRC, 24.8% in Mozambique, 20.2% in Swaziland and 22.5% in Zimbabwe. In addition, women's access to resources increases inequality in countries like Ghana (306.4%) and Sierra Leone (91.5%). The current results support the suggestion earlier made, that women's empowerment by virtue of its relationship with access to resources will influence the level of socioeconomic inequality in child health. It is also important to note that the importance of women's empowerment (social norms and women's access to resources) to socioeconomic inequality in poor child health status is not pervasive but peculiar to certain countries as the results suggest. This may reflect the peculiarities and policy differences in individual countries.

Consistent with the results of the pooled SSA data, the results from individual countries suggest that household wealth, access to good water and sanitation, access to health services, regional and provincial variation and to some extent education are the most important contributors to poor child health status inequality. The results in Tables 6.8 and 6.9 attest to this. It is equally important to note that in countries such as Niger, Sierra Leone and Zimbabwe, the contributions of these determinants to long-term poor child health status inequality are exceptionally high. The same is true for DRC, Ghana, Senegal, Sierra Leone, Rwanda and Zimbabwe for short-term poor child health status inequality. Aside Ghana and Senegal, it is not surprising to find that household wealth, education, access to health services and access to good water and sanitation have relatively higher levels of contributions to poor child health status inequality in SSA. This may be related to poverty and lack of economic opportunities in most of these countries. For example, Zimbabwe has been through a long period of economic turbulence. Rwanda, DRC and Sierra Leone are recovering from major civil wars, whiles political instability in Niger may to a certain extent be responsible for this state of affairs.

The results also suggest that regional/provincial differences contribute significantly to socioeconomic inequality in poor child health status (see Table 6.8 and 6.9). For example, regional and provincial differences contributes more than 30% to socioeconomic inequality in long-term poor child health status in Burkina Faso, Ghana, Niger, Nigeria, Sierra Leone, Uganda and Zimbabwe but less than 30% in only 5 countries (Cameroun, DRC, Malawi, Mozambique, Swaziland) in the case of short-term poor child health status. In many developing countries, regional/provincial inequities in resource allocation can be common. Regional and provincial inequities in federal budget allocation and social infrastructure such as health services may result in unequal access to health services when needed. This may lead to socioeconomic inequality in child health as in the present case. The findings of van Doorslaer and Koolman, (2004), although not from SSA, is relevant to the current study. Using 13 countries from Europe, they find regional differences as one of the key drivers of income related health inequalities in Europe.

To have a better appreciation of the regional and provincial differences, details of the contributions from the different regions/provinces in each country is presented in Table 6.10 and 6.11. Generally, the greatest regional/provincial contributions seem to come from either major/resource-rich or neglected regions/provinces. For example, in Table 6.10, Est and Hauts Bassins in Burkina Faso, Tahoua and Tiilaberi in Niger, Greater Accra and Ashanti in Ghana, North West and South West in Nigeria, Harare and Masyingo in Zimbabwe have some of the largest contribution to socioeconomic inequality in long-term poor child health status. Not surprisingly, most of these regions are either national capitals or major regions controlling substantial resources or very marginalised regions in their respective countries.

For instance, Greater Accra and Harare are national capitals, whiles Ashanti in Ghana and South West in Nigeria, though not national capitals have some of the best socioeconomic infrastructure and economic opportunities in those countries. In many developing countries, resource-rich regions tend to attract migrant workers from less privileged regions in search of jobs and opportunities, which may not exist. The Ashanti region in Ghana for example, attracts migrant workers from the northern part of Ghana. Many of these migrant workers are often engaged in menial jobs with compensation packages that may not be enough for food, let alone health services. This may have implication in terms of access to health services especially where users are expected to bear the cost of medical care either directly or indirectly. Considering that direct cost of healthcare (e.g. hospital fees) and indirect cost (e.g. distance and transportation cost) are agued to be major determinants of use of health services and health (Sahn, 1994; Sahn et al., 2003; Overbosch et al., 2004), unequal access to income/wealth may mean unequal access to health services especially for poor people.

In the same way, marginalised regions may lack social amenities and therefore create disparities in access, leading to socioeconomic inequality in child health. For example, the historical and colonial antecedents of the Northern region of Uganda, together with the long period of war in that region, have meant extreme levels of deprivation. In addition, poor economic conditions in the Masyingo province of Zimbabwe, together with the predominance of religious beliefs that are anti 'western medicine' and the skewed nature of resource distribution in the North Western region of Nigeria, owing to patriarchy and political clientelism, may partly explain the high contribution of these regions to socioeconomic inequality in poor child health status.

6.6 Policy Implications and Conclusion

There have been several studies in SSA investigating socioeconomic inequality in health and use of health services (Castro-Leal et al., 2000; Sahn and Younger, 2000; Van de Poel et al., 2007; Uthman, 2009b; Nkonki et al., 2011; Zere et al., 2011; Akazili et al., 2011; Ataguba et al., 2011). However, studies based on cross-country evidence are rare. This makes the current study unique in terms of its contribution to the literature and policy. The findings suggest that in almost all the 20 countries, socioeconomic inequality in poor child health status exist. What is even surprising is the fact that the countries with relatively better average child health outcomes, higher GNI per capita and health expenditure per capita tend to have higher levels of socioeconomic inequality in poor child health status. A situation that may be due to the fundamental lack of fairness in the distribution of resources in such countries. This may also be an indication of policies that benefit the rich more than the poor.

Thus, it may be important for governments of SSA countries to put in place policies that specifically target the poor and economically marginalised, so as to reduce the levels of child health inequality, especially in Countries like Senegal, Cameroon, Nigeria, Namibia, Burkina Faso etc. As explained in the findings, it is possible that in these countries, extra resources in lieu of consumption and healthcare, benefits the rich more than the poor (inequality) and therefore making the poor worse off and consequently an overall deterioration in mean of child health. Thus, efforts at reducing child health inequality may also serve to improve average outcomes in child health, making it an important policy option to be considered.

Importantly, the ability of policy makers to reduce the level of child health inequality depends on the knowledge of what the drivers of inequalities are. A major objective in this chapter is examining the comparative contribution of social norms and access to resources (women's economic power) to socioeconomic inequality in poor child health. Although the results suggest that women's empowerment is important, the phenomenon is not pervasive but specific to certain countries (e.g. Namibia, Sierra Leone, Niger, Zambia and Swaziland). In these countries, policy makers may target women's empowerment as an option for reducing socioeconomic related child health inequality. Notwithstanding the importance of women's empowerment, household wealth, access to good water and sanitation, access to health services, education and regional/provincial differences seem to play the most important role in determining the level of poor child health status inequality in all the countries studied.

Unlike Chapter 4 and 5, the question of where to lay emphasis is straightforward, since the estimates are based on percentages rather coefficients. However, examining the effect of changes in social norms, women's access to resources and other child health determinants on contributions to inequality in poor child health status will be a more robust strategy to address this question. Thus, we use the pooled SSA data to simulate the effect of changes in social norms, women's access to resources and other child health determinants on contributions of these variables to inequality in poor child health status.[88] It is important to caution, that the essence of the simulation is not to infer causality, especially taking into consideration possible identification challenges with our OLS model (see Chapter 4). The results in Table 6.12 suggest that changes in the social norms index has a higher effect on poor child health status inequality compared to women's access to resources. For example, a 15.1% increase in the mean of the social norms index is associated with a 101.1% reduction in the contribution of social norms to long-term poor child health status inequality.

[88] For purposes of illustration, we use social norms and Neghaz in Table 6.12 to explain how the simulation was done: Note that this method is applicable for the other variables simulated: (1) All women with values below the median value of 0.47376 are given the median value. This increases the mean of the social norms index by 15.1% (i.e. from 0.47555 to 0.54726). (2) The new social norms index variable is used in the decomposition of poor child health status inequality with all other variables unchanged (3) The effect is that the 1.4% contribution of social norms to poor child health inequality reduces to 0.0%, representing a reduction of 101.5%. The same procedure is repeated in a second simulation of the social norms index but using the 75th percentile value. That is all women with social norms value less than the 75th percentile value are given the 75th percentile value and the new variable used for the decomposition of poor child health inequality.

On the contrary a 13.3% increase in the mean of women’s access to resources index is associated with a 9% reduction in the contribution of women’s access to resources to long-term poor child health status inequality (see Table 6.12). This trend is not entirely different in the case of short-term poor child health status inequality. From Table 6.12, the percentage change associated with changes in the women’s empowerment variables (social norms and women’s access to resources) seem larger compared to variables such as household wealth and healthcare. However, relying only on these figures may be misleading, considering that the magnitude of improvements in child health inequality associated with increases in household wealth, availability and accessibility of health services are far higher. For example, a 15.1% increase in the mean of the social norms index results in reducing the contribution of the social norms index from 1.4% to 0.0%. On the contrary, increasing the mean household wealth by 5.6%, reduces the contribution of household wealth to long-term poor child health status inequality from 58.6% to 48.5%. The later is clearly a higher reduction in percentage contribution to poor child health status inequality compared to the former.

The decomposition and simulation results both suggest that women’s empowerment is an important policy option for reducing child health inequality, but even more crucial are traditional factors such as household wealth, access to and availability of health services. The emerging policy story from this result is that policy makers should continue to explore options to use women’s empowerment as a driver for reducing child health inequality. However, such policies should be pursued recognizing both the intrinsic and instrumental ability of social norms to either constrain or promote the aims of such policies. This point has been forcefully articulated by some studies in the women’s empowerment literature as discussed in Chapter 4 (Kabeer, 1999; 2005; Narayan, 2005; Allendorf, 2007b; Goldstein and Udry, 2008; Wahhaj and Kanzianga, 2010).

In Chapters 4 and 5, we argued based on the results that a lot more emphasis should be placed on traditional determinants of health services such as household wealth, education and access to health services compared to women’s empowerment. This emphasis is also true in the case of this chapter. The decomposition and simulation results support the fact that education, household wealth, bridging provincial/regional gaps, access to good water and sanitation and health services are likely to reduce child health inequality more than women’s empowerment. The case has been made in

Chapter 4 that institutions in general could be path dependent and sticky (North, 1990; Williamson, 1998; 2000) and therefore informal institutions such as social norms could take a long time to change (North, 1990; Albiston, 2005). This may explain the relatively lower effect of changes in women's empowerment (social norms and women's access to resources) on child health inequality compared to other traditional determinants of child health. It may also be that the high levels of poverty in SSA (Okojie and Shimeles, 2006) coupled with poor child health indicators and weak health systems (Ezzati et al., 2002;Black et al., 2003;Pelletier and Frongillo, 2003;Black et al., 2008) means higher marginal returns on investments that improves household wealth, education, access to good water and sanitation, accessibility to and availability of health services.

Thus policy makers may adopt a two-prong strategy where policies to address child health inequality have (1) a strong component on interventions that address bargaining power of women both within and outside of the household (2) interventions that seeks to improve education of women, access to good water and sanitation, household incomes/wealth, especially among the poor and vulnerable populations and access to and availability of the requisite health infrastructure. Although returns on empowerment policies (especially issues on social norms) may be realized in the long-term, they are still important, in that they may bolster short-term gains in improvement in household wealth and accessibility to health services and perhaps make such gains sustainable.

As in Chapter 4, we recognize that the underlying OLS model used for the decomposition may have identification challenges (see Chapter 4). Secondly, including indicators of women's health in this chapter would have been appropriate considering that the first two chapters dealt with both children and women's health. However, this has not been possible for two reasons. First, the objective of this chapter is exploring an issue, which has received limited attention in the literature. Thus using only child health is deemed enough to tell the story. Secondly, the inclusion of women's health could mean a bigger chapter, which the constraints on space will make it difficult to accommodate. Thus new studies could focus attention on women's health status indicators.

Table 6.1: Summary Statistics for Child Health Status Indicators

Countries	Height for Age		Weight for Height	
	Mean NegHaz	**% Stunted**	**Mean NegWhz**	**% Wasted**
Burkina Faso	2.271	43.07	1.572	21.36
Cameroon	1.986	35.42	1.060	6.26
Dem. Rep of Congo	2.298	44.74	1.200	10.1
Ethiopia	2.432	50.05	1.264	12.18
Ghana	1.737	27.23	1.100	8.89
Guinea	2.081	39.29	1.233	11.3
Malawi	2.165	46.91	0.910	4.14
Mali	2.119	37.8	1.371	15.58
Mozambique	2.226	47.13	0.967	5.09
Namibia	1.738	29.35	1.073	7.59
Niger	2.596	54.85	1.260	12.96
Nigeria	2.279	40.39	1.429	13.95
Rwanda	2.278	50.66	0.945	4.67
Senegal	1.495	20.17	1.110	8.52
Sierra Leone	2.135	36.39	1.243	10.42
Swaziland	1.686	27.56	0.852	2.53
Tanzania	2.040	43.69	0.870	3.57
Uganda	1.953	37.98	1.015	6.59
Zambia	2.187	45.42	0.998	5.31
Zimbabwe	1.856	32.81	1.030	6.49
Sub-Saharan Africa	2.149	41	1.223	10.32

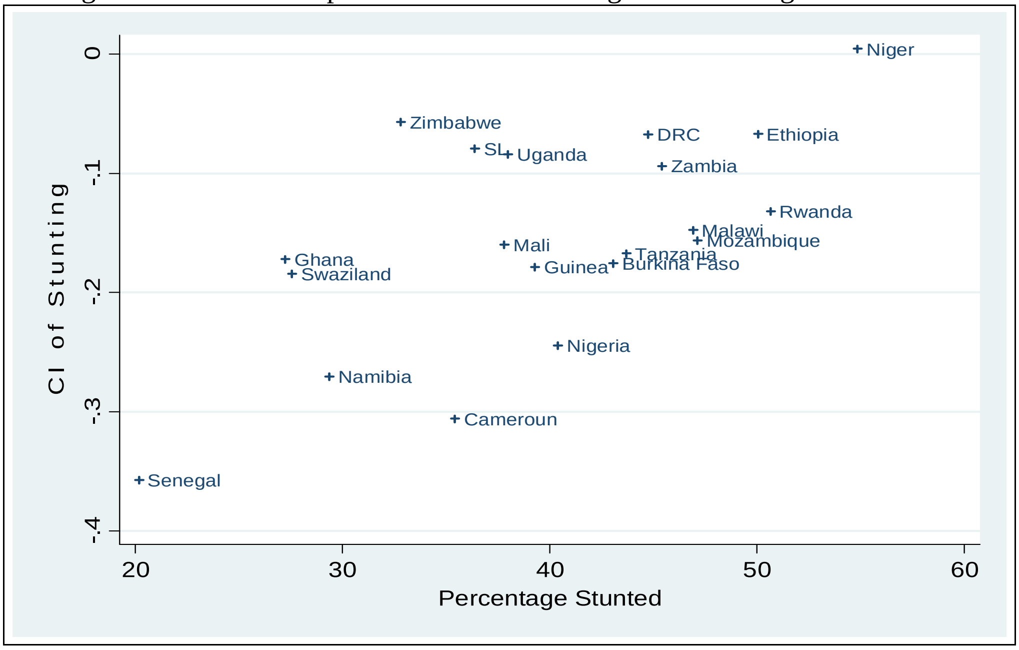
Source: Author’s Calculation

Table 6.2: Concentration Indices and t-values for Poor Child Health Status in SSA

Countries	Negative of Height for Age Unstandardized			Negative of Weight for Height Unstandardized			Negative of Height for Age Standardized			Negative of Weight for Height Standardized		
	Rank	CI	t-value	Rank	CI	t-value	Rank	CI	t-value	Rank	CI	t-value
Burkina Faso	16	-0.0652	-12.73	9	-0.0173	-2.603	16	-0.0684	-13.35	8	-0.0154	-2.322
Cameroon	19	-0.0921	-9.19	17	-0.0590	-3.359	19	-0.0922	-9.20	17	-0.0574	-3.267
Dem. Rep of Congo	5	-0.0240	-3.40	6	-0.0119	-1.151	6	-0.0261	-3.70	6	-0.0110	-1.067
Ethiopia	6	-0.0246	-4.45	15	-0.0469	-5.909	5	-0.0248	-4.49	15	-0.0499	-6.283
Ghana	14	-0.0594	-6.81	3	-0.0051	-0.446	13	-0.0585	-6.71	3	-0.0072	-0.634
Guinea	12	-0.0539	-5.89	13	-0.0353	-2.449	14	-0.0604	-6.60	12	-0.0314	-2.182
Malawi	10	-0.0473	-8.89	20	-0.0855	-5.722	10	-0.0464	-8.71	20	-0.0849	-5.683
Mali	9	-0.0439	-8.78	5	-0.0089	-1.452	9	-0.0455	-9.10	5	-0.0080	-1.306
Mozambique	15	-0.0602	-14.09	14	-0.0414	-3.790	15	-0.0615	-14.38	14	-0.0408	-3.738
Namibia	17	-0.0799	-8.99	16	-0.0586	-4.891	17	-0.0783	-8.80	16	-0.0565	-4.718
Niger	1	-0.0018	-0.32	11	-0.0249	-3.721	1	-0.0055	-0.95	11	-0.0245	-3.667
Nigeria	18	-0.0828	-23.88	18	-0.0666	-10.563	18	-0.0835	-24.08	18	-0.0666	-10.563
Rwanda	8	-0.0399	-7.68	8	-0.0162	-1.214	8	-0.0399	-7.68	9	-0.0162	-1.214
Senegal	20	-0.1121	-10.12	4	-0.0061	-0.414	20	-0.1114	-10.06	4	-0.0074	-0.504
Sierra Leone	4	-0.0228	-2.27	2	-0.0032	-0.245	4	-0.0243	-2.42	2	-0.0026	-0.196
Swaziland	13	-0.0563	-6.74	19	-0.0720	-3.812	12	-0.0550	-6.59	19	-0.0722	-3.823
Tanzania	11	-0.0521	-10.15	7	-0.0129	-1.459	11	-0.0515	-10.04	7	-0.0135	-1.523
Uganda	3	-0.0186	-2.98	10	-0.0204	-1.387	3	-0.0192	-3.08	10	-0.0231	-1.572
Zambia	7	-0.0346	-5.46	12	-0.0352	-2.612	7	-0.0344	-5.43	13	-0.0359	-2.671
Zimbabwe	2	-0.0045	-0.56	1	0.0153	1.003	2	-0.0064	-0.79	1	0.0167	1.093
Sub-Saharan Africa		-0.0511	-32.12		-0.0247	-9.093		-0.0521	-32.75		-0.0239	-8.827

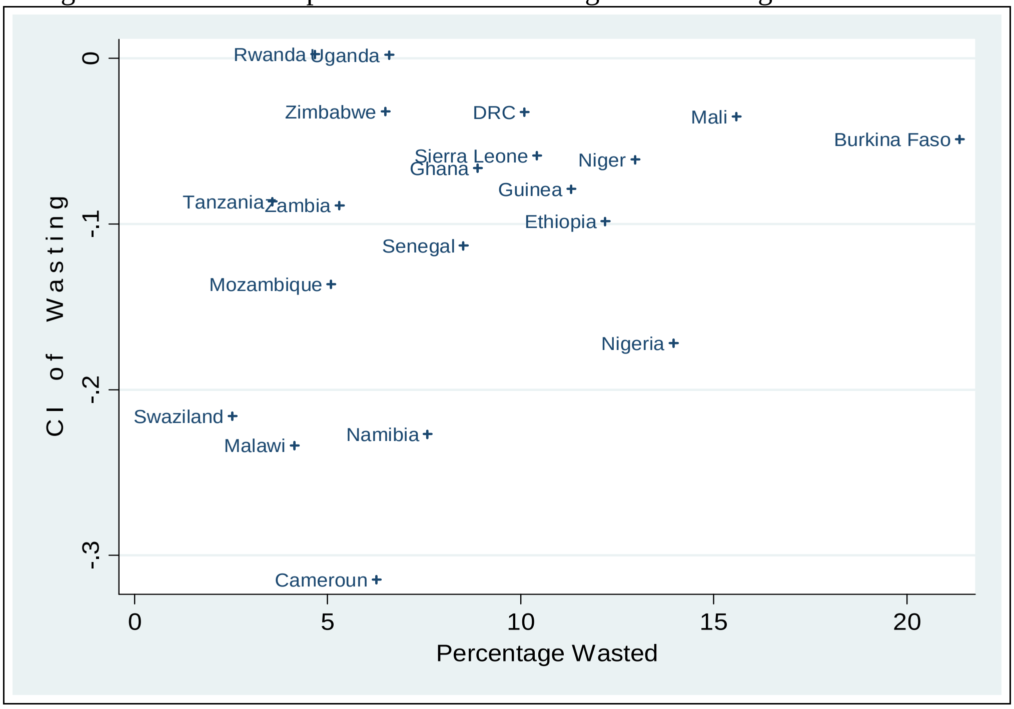
Source: Author's Calculations

Figure 6.2: Relationship between CI of Stunting and Percentage Stunted



Source: Author's calculation

Figure 6.3: Relationship between CI of Wasting and Percentage Wasted



Source: Author's calculation

Table 6.3: Country Ranking on GNI and Health Expenditure per Capita

Countries	**2010 GNI per Capita (Atlas Method)**		**2010 Health Expenditure per Capita (Current US Dollars)**	
	Value	**Rank**	**Value**	**Rank**
Congo, Dem. Rep.	180	1	15.75	3
Malawi	330	2	25.62	7
Sierra Leone	340	3	42.53	11
Niger	360	4	18.29	4
Ethiopia	390	5	15.71	2
Guinea	390	6	23.01	6
Mozambique	440	7	21.34	5
Zimbabwe	480	8	N/A	1
Uganda	500	9	46.72	12
Rwanda	520	10	55.51	13
Tanzania	530	11	30.91	8
Burkina Faso	550	12	39.78	10
Mali	600	13	31.66	9
Zambia	1070	14	72.88	18
Senegal	1080	15	58.5	14
Nigeria	1170	16	62.78	16
Cameroon	1200	17	61.34	15
Ghana	1250	18	67.03	17
Swaziland	2930	19	203.13	19
Namibia	4250	20	361.31	20

Source: World Development Indicators, 2013

Table 6.4: Concentration Indices and t-values for Poor Child Health Status – Based on Alternative Measures by Binary Variables

Countries	Stunting						Wasting					
	Standard Index		Wagstaff Index		Erreygers Index		Standard Index		Wagstaff Index		Erreygers Index	
	CI	t-value	CI	t-value	CI	t-value	CI	t-value	CI	t-value	CI	t-value
Burkina Faso	-0.1000	-11.249	-0.1756	-19.758	-0.1723	-19.378	-0.0382	-2.686	-0.0486	-3.416	-0.0327	-2.296
Cameroon	-0.1974	-11.646	-0.3057	-18.034	-0.2797	-16.501	-0.2950	-6.402	-0.3147	-6.829	-0.0738	-1.602
Dem. Rep of Congo	-0.0374	-3.015	-0.0677	-5.457	-0.0670	-5.396	-0.0292	-0.969	-0.0324	-1.078	-0.0118	-0.391
Ethiopia	-0.0335	-3.540	-0.0670	-7.087	-0.0670	-7.087	-0.0862	-4.535	-0.0982	-5.164	-0.0420	-2.209
Ghana	-0.1251	-6.458	-0.1720	-8.875	-0.1363	-7.035	-0.0602	-1.781	-0.0661	-1.954	-0.0214	-0.633
Guinea	-0.1084	-6.477	-0.1786	-10.669	-0.1704	-10.179	-0.0701	-1.917	-0.0790	-2.161	-0.0317	-0.867
Malawi	-0.0784	-7.341	-0.1477	-13.828	-0.1471	-13.775	-0.2239	-5.034	-0.2335	-5.252	-0.0371	-0.834
Mali	-0.0995	-11.740	-0.1600	-18.875	-0.1505	-17.751	-0.0297	-2.080	-0.0351	-2.464	-0.0185	-1.297
Mozambique	-0.0827	-10.695	-0.1563	-20.229	-0.1558	-20.162	-0.1292	-4.231	-0.1361	-4.458	-0.0263	-0.862
Namibia	-0.1911	-10.199	-0.2705	-14.435	-0.2243	-11.972	-0.1667	-4.627	-0.2267	-6.293	-0.1766	-4.901
Niger	0.0019	0.204	0.0042	0.451	0.0042	0.447	-0.0530	-3.056	-0.0609	-3.511	-0.0275	-1.584
Nigeria	-0.1456	-24.283	-0.2443	-40.739	-0.2353	-39.236	-0.1480	-10.990	-0.1719	-12.771	-0.0826	-6.132
Rwanda	-0.0652	-7.343	-0.1322	-14.884	-0.1321	-14.882	0.0023	0.051	0.0024	0.054	0.0004	0.010
Senegal	-0.2851	-10.718	-0.3572	-13.426	-0.2301	-8.648	-0.1033	-2.235	-0.1129	-2.443	-0.0352	-0.762
Sierra Leone	-0.0503	-2.873	-0.0791	-4.516	-0.0732	-4.181	-0.0526	-1.470	-0.0587	-1.641	-0.0219	-0.613
Swaziland	-0.1336	-6.766	-0.1844	-9.340	-0.1473	-7.459	-0.2103	-3.273	-0.2158	-3.358	-0.0213	-0.332
Tanzania	-0.0943	-9.085	-0.1674	-16.133	-0.1647	-15.876	-0.0831	-2.379	-0.0862	-2.467	-0.0119	-0.340
Uganda	-0.0521	-3.703	-0.0841	-5.971	-0.0792	-5.626	0.0019	0.048	0.0021	0.051	0.0005	0.013
Zambia	-0.0513	-4.061	-0.0939	-7.441	-0.0931	-7.379	-0.0839	-1.856	-0.0886	-1.960	-0.0178	-0.394
Zimbabwe	-0.0385	-2.385	-0.0572	-3.549	-0.0505	-3.130	-0.0300	-0.664	-0.0321	-0.710	-0.0078	-0.172
Sub-Saharan Africa	-0.0974	-37.053	-0.1651	-62.830	-0.1598	-60.806	-0.0706	-10.519	-0.0788	-11.729	-0.0292	-4.340

Source: Author’s Calculations. T-values based on Bootstrapped Standard Errors on 500 replications

Table 6.5: Achievement Indices and Standard Errors (SE) for Negative of Height for Age and Weight for Height Z-Scores

Countries	Negative of Height for Age Z-Score								Negative of Weight for Height Z-Score							
	V=2				V=3		V=4		V=2				V=3		V=4	
	Mean	**I(v)**	**SE**	**%**	**I(v)**	**SE**	**I(v)**	**SE**	**Mean**	**I(v)**	**SE**	**%**	**I(v)**	**SE**	**I(v)**	**SE**
Burkina	2.271	2.412	0.006	6.2	2.458	0.009	2.482	0.011	1.572	1.603	0.007	2.0	1.596	0.010	1.587	0.012
Cameroon	1.986	2.136	0.008	7.6	2.205	0.012	2.245	0.016	1.06	1.101	0.014	3.9	1.121	0.022	1.130	0.025
DRC	2.298	2.407	0.008	4.7	2.431	0.012	2.441	0.016	1.2	1.227	0.012	2.3	1.240	0.019	1.248	0.025
Ethiopia	2.432	2.542	0.007	4.5	2.570	0.011	2.589	0.014	1.264	1.335	0.009	5.6	1.370	0.016	1.392	0.022
Ghana	1.737	1.833	0.010	5.5	1.878	0.017	1.907	0.022	1.1	1.147	0.013	4.3	1.180	0.023	1.204	0.029
Guinea	2.081	2.167	0.008	4.1	2.201	0.013	2.220	0.017	1.233	1.249	0.013	1.3	1.258	0.020	1.266	0.025
Malawi	2.165	2.244	0.005	3.6	2.275	0.008	2.293	0.010	0.91	0.926	0.012	1.8	0.926	0.022	0.922	0.027
Mali	2.119	2.219	0.005	4.7	2.245	0.007	2.254	0.009	1.371	1.383	0.006	0.9	1.379	0.009	1.374	0.012
Mozambique	2.226	2.375	0.005	6.7	2.416	0.007	2.429	0.009	0.967	1.009	0.011	4.3	1.031	0.017	1.045	0.020
Namibia	1.738	1.844	0.007	6.1	1.892	0.011	1.922	0.014	1.073	1.102	0.010	2.7	1.113	0.015	1.115	0.020
Niger	2.596	2.738	0.008	5.5	2.757	0.011	2.765	0.014	1.26	1.316	0.009	4.4	1.332	0.014	1.339	0.019
Nigeria	2.279	2.457	0.004	7.8	2.543	0.007	2.592	0.009	1.429	1.548	0.008	8.3	1.621	0.012	1.669	0.016
Rwanda	2.278	2.395	0.006	5.1	2.437	0.009	2.462	0.011	0.945	0.971	0.015	2.8	0.978	0.023	0.978	0.029
Senegal	1.495	1.611	0.008	7.8	1.676	0.015	1.717	0.018	1.11	1.141	0.012	2.8	1.159	0.021	1.171	0.027
Sierra Leone	2.135	2.202	0.011	3.1	2.210	0.017	2.203	0.022	1.243	1.240	0.015	-0.2	1.253	0.024	1.268	0.029
Swaziland	1.686	1.775	0.009	5.3	1.816	0.014	1.840	0.016	0.852	0.876	0.022	2.8	0.880	0.032	0.879	0.042
Tanzania	2.04	2.168	0.005	6.3	2.211	0.009	2.231	0.011	0.87	0.870	0.009	0.0	0.872	0.014	0.874	0.018
Uganda	1.953	2.020	0.008	3.4	2.044	0.013	2.062	0.016	1.015	1.028	0.018	1.3	1.034	0.026	1.039	0.034
Zambia	2.187	2.263	0.006	3.5	2.283	0.009	2.289	0.011	0.998	1.021	0.013	2.3	1.034	0.020	1.043	0.027
Zimbabwe	1.856	1.874	0.008	1.0	1.878	0.011	1.876	0.013	1.03	1.050	0.015	1.9	1.064	0.020	1.072	0.024
SSA	2.193	2.264	0.002	3.2	2.298	0.003	2.311	0.003	1.378	1.268	0.003	-8.0	1.291	0.005	1.307	0.006

Source: Author's Calculations. Standard Errors Bootstrapped on 500 replications

Table 6.6A: Decomposition of Poor Child Health Status Concentration Index (CI) Over the Determinants of Child Health

Variables	Negative Of Height for Age				Negative of Weight for Height			
	Elasticity	**CI**	**Cont.**	**Cont. %**	**Elasticity**	**CI**	**Cont.**	**Cont. %**
Standardizing Variables								
Child Age (months)								
12-23	0.0563	-0.0026	-0.0001	0.3	-0.0195	-0.0026	0.0000	-0.2
24-35	0.0710	0.0178	0.0013	-2.5	-0.0477	0.0178	-0.0008	3.4
36-47	0.0719	-0.0022	-0.0002	0.3	-0.0624	-0.0022	0.0001	-0.5
48-49	0.0472	0.0008	0.0000	-0.1	-0.0667	0.0008	-0.0001	0.2
Female Child	0.0460	-0.0001	0.0000	0.0	0.0202	-0.0001	0.0000	0.0
Other Controls								
Social Norms	-0.0141	0.0491	-0.0007	1.4	0.0301	0.0491	0.0015	-6.0
Access to Resources	-0.0273	0.0376	-0.0010	2.0	0.0622	0.0376	0.0023	-9.5
Size at Birth								
Average and Above	-0.0716	0.0091	-0.0007	1.3	-0.0477	0.0091	-0.0004	1.8
Very Large	-0.0187	0.0345	-0.0006	1.3	-0.0155	0.0345	-0.0005	2.2
Woman’s Education								
Primary	-0.0145	0.0224	-0.0003	0.6	-0.0112	0.0224	-0.0003	1.0
Secondary	-0.0124	0.3965	-0.0049	9.6	-0.0098	0.3965	-0.0039	15.8
Tertiary	-0.0023	0.8150	-0.0019	3.7	-0.0010	0.8150	-0.0008	3.4
Partner’s Education								
Primary	-0.0128	-0.0327	0.0004	-0.8	-0.0233	-0.0327	0.0008	-3.1
Secondary	-0.0060	0.2721	-0.0016	3.2	-0.0191	0.2721	-0.0052	21.1
Tertiary	0.0004	0.6776	0.0003	-0.6	-0.0054	0.6776	-0.0036	14.8
Woman’s Height	-2.0156	0.0024	-0.0048	9.5	-0.3145	0.0024	-0.0008	3.1
Age at First Birth	-0.0113	0.0170	-0.0002	0.4	-0.0264	0.0170	-0.0005	1.8
Female Household Head	0.0017	0.0073	0.0000	0.0	-0.0073	0.0073	-0.0001	0.2
No. of Children in HH	0.0372	-0.0251	-0.0009	1.8	0.0171	-0.0251	-0.0004	1.7
No. of Women in HH	-0.0223	0.0350	-0.0008	1.5	-0.0250	0.0350	-0.0009	3.6
Asset Index	-0.1932	0.1550	-0.0299	58.6	-0.0795	0.1550	-0.0123	50.0
Cluster Pipe Water	-0.0226	0.0462	-0.0010	2.0	-0.0287	0.0462	-0.0013	5.4
Cluster Flush Toilet	0.0026	0.1467	0.0004	-0.8	0.0036	0.1467	0.0005	-2.1
4+ Antenatal Visits	-0.0250	0.1034	-0.0026	5.1	-0.0326	0.1034	-0.0034	13.7
Health Facility Delivery	-0.0600	0.1972	-0.0118	23.2	-0.0537	0.1972	-0.0106	43.0
Rural Residence	-0.0041	-0.1856	0.0008	-1.5	-0.0532	-0.1856	0.0099	-40.1
Country Fixed Effect			0.0008	-1.6			-0.0013	5.5
Regression Error			0.0092	-18			0.0074	-30.1
Total			**-0.0511**	**100**			**-0.0247**	**100**

Source: Author’s calculation. Note Cont. is Contribution

Table 6.6B: Decomposition of Poor Child Health Status Concentration Index (CI) over the Determinants of Child Health – Details of Country Fixed Effects

Country	**Negative Of Height for Age**				**Negative of Weight for Height**			
	Elasticity	**CI**	**Cont.**	**% Cont**	**Elasticity**	**CI**	**Cont**	**% Cont**
Burkina	0.0109	-0.0006	0.0000	0.0	0.0151	-0.0006	0.0000	0.0
Cameroon	0.0052	-0.1222	-0.0006	1.2	-0.0054	-0.1222	0.0007	-2.7
DRC	0.0110	0.0220	0.0002	-0.5	0.0050	0.0220	0.0001	-0.4
Ethiopia	0.0123	-0.0677	-0.0008	1.6	0.0053	-0.0677	-0.0004	1.5
Guinea	0.0025	-0.0128	0.0000	0.1	0.0006	-0.0128	0.0000	0.0
Malawi	0.0254	0.0860	0.0022	-4.3	-0.0152	0.0860	-0.0013	5.3
Mali	0.0119	0.0620	0.0007	-1.4	0.0070	0.0620	0.0004	-1.8
Mozambique	0.0106	-0.0008	0.0000	0.0	-0.0123	-0.0008	0.0000	0.0
Namibia	0.0023	-0.0664	-0.0002	0.3	-0.0001	-0.0664	0.0000	0.0
Niger	0.0165	-0.0107	-0.0002	0.3	-0.0040	-0.0107	0.0000	-0.2
Nigeria	0.0365	-0.0096	-0.0004	0.7	0.0209	-0.0096	-0.0002	0.8
Rwanda	0.0028	-0.0710	-0.0002	0.4	-0.0026	-0.0710	0.0002	-0.7
Senegal	0.0073	0.1987	0.0014	-2.8	-0.0130	0.1987	-0.0026	10.4
Sierra Leone	-0.0061	0.0056	0.0000	0.1	-0.0072	0.0056	0.0000	0.2
Swaziland	0.0002	-0.0954	0.0000	0.0	-0.0034	-0.0954	0.0003	-1.3
Tanzania	0.0058	-0.0524	-0.0003	0.6	-0.0121	-0.0524	0.0006	-2.6
Uganda	0.0039	0.0427	0.0002	-0.3	-0.0051	0.0427	-0.0002	0.9
Zambia	0.0073	-0.1221	-0.0009	1.7	-0.0064	-0.1221	0.0008	-3.2
Zimbabwe	0.0038	-0.0883	-0.0003	0.7	-0.0020	-0.0883	0.0002	-0.7
Total			**0.0008**	**-1.6**			**-0.0013**	**5.5**

Source: Author’s Calculations

Table 6.7: Concentration Indices for Determinants of Child Health by Country

Variables	**Burkina**	**Cameroon**	**DRC**	**Ethiopia**	**Ghana**	**Guinea**	**Malawi**	**Mali**	**Mozambique**	**Namibia**	**Niger**	**Nigeria**	**Rwanda**	**Senegal**	**Sierra Leone**	**Swaziland**	**Tanzania**	**Uganda**	**Zambia**	**Zimbabwe**
Child Age																				
12-23	0.026	0.007	-0.017	-0.012	0.018	-0.030	0.000	0.016	0.013	-0.042	0.030	-0.005	-0.015	-0.016	-0.029	-0.019	-0.020	0.013	-0.015	0.018
24-35	0.031	-0.031	-0.017	0.029	-0.030	0.073	-0.007	0.015	0.017	0.009	0.004	0.035	-0.003	0.043	0.021	-0.009	0.014	0.024	0.010	0.024
36-47	-0.013	0.027	0.022	-0.002	0.010	-0.001	-0.038	-0.014	0.000	0.032	0.010	-0.010	0.019	-0.031	0.013	0.033	0.017	-0.024	-0.014	0.004
48-49	0.006	-0.014	0.013	-0.043	-0.016	0.009	0.042	0.009	-0.002	0.012	0.000	-0.002	0.013	0.009	-0.003	0.021	-0.029	-0.014	0.008	-0.002
Female Child	-0.003	0.004	0.008	-0.004	0.005	0.007	-0.002	-0.001	-0.009	-0.003	-0.007	-0.007	-0.003	0.012	0.002	-0.028	0.002	0.013	0.008	-0.016
Social Norms	0.023	0.062	0.045	0.048	0.053	-0.037	0.021	0.014	0.034	0.096	0.010	0.086	0.010	0.068	0.031	0.033	0.036	0.015	0.045	0.049
Access to Res	-0.033	-0.057	0.024	0.046	0.041	0.053	0.032	-0.023	-0.053	0.144	0.038	0.014	0.017	0.133	0.043	-0.024	-0.028	0.036	0.088	-0.055
Size at Birth																				
Average	0.018	0.010	0.001	0.014	0.023	0.016	0.012	-0.016	0.001	0.019	0.021	0.017	0.000	0.016	0.024	0.004	-0.005	-0.003	-0.008	-0.003
Very Large	0.047	0.103	0.041	0.036	-0.004	-0.022	0.011	0.028	0.096	-0.124	0.132	0.061	0.041	0.055	0.023	-0.149	0.114	0.163	0.109	0.061
Woman's Educ.																				
Primary	0.331	-0.022	-0.103	0.266	-0.026	0.268	-0.041	0.260	0.154	-0.281	0.284	0.034	-0.011	0.321	0.173	-0.233	0.076	-0.005	-0.088	-0.296
Secondary	0.788	0.448	0.332	0.786	0.294	0.632	0.491	0.658	0.809	0.151	0.756	0.408	0.565	0.637	0.553	0.137	0.662	0.502	0.365	0.194
Tertiary	0.985	0.855	0.848	0.960	0.842	0.904	0.926	0.898	0.995	0.673	0.971	0.773	0.973	0.818	0.824	0.783	0.912	0.743	0.887	0.730
Partner's Educ.																				
Primary	0.326	-0.096	-0.233	0.141	-0.206	0.020	-0.088	0.094	-0.007	-0.238	0.278	-0.007	-0.014	0.218	0.143	-0.219	0.018	-0.074	-0.192	-0.324
Secondary	0.741	0.282	0.071	0.530	0.178	0.307	0.309	0.573	0.594	0.177	0.594	0.282	0.427	0.494	0.382	0.141	0.574	0.239	0.206	0.115
Tertiary	0.972	0.735	0.704	0.895	0.618	0.673	0.784	0.815	0.967	0.619	0.860	0.559	0.920	0.639	0.644	0.778	0.787	0.500	0.766	0.651
Woman Height	0.001	0.001	0.006	0.000	0.001	0.003	0.002	0.001	0.004	0.001	0.002	0.004	0.002	0.003	0.003	0.003	0.000	-0.003	0.003	0.002
Age First Birth	0.007	0.025	0.004	0.004	0.030	0.007	0.007	0.005	0.001	0.021	0.006	0.044	0.007	0.033	-0.002	0.022	0.011	0.006	0.012	0.019
Female Head	0.194	0.109	-0.024	-0.007	0.082	0.128	-0.155	0.163	0.029	-0.056	-0.165	0.076	-0.049	0.271	0.050	-0.042	-0.017	0.009	-0.024	-0.086
No. of Children	0.036	-0.053	0.013	-0.017	-0.069	0.000	-0.023	-0.022	0.001	-0.080	0.018	-0.028	0.016	-0.034	-0.015	-0.088	-0.082	-0.023	-0.040	-0.072
No. of Women	0.092	0.030	0.050	0.029	-0.013	0.049	0.044	0.018	0.083	0.029	0.055	-0.014	0.040	0.071	0.054	0.019	-0.001	0.043	0.067	0.038
Asset Index	0.597	0.486	0.451	0.082	0.244	0.554	0.420	0.475	0.618	0.421	0.438	0.378	0.653	0.374	0.331	0.308	0.445	0.283	0.494	0.436
C. Pipe Water	0.709	0.461	0.677	0.352	0.051	0.711	0.045	0.537	0.631	0.072	0.623	0.320	0.222	0.270	0.365	0.160	0.373	-0.019	0.691	0.219
C. Flush Toilet	0.623	0.671	0.806	0.340	0.651	0.797	0.802	0.496	0.843	0.597	0.829	0.690	0.680	0.483	0.813	0.622	0.744	0.876	0.801	0.690
4+ Antenatal	0.177	0.128	0.050	0.381	0.116	0.130	0.010	0.170	0.144	0.004	0.236	0.282	0.075	0.129	0.055	-0.005	0.049	0.043	0.002	0.019
Health Fac.	0.254	0.217	0.114	0.610	0.201	0.323	0.038	0.194	0.245	0.066	0.464	0.377	0.175	0.215	0.147	0.050	0.154	0.165	0.236	0.126
Rural Res	-0.121	-0.333	-0.297	-0.068	-0.303	-0.197	-0.102	-0.222	-0.226	-0.342	-0.135	-0.212	-0.086	-0.298	-0.222	-0.153	0.036	-0.082	-0.278	-0.277

Source: Author's Calculations

Table 6.8: Contributions of Child Health Determinants to Inequalities in Negative of Height for Age (%)

Variables	**Burkina**	**Cameroon**	**DRC**	**Ethiopia**	**Ghana**	**Guinea**	**Malawi**	**Mali**	**Mozambique**	**Namibia**	**Niger**	**Nigeria**	**Rwanda**	**Senegal**	**Sierra Leone**	**Swaziland**	**Tanzania**	**Uganda**	**Zambia**	**Zimbabwe**
Child Age																				
12-23	-2.4	-0.5	2.0	2.7	-1.1	4.4	0.0	-2.5	-1.1	4.1	-114.8	0.3	3.2	0.5	7.1	3.6	2.2	-3.7	2.7	-19.4
24-35	-4.0	2.2	4.8	-11.1	2.5	-14.9	0.9	-3.0	-1.9	-0.3	-28.5	-2.2	0.8	-1.6	-7.9	1.3	-1.8	-7.2	-1.5	-30.3
36-47	1.9	-2.4	-8.6	0.4	-0.8	0.3	3.6	3.1	0.0	-1.6	-66.4	0.6	-3.0	2.5	-6.0	-2.0	-1.7	8.8	2.1	-4.4
48-49	-0.5	0.7	-6.2	6.6	1.1	-1.4	-2.8	-1.4	0.2	-0.4	1.1	0.1	-1.6	-0.2	1.0	-2.5	2.6	3.3	-1.3	1.9
Female Child	0.2	-0.1	-0.9	0.5	-0.2	-0.4	0.3	0.1	0.7	0.2	11.4	0.4	0.3	-0.6	-0.7	1.9	-0.2	-4.6	-1.4	9.8
Social Norms	-2.4	4.7	-6.9	-4.2	-2.6	0.0	2.3	1.7	4.9	-10.8	33.4	-1.8	4.9	0.7	14.4	2.7	-2.1	-2.6	-3.8	19.5
Access to Rsources	3.6	6.9	15.3	-11.3	-5.8	1.6	2.0	0.2	-1.9	15.9	148.7	-0.6	-0.6	14.0	-57.5	-24.5	1.5	0.1	8.7	-21.0
Size at Birth																				
Average and Above	2.2	1.1	-0.3	-0.5	1.7	2.3	0.6	-2.0	0.1	1.8	75.1	1.1	0.0	1.1	6.8	0.0	-1.4	-2.7	-2.3	-10.1
Very Large	0.7	4.7	-2.1	1.3	-0.2	-2.1	0.5	2.3	0.7	-2.1	21.9	1.8	0.9	0.6	1.5	-2.8	3.5	17.3	3.5	20.3
Woman’s Education																				
Primary	2.6	0.7	-12.6	-1.2	1.4	-0.4	-2.8	3.1	-1.3	-13.5	-78.4	0.5	0.2	9.9	0.9	2.5	0.8	-0.1	16.1	39.6
Secondary	2.7	5.3	64.5	-21.7	-12.8	-6.3	7.8	7.4	-0.9	2.1	243.5	12.4	-7.4	5.6	-18.0	6.7	-3.9	17.7	15.0	31.6
Tertiary	0.4	3.4	7.5	-6.4	2.2	-2.3	5.7	-4.1	-0.1	3.6	10.2	8.4	-0.8	0.7	5.7	4.2	-1.1	17.0	6.7	88.5
Partner’s Education																				
Primary	2.9	-0.8	-19.6	7.5	-1.6	0.4	0.7	0.8	-0.2	1.9	-98.2	0.0	-0.6	0.7	-9.2	-1.0	0.4	-46.6	-4.2	316.3
Secondary	2.3	5.6	9.9	33.6	26.9	1.9	1.8	10.3	10.5	-9.1	-142.3	0.9	-4.2	11.2	40.0	30.3	3.4	31.3	1.3	-377.0
Tertiary	0.4	-3.9	20.1	8.8	8.2	3.9	4.4	1.9	0.2	-0.3	-28.2	-1.8	4.2	4.7	25.0	29.7	4.1	11.9	4.1	-229.0
Woman’s Height	3.3	3.3	32.0	2.7	2.3	14.1	2.4	5.5	24.2	3.4	235.1	6.5	14.5	9.2	9.3	3.6	1.1	-53.3	18.9	97.6
Age at First Birth	-0.4	-4.4	-3.2	-2.1	2.6	-0.7	-0.4	0.6	-0.2	1.4	38.5	0.0	2.1	-1.1	-0.1	-11.1	-0.6	7.1	0.8	27.7
Female HH Head	1.2	-2.0	0.5	-0.2	-0.2	-0.8	-2.2	-1.1	-0.2	-3.1	-14.6	-0.1	2.6	5.1	-3.2	-2.1	0.2	-0.3	1.7	6.8
No. of Children in HH	-3.7	3.9	-7.1	-2.7	4.2	0.0	1.7	2.4	0.0	7.6	-22.2	1.3	-0.9	0.8	7.3	14.6	2.2	20.4	7.6	49.1
No. of Women in HH	0.8	-1.0	-9.3	-16.0	-1.3	-1.2	-3.0	0.0	0.0	-3.2	-58.4	-0.5	-1.8	8.1	30.2	-6.3	-0.2	10.6	6.4	-9.0
Asset Index	31.4	89.5	17.1	64.8	41.3	63.9	45.2	26.7	62.1	157.8	591.1	18.0	64.5	-2.7	13.5	-16.2	108.6	139.5	44.2	117.7
Cluster Pipe Water	-7.2	9.3	-16.6	-24.6	-1.1	-7.0	-1.3	15.2	16.0	-7.8	-581.0	1.4	-6.9	-20.7	-57.8	15.8	7.8	-1.6	-0.3	389.0
Cluster Flush Toilet	1.1	-13.0	7.9	-3.2	17.0	2.2	-1.0	-5.4	-4.2	-22.8	80.8	5.3	1.7	24.2	36.4	91.4	-7.1	-14.1	7.0	-672.3
4+ Antenatal Visits	10.7	-1.4	37.9	47.0	7.2	34.9	-0.7	7.7	-4.9	-0.3	59.2	-7.1	-5.3	-5.7	33.2	2.8	1.7	20.8	0.1	-49.3
Health Facility Deliv.	14.2	10.3	-28.6	33.9	-4.8	13.1	-11.9	12.0	45.0	10.4	486.0	16.6	-7.6	-18.6	-30.7	-24.7	6.1	0.4	41.2	-199.6
Rural Residence	10.8	-9.1	128.7	42.1	-18.0	25.7	-6.5	34.6	-14.8	-23.4	1215.0	1.1	-0.7	4.2	71.3	-22.0	-23.7	-70.2	-32.5	315.8
Regional Fixed Effect	30.1	-3.9	-5.8	-18.9	36.5	-7.1	1.5	15.8	9.1	-21.7	221.2	39.6	5.5	24.6	67.1	4.6	9.7	152.8	-0.3	36

Source: Author’s Calculations

Table 6.9: Contributions of Child Health Determinants to Inequalities in Negative of Weight for Height (%)

Variables	**Burkina**	**Cameroon**	**DRC**	**Ethiopia**	**Ghana**	**Guinea**	**Malawi**	**Mali**	**Mozambique**	**Namibia**	**Niger**	**Nigeria**	**Rwanda**	**Senegal**	**Sierra Leone**	**Swaziland**	**Tanzania**	**Uganda**	**Zambia**	**Zimbabwe**
Child Age																				
12-23	4.4	0.0	-5.3	-0.7	21.3	-0.8	0.0	1.8	0.7	1.7	-1.1	-0.1	-1.0	-8.7	-48.0	1.3	-3.5	1.6	-0.9	-4.0
24-35	10.4	2.2	-9.2	5.0	-59.3	10.6	-0.3	8.6	0.7	1.1	0.3	2.1	-1.3	7.1	51.8	-0.7	4.2	11.5	1.2	-6.4
36-47	-8.2	1.7	7.5	-0.3	25.6	-0.2	-3.7	-7.8	0.0	-0.1	1.5	-0.6	8.4	-19.1	15.5	-1.6	8.5	-13.0	-2.9	-0.9
48-49	3.8	-1.0	18.4	-10.4	-30.3	1.9	4.7	7.2	-0.4	0.0	0.0	-0.1	4.9	5.0	-0.4	1.4	-12.7	-9.3	1.5	1.4
Female Child	0.3	-0.2	-4.2	0.2	0.7	-0.6	0.0	0.2	0.4	0.8	0.8	-0.1	0.7	-5.9	1.1	-0.7	-0.9	-4.2	-1.2	1.1
Social Norms	5.3	3.2	-79.6	-7.9	8.7	8.2	-5.1	-6.6	-24.8	19.4	0.2	-6.8	-9.7	149.5	-7.1	-20.2	-7.1	8.1	-12.2	22.5
Access to Res.	-9.0	-8.1	-6.8	3.3	306.4	-41.2	-4.3	10.6	37.1	-13.6	-3.8	-8.7	0.3	7.8	91.5	-11.4	43.3	18.1	-6.9	-25.0
Size at Birth																				
Average and Abov	3.6	-0.1	1.9	-0.2	59.2	2.2	1.5	-9.8	0.1	3.7	8.0	-0.3	0.2	-3.8	123.5	-1.8	-4.7	-1.1	-0.9	3.1
Very Large	3.6	0.0	8.1	0.3	-5.2	-1.6	0.0	11.3	5.3	-3.0	5.8	0.7	1.3	13.5	25.6	10.2	11.0	-4.5	-0.1	-11.3
Woman's Education																				
Primary	5.1	-1.9	57.8	4.1	-16.2	-23.6	-1.2	1.4	-0.8	11.8	0.9	1.8	3.3	307.9	104.9	38.8	19.8	-1.1	-26.9	-150.7
Secondary	15.8	7.2	115.1	43.2	257.5	-19.8	-3.8	6.8	-13.6	-12.9	5.2	31.4	25.1	142.3	438.3	-69.7	-2.1	-3.3	56.6	11.5
Tertiary	-1.3	7.9	58.2	0.5	93.0	0.0	0.4	-6.8	-1.7	8.9	0.5	19.5	3.8	-18.7	-18.9	-26.3	28.1	25.0	-15.0	6.4
Partner's Education																				
Primary	-6.4	-3.9	-18.0	4.8	-62.5	0.7	-8.7	0.2	1.1	-13.7	-0.5	-0.1	-0.8	-30.6	7.8	9.1	2.0	-24.7	10.4	105.7
Secondary	-11.6	9.3	-17.7	7.4	-107.0	14.9	10.3	17.8	-15.2	0.6	16.9	-4.7	26.0	-168.7	390.6	-6.7	4.0	48.8	11.2	-30.4
Tertiary	7.8	14.7	-31.3	0.4	5.3	22.2	6.5	16.4	6.6	-34.6	-6.3	-8.4	-33.5	-7.2	16.6	3.7	16.0	48.5	23.7	8.6
Woman's Height	2.9	3.7	35.8	0.4	2.4	4.3	-1.5	7.6	1.5	-1.2	7.2	-2.0	-17.0	37.7	-40.5	24.0	1.9	-21.4	15.4	-10.8
Age at First Birth	0.4	-13.6	-5.7	0.7	7.1	-4.7	3.4	9.1	0.3	-3.5	-5.8	-3.2	-16.5	122.0	2.1	0.3	-0.9	-8.2	-5.6	1.9
Female HH Head	1.2	0.6	1.5	0.0	31.8	1.9	10.4	7.2	0.2	-1.6	5.1	1.2	2.1	23.0	63.9	-3.9	1.0	0.1	-1.8	28.6
No. of Children	-2.2	11.3	5.1	-4.4	-93.8	0.0	-4.2	10.8	-0.1	21.9	7.3	-0.7	-14.3	69.0	-101.3	-46.5	75.9	19.5	6.6	93.4
No. of Women	6.1	7.5	13.7	-8.0	22.8	17.8	-0.7	4.5	15.9	16.2	-23.4	-0.5	-4.6	94.4	15.0	-7.7	-0.7	-29.7	-18.9	0.5
Asset Index	53.1	-35.2	-656.2	39.0	-178.8	150.5	49.7	75.2	81.1	3.7	111.4	32.9	232.4	772.3	216.6	372.4	-130.5	19.8	144.4	-237.4
Cluster Pipe Water	110.7	-25.4	428.7	-5.8	19.3	-22.2	-16.1	31.3	-12.1	-2.2	43.4	-2.4	-26.8	-790.4	-746.6	3.7	75.9	-7.1	-35.3	-80.6
Cluster Flush Toilt	3.7	1.4	-18.9	13.7	-96.6	19.6	0.6	-43.2	-18.8	-58.4	0.0	3.6	-77.0	-307.2	782.8	-59.7	14.4	5.6	-35.1	-127.3
4+ Antenatal Visits	21.9	42.2	45.1	40.2	128.3	-19.2	0.8	109.8	77.2	2.1	41.0	-1.7	-10.1	-114.1	-818.2	9.5	-7.5	-69.2	0.2	-41.2
Health Faci Deliv.	31.1	15.6	279.2	-32.9	-480.2	63.3	11.3	43.5	-0.5	-33.5	58.5	23.3	54.8	-497.6	318.7	-50.6	-12.1	11.9	55.0	-6.1
Rural Residence	-64.2	27.3	-486.8	-73.7	119.3	-54.1	-7.9	38.1	-64.9	140.1	-45.4	-8.8	65.0	636.6	-155.0	-21.8	37.1	-5.6	-158.6	494.1
Regional Fixed Eff	-37.4	-21.3	26.4	54.8	236	-88.6	2.5	-120.6	24.5	-30.9	-86.2	38.1	-118.3	115.6	-246.5	9.4	-17.9	33.5	95.6	-106.7

Source: Author's Calculations

Table 6.10: Contributions of Child Health Determinants to Inequalities in Negative of Height for Age – Regional and Provincial Details (%)

	Burkina	**Cameroon**	**DRC**	**Ethiopia**	**Ghana**	**Guinea**	**Malawi**	**Mali**	**Mozambique**	**Namibia**	**Niger**	**Nigeria**	**Rwanda**	**Senegal**	**Sierra Leone**	**Swaziland**	**Tanzania**	**Uganda**	**Zambia**	**Zimbabwe**
Region 2	0.0	0.6	0.1	-13.8	0.9	-25.9	1.2	7.7	0.0	-8.9	-4.4	5.3	-0.7	0.7	33.6	19.2	0.4	-12.8	32.6	-110.5
Region 3	-0.1	-6.1	21.7	-10.3	39.4	0.9	0.4	7.4	-1.9	-1.4	22.2	9.1	-0.2	-0.8	49.7	-2.9	2.7	14.6	-18.8	24.1
Region 4	0.5	0.0	1.3	10.8	-4.6	1.6		3.6	3.5	1.1	-61.6	9.5	0.0	5.3	-16.2	-11.6	-0.5	-4.5	-0.5	-9.4
Region 5	0.1	5.8	-11.2	0.6	-1.4	-0.7		0.4	0.4	11.2	240.9	6.5	4.7	9.5			0.1	11.4	33.6	-217.9
Region 6	-0.7	0.0	-0.1	0.0	5.8	3.3		0.1	-0.3	-29.8	59.0	9.2	1.7	1.1			-0.5	159.2	-19.6	-24.8
Region 7	1.1	3.5	0.3	-5.6	-1.8	0.4		4.2	-0.1	1.9	64.1		1.2	0.9			11.5	5.8	-8.1	-72.2
Region 8	-0.2	1.3	-3.6	0.4	1.2	13.3		0.4	2.3	0.2	-99.0		0.1	-0.8			-0.2	-2.7	-2.1	-311.8
Region 9	18.8	-1.3	0.9	-0.7	-0.8			-7.8	1.7	-0.5			-0.6	4.9			-1.0	-18.3	-17.4	612.7
Region 10	-0.3	-0.9	-13.3	-0.1	-2.3				8.7	1.2			1.3	3.5			0.1			145.9
Region 11	-0.2	-1.3	-1.9	-0.2					-5.1	0.0			0.1	0.2			-0.8			
Region 12	6.7	-5.7								4.5			-2.1				0.0			
Region 13	5.6									-1.4							-0.4			
Region 14	-1.0																-6.6			
Region 15																	0.2			
Region 16																	0.0			
Region 17																	0.3			
Region 18																	-2.0			
Region 19																	3.4			
Region 20																	0.4			
Region 21																	-1.6			
Region 22																	0.3			
Region 23																	0.5			
Region 24																	3.0			
Region 25																	0.1			
Region 26																	0.3			

Source: Author’s Calculations

Table 6.11: Contributions of Child Health Determinants to Inequalities in Negative of Weight for Height – Regional and Provincial Details (%)

	Burkina	**Cameroon**	**DRC**	**Ethiopia**	**Ghana**	**Guinea**	**Malawi**	**Mali**	**Mozambique**	**Namibia**	**Niger**	**Nigeria**	**Rwanda**	**Senegal**	**Sierra Leone**	**Swaziland**	**Tanzania**	**Uganda**	**Zambia**	**Zimbabwe**
Region 2	0.0	-5.6	-16.2	0.0	-30.0	-136.6	2.8	31.0	-0.2	-2.8	-1.4	13.8	-17.9	-1.1	120.3	9.2	0.3		41.4	17.6
Region 3	2.5	-49.3	30.9	-0.9	336.7	6.9	-0.3	12.9	26.3	-6.6	-8.4	12.8	32.6	-50.9	172.5	1.9	-1.0	9.8	1.1	-11.0
Region 4	1.1	0.1	56.9	2.4	-44.4	4.4		-14.8	23.2	9.7	2.0	5.3	0.4	-52.3	-539.3	-1.8	1.1	-65.6	0.7	-2.1
Region 5	1.6	40.4	3.2	28.1	-7.1	-3.1		-0.1	2.4	18.3	-39.7	3.2	-16.7	70.3			0.3	-29.5	11.4	27.6
Region 6	-2.0	-3.1	-0.3	0.1	5.3	12.2		0.0	1.2	-53.3	-14.7	2.9	16.2	-1.9			0.9	21.3	-3.7	11.9
Region 7	-30.2	25.9	0.7	9.6	-58.5	-0.4		-6.5	5.3	0.0	0.4		-18.2	-33.5			-25.8	102.1	5.0	9.1
Region 8	0.8	7.2	-16.6	0.1	63.2	28.1		-0.3	-1.6	-7.5	-24.3		-4.7	2.5			-1.8	10.2	-0.2	-18.2
Region 9	-22.6	-6.2	3.7	1.1	-9.4			-142.7	-12.2	-1.2			-21.7	53.3			-7.7	2.2	39.8	-145.6
Region 10	-7.0	-2.8	-86.4	14.8	-19.8				1.0	13.9			-53.0	123.1			8.8			4.0
Region 11	-5.3	-3.9	50.6	-0.3					-21.0	-0.9			10.9	6.1			16.4			
Region 12	58.1	-24.3								4.6			-46.2				-0.7			
Region 13	-20.2									-5.0							14.3			
Region 14	-14.1																3.3			
Region 15																	-8.4			
Region 16																	3.1			
Region 17																	-3.7			
Region 18																	7.1			
Region 19																	0.5			
Region 20																	-1.2			
Region 21																	-5.3			
Region 22																	-3.9			
Region 23																	-3.8			
Region 24																	-8.4			
Region 25																	-0.4			
Region 26																	-1.8			

Source: Author's Calculations

Table 6.12: Simulated Effect of Changes in Selected Determinants of Child Health on Poor Child Health Inequality

Quantities	**Social Norms**		**Access to Resources**		**Wealth Index**		**Cluster Antenatal**		**Cluster Health Fac. Deliv**	
	NEGHAZ	**NEGWHZ**	**NEGHAZ**	**NEGWHZ**	**NEGHAZ**	**NEGWHZ**	**NEGHAZ**	**NEGWHZ**	**NEGHAZ**	**NEGWHZ**
Mean	0.47555		0.60613		2.50027		0.41743		0.44322	
Median	0.47376		0.61556		2.25368		0.42105		0.43333	
Mean2	0.54726		0.68484		2.64011		0.53046		0.58475	
% Change in Mean	**15.1**		**13.0**		**5.6**		**27.1**		**31.9**	
Use 75th Percentile	0.61814		0.78892		2.76544		0.62500		0.75000	
Mean 3	0.63753		0.79586		2.97472		0.65919		0.77920	
% Change in Mean	**34.1**		**31.3**		**19.0**		**57.9**		**75.8**	
Cont % 1 - Base	**1.4**	**-6**	**2**	**-9.5**	**58.6**	**50**	**5.1**	**13.7**	**23.2**	**43**
Cont % 2 – Based on Median	0.0	-6.5	1.8	-12.4	48.5	21.4	1.4	4.2	12.4	19.8
% Change	**-101.5**	**7.8**	**-9.0**	**31.0**	**-17.2**	**-57.3**	**-72.4**	**-69.4**	**-46.6**	**-54.0**
Cont % 3- Based 75th Percentile	-0.3	-4.1	0.1	-1.7	27.8	7.2	0.5	1.8	3.4	7.7
% Change	**-121.1**	**-31.7**	**-96.8**	**-82.0**	**-52.6**	**-85.6**	**-90.5**	**-86.7**	**-85.2**	**-82.0**

Source: Author’s Calculation

Table 6.13: Regional/ Provincial Dummies by Country

	Burkina Faso	**Cameroon**	**DRC**	**Ethiopia**	**Ghana**	**Guinea**	**Malawi**	**Mali**	**Mozambique**	**Namibia**
Region1	Ouagadougou	Adamaoua	Kinshasa	Tigray	Western	BokÈ	Northern	Kayes	Niassa	Caprivi
Region2	Boucle de Mouhoun	Centre	Bas-Congo	Afar	Central	Conakry	Central	Koulikoro	Cabo delgado	Erongo
Region3	Centre	Douala	Bandundu	Amhara	Gt. Accra	Faranah	Southern	Sikasso	Nampula	Hardap
Region4	Centre-Sud	Est	Equateur	Oromiya	Volta	Kankan		Segou	Zambezia	Karas
Region5	Plateau Central	Extreme Nor	Orientale	Somali	Eastern	Kindia		Mopti	Tete	Kavango
Region6	Centre-Est	Littoral	Nord-Kivu	Ben-Gumz	Ashanti	LabÈ		Tombouctou	Manica	Khomas
Region7	Centre-Nord	Nord	Maniema	Snnp	Brong Ahafo	Mamou		Gao	Sofala	Kunene
Region8	Centre-Ouest	Nord Ouest	Sud-Kivu	Gambela	Northern	N'zÈrÈkorÈ		Kidal	Inhambane	Ohangwena
Region9	Est	Ouest	Katanga	Harari	Upper East			Bamako	Gaza	Omaheke
Region10	Nord	Sud	KasaÔ Oriental	Addis Abeba	Upper West				Maputo Provincia	Omusati
Region11	Cascades	Sud Ouest	KasaÔ Occident	Dire Dawa					Maputo Cidade	Oshana
Region12	Hauts Bassins	Yaounde								Oshikoto
Region13	Sahel									Otjozondjupa
Region14	Sud-Ouest									

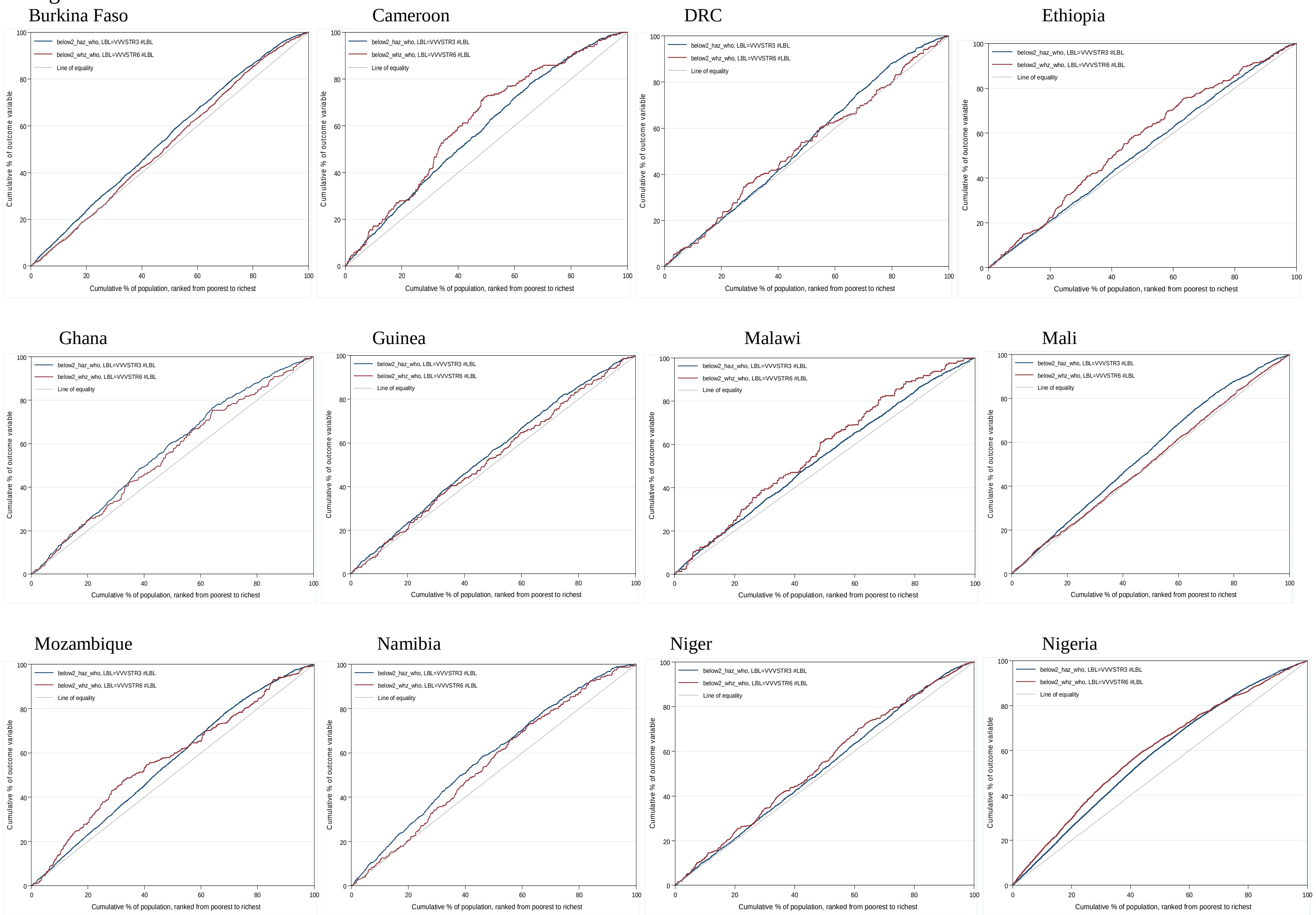
Source: From DHS Data from the respective countries. Note: **Region1** is the reference for each country and highlighted regions are the 2-3 regions in a country having the highest contribution

Table 6:13 Cont. Regional/ Provincial Dummies by Country

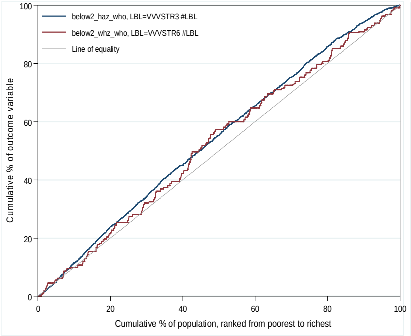
	Niger	Nigeria	Rwanda	Senegal	Sierra Leone	Swaziland	Tanzania	Uganda	Zambia	Zimbabwe
Region1	Agadez	North Central	City of Kigali	Dakar	Eastern	Hhohho	Dodoma	Central 1	Central	Manicaland
Region2	Diffa	North East	Kigali Ngali	Diourbel	Northern	Manzini	Arusha	Central 2	Copperbelt	Mashonaland Central
Region3	Dosso	North West	Gitarama	Fatick	Southern	Shiselweni	Kilimanjaro	Kampala	Eastern	Mashonaland East
Region4	Maradi	South East	Butare	Kaolack	Western	Lubombo	Tanga	East central	Luapula	Mashonaland West
Region5	Tahoua	South South	Gikongoro	Kolda			Morogoro	Eastern	Lusaka	Matebeleland North
Region6	TillabÈri	South West	Cyangugu	Louga			Pwani	North	Northern	Matebeleland South
Region7	Zinder		Kibuye	Matam			Dar es salam	West Nile	North Western	Midlands
Region8	Niamey		Gisenyi	Saint-Louis			Lindi	Western	Southern	Masvingo
Region9			Ruhengeri	Tambacounda			Mtwara	South West	Western	Harare
Region10			Byumba	ThiËs			Ruvuma			Bulawayo
Region11			Umutara	Zuguinchor			Iringa			
Region12			Kibungo				Mbeya			
Region13							Singida			
Region14							Tabora			
Region15							Rukwa			
Region16							Kigoma			
Region17							Shinyanga			
Region18							Kagera			
Region19							Mwanza			
Region20							Mara			
Region22							Manyara			
Region23							Zanzibar North			
Region24							Zanziba South			
Region25							Town West			
Region26							Pemba North			

Source: From DHS Data from the respective countries. Note: **Region1** is the reference for each country

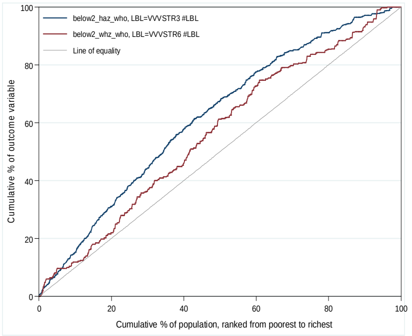
Figure 6.3: Concentration Curves for Selected Countries



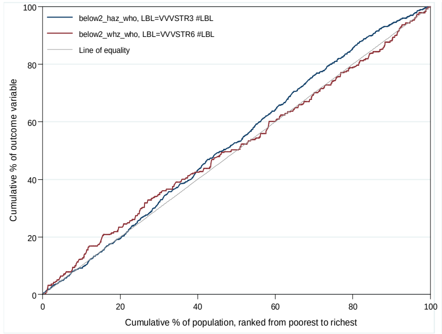
Rwanda



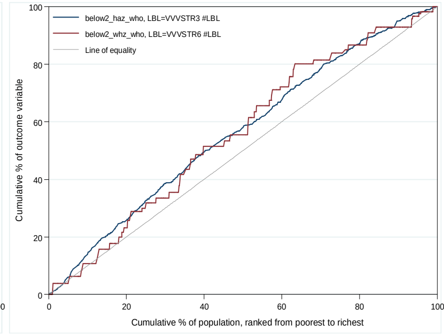
Senegal



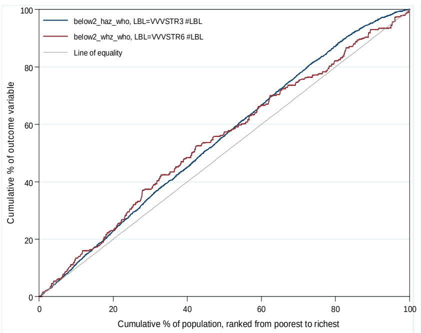
Sierra Leone



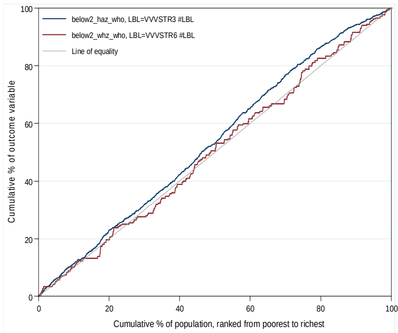
Swaziland



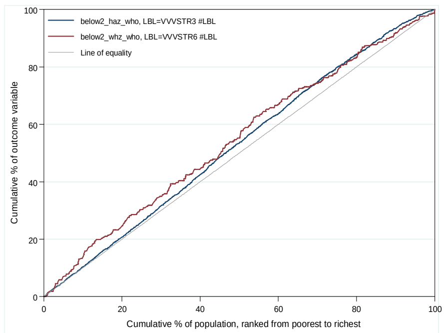
Tanzania



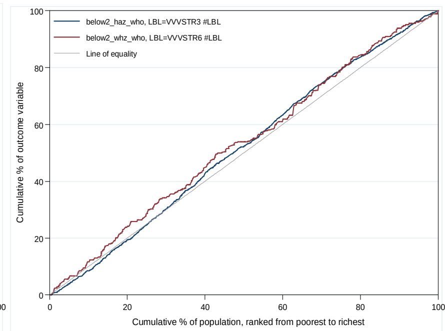
Uganda



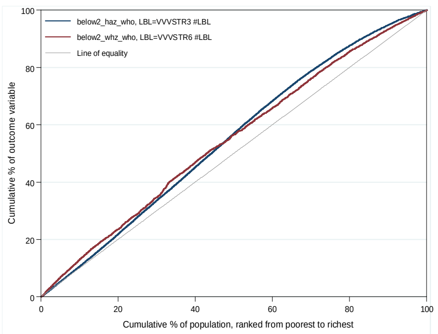
Zambia



Zimbabwe



SSA



CHAPTER SEVEN

SUMMARY AND CONCLUSION

7.1 Introduction

The study examined the effect of women's empowerment on children and women's health status in SSA. Over the last two decades, issues on gender inequality and women's empowerment has received tremendous attention. Evidence in the literature suggest that women's empowerment/bargaining power is a multi-dimensional concept and influences development outcomes such as health, agricultural production and education. However, a source of contention in this literature is what constitutes women's empowerment and consequently appropriate indicators for measuring it. As a result, different definitions and indicators have been used. Within the economics and human development literature, the use of proxies reflecting access to resources and capabilities is dominant. This creates a one sided story (i.e. the essence of women's empowerment is access to resource and or capabilities). On the contrary, social norms, which often define gender roles and privileges and whether women have opportunities to negotiate rights and access to resources or capabilities, have often received little attention. In instances where indicators capturing some aspect of social norms have been used (see the demography literature), they have mainly emphasise women's exercise of agency in addition to such variables being used alone. Thus, creating the same single-sided impression as in the economics and human development literature. Thus, it may be important for on-going research to emphasise the multi-dimensionality of women's empowerment and more importantly, the comparative effect of social norms and access to resources on development outcomes.

Secondly, in examining the instrumental importance of women's empowerment, the literature seems to have focused mainly on the effect of women's empowerment on mean outcomes. There is little attention paid to the distribution of mean outcomes in the population (inequality). However, policy makers may not only be interested in factors that improve mean outcomes but also the distribution of mean outcomes in the population. Thus, it may be important for on-going research to examine not only the effect of women's empowerment on mean outcomes but also the distribution of such outcomes in the population.

Based on the foregoing, the study conceptualise and measure women's empowerment from the perspective of social norms and women's access to resources and examine their comparative effect on children and women's health status in SSA. Specifically, the study

1. Examines the effect of women's empowerment on children's health status and whether social norms are equally as important as access to resources in determining children's health status.
2. Examine the effect of women's empowerment on women's health status and whether social norms are equally as important as access to resources in determining women's health status.
3. Determine the levels of socioeconomic inequality in poor child health status in SSA and the comparative contribution of social norms and access to resources to such levels of socioeconomic inequality in child health status.

To pursue the objectives above, we situate the study in an appropriate theoretical and conceptual framework in Chapter 3. The chapter begins with a working definition of women's empowerment, based on the work of Kabeer, (1999) and England, (2000). Indicators to measure the two dimensions of women's empowerment are identified based on a review of the existing literature. In addition, the pioneering work of Becker on household production, together with others (Rosenzweig and Schultz, 1983; Pitt and Rosenzweig, 1985) is used to argue a relationship between women's empowerment and household health (i.e. women and children's health). Specifically, we argue that women's empowerment can be treated as a characteristic of the woman, which together with other characteristics and household health inputs, can affect the health of children and women. Possible channels via which women's empowerment transmit improvement or deterioration in children and women's health is explained in detail using a modified version of the framework in Engle, (1999) and Smith et al. (2003). In this framework, we argue that women's empowerment affect children and women's health in a two-step process. First, women's empowerment affects care resources. Secondly, care resources affect (a) care for children and consequently the health status of children (b) care resources affect care for women and consequently their health status and that of their children. Based on this framework and findings of existing studies, we argue that, the transmission between women's empowerment and household health could either be positive or negative.

7.2 Summary of Findings

Using the theoretical framework in Chapter 3, we address the objectives of the study. The first objective is addressed in Chapter 4 and broken down into the following sub-objectives:

1. Examine the effect of women's empowerment on child health status (child height for age and weight for height z-scores).
2. Examine the differential effect of social norms and access to resources on child health status.
3. Examine child age cohorts and quantile specific effect of women's empowerment on child health status.
4. Determine whether the use of a composite index, sub-indices or individual variables making up such indices moderate the effect of women's empowerment on child health status.

Using DHS data from 20 SSA countries, we select variables capable of capturing social norms and women's access to resources, also referred to as women's economic power. Using a PCA technique, the selected variables are used to compute a composite index and sub-indices reflecting the two dimensions of women's empowerment. The values of the composite index and associated sub-indices are rescaled to lie between 0 and 1. Values closer to 1 reflect a higher level of women's empowerment with the reverse being true for lower levels of women's empowerment. The results of the composite index suggest higher levels of women's empowerment in Southern African countries, compared to countries in West Africa and East and Central Africa.

On the sub-indices, Countries from Southern Africa continue to have higher scores on the social norms sub-index, whiles countries from West Africa occupy the top spots on the access to resources index. A review of the history, politics and economics of SSA, suggest that women's involvement in the liberation struggles of the Southern African region, created opportunities for women to negotiate intrahousehold and extrahousehold space to pursue issues of interest to them. On the contrary, the superior performance of West African Countries on the access to resources sub-index is explained by the differences in the economic structure of the three sub-regions. Existing data from the World Bank and ILO, suggest that West Africa has the biggest informal sector, followed by East and Central Africa and finally Southern Africa. According to the ILO data, women in West Africa have a higher participation rate in the informal sector. This we believe explains the relatively higher level of access to resources by women in West Africa.

The effect of women's empowerment on child health, as per the four sub-objectives is estimated using OLS models. However, the quantile specific effect of women's empowerment is estimated using quantile regression models. On the first sub-objective, the results suggest that the composite women's empowerment index is significantly positively correlated with child health. Secondly, results from the comparative estimation (second sub-objective) suggest that social norms are equally as important as women's access to resources in predicting child health status. However, the impact of changes in social norms on child health is higher compared to access to resources. Thirdly, the results suggest that the effect of women's empowerment on child health differ for different age cohorts of children and quantiles of child health. Finally, a comparison of results from the composite index to results from sub-indices and underlying variables reveals differences in some instances. The composite index tends to mask up details in terms of the nuanced nature of women's empowerment and the effect of the different dimensions on the outcome variable. On the contrary, the sub-indices and underlying variables show great detail in terms of the different dimensions and indicators and their effect on the outcome variable. In addition to women's empowerment, other factors such as child age, gender of the child, birth size, parental education, number of children in the household, number of adult women in the household, household wealth, access to pipe water and access to health services were found to be significantly correlated with child health status.

The second objective is addressed in Chapter 5, with four sub-objectives. Specifically Chapter 5 examines:

1. The effect of women's empowerment on selected indicators of women's health status – reproductive health (delivery in a health facility, 4+ antenatal services uptake and use of modern contraceptive methods) and women's nutrition (BMI).
2. The differential effect of social norms and access to resources on indicators of women's health status
3. The age cohort specific effect of women's empowerment on indicators of women's health status

4. Whether the use of a composite index, sub-indices or individual variables making up such indices moderate the effect of women's empowerment on women's health status.

Since the reproductive health variables are in a binary choice form, a probit model is used to estimate the effect of women's empowerment on use of reproductive health services. On the contrary, an OLS model is used for women's BMI in its continuous form, whiles a multinomial logit model is used for BMI in a categorised form (CED, normal weight, over-weight and obesity).[89] The results suggest a significant positive correlation between women's empowerment and women's health status, with social norms being as important as access to resources in predicting women's health status. However, the impact of changes in social norms on women's health status is higher compared to access to resources.

Consistent with the findings in Chapter 4, the results suggest that the effect of women's empowerment on women's health status differ for different age cohorts of women. On the fourth sub-objective, the results suggest that using indices as a measure of women's empowerment may musk up the differential effect of different dimensions or individual variables making up a dimension. For example CWEI is significantly positively correlated with the selected indicators of women's health. However, when the composite index is decomposed into sub-indices and underlying variables, some sub-indices (dimensions) or variables are either not significant or in some circumstances negative. Besides women's empowerment, other variables such as women's age, birth order, religion, women and partner's education, age of head of household, household wealth, access to health services and social infrastructure and place of residence are significantly correlated with women's health status.

The last objective is addressed in Chapter 6, with three sub-objectives. Specifically, the chapter

1. Examines the degree of socioeconomic inequality in long-term poor child health status (negative height for age) and short-term poor child health status (negative weight for height) for 20 SSA countries.
2. Examines the influence of inequality on mean child health outcomes

[89] WHO categorization of BMI are as follows: Women with BMI<18.5 are CED, BMI 18.5 – 24.9 are classified as normal weight, BMI 25 – 29.9 are classified as overweight and finally BMI≥30 are classified as Obese (WHO, 1995; WHO, 2004).

3. Examine the comparative contribution of social norms and access to resources to the levels of socioeconomic inequality in poor child health status.

Unlike the first two objectives that focused on average outcomes, the focus of the third objective is child health inequality. The analysis is based on both pooled data and individual country data. Estimates for the first and second sub-objectives were obtained using concentration curves/concentration indices and achievement indices respectively. Finally, a linear decomposition method is used to decompose inequalities in poor child health status over child health determinants (including social norms and access to resources) to obtain estimates for the last sub-objective.

The results suggest the presence of poor child health status inequality to the disadvantage of the poor in almost all the 20 countries investigated. The trend remains almost the same even when the results are adjusted for needs based on demographic characteristics (age and sex) or when a binary indicator (stunting or wasting) is used instead of the continuous negative height for age or weight for height. Interestingly, a comparison of the inequality indices with mean outcomes in poor child health status, suggest that, countries with better mean child health outcomes tend to have higher levels of inequality. In addition, estimates of the achievement indices suggest that, the presence of inequality, results in deterioration in mean child health outcomes in almost every country. Using the findings and WDI data, we argue that, the levels of inequality may be due to children from richer households benefiting from extra investment in child health, resulting in better average outcomes but high levels of inequality.

Results for the last sub-objective suggest that, social norms and women's access to resources are important contributors to inequality in poor child health status. As in Chapter 4 and 5, social norms tend to increase inequality more than access to resources. A simulation of changes in social norms and access to resources on contributions to inequality confirms the fact that, social norms increases poor child health status inequality more than women's access to resources. In addition, the decomposition and simulation results suggest that other factors such as household wealth, women's education, access to good water and sanitation, access to health services and regional/provincial differences make larger contributions to poor child health status inequality compared to social norms and access to resources.

7.3 Contribution of the Study

In this section, we discuss contributions of the study to the literature and implications of the findings on policy as follows:

7.3.1 Contribution to the Literature

The theoretical and empirical models used, together with the findings, have implications for the literature. Women's empowerment has been argued to be multi-dimensional, with the exercise of agency being at the core of the empowerment process. However, existing definitions and conceptualisations have not clearly explained agency in a manner that links with the different dimensions and consequently how the dimensions are measured. A unique aspect of this study is that the working definition is explained in a way that elicits the two dimensions of interest (social norms and access to resources) and consequently how they are measured. Added to this is the fact that variables normally used in the literature to capture some form of agency (decision-making, perception on partner violence and women's mobility) are used as proxies for social norms and supported with literature from other disciplines. In other words, the study opens up new spaces to experiment with existing variables to address new conceptualisations within the women's empowerment literature.

In the micro literature, differences in women's empowerment has been linked to differences in access to resources and or capability/functioning (income, employment, education, health etc), whiles other studies, especially in the demography literature, have emphasised the importance of women's agency. At the macro level, political and economic systems have also been emphasised. However, an area less researched is the role of history in the empowerment process. Interestingly, the findings of the current study, opens up opportunities to interrogate the relationship between history and the empowerment process. This assertion is based on the fact that, the CWEI ranking, suggest that empowerment differentials between women in Sothern Africa and the rest of SSA is explained by the role played by women in the liberation struggles in Southern Africa. Although the findings of the study may not be enough to generalise history as a source of women's empowerment, it nonetheless give us an idea of the role of history in the empowerment process. It may also help open up new areas of research, with a focus on how histories of different communities shape the empowerment of women.

A common argument often made in the women's empowerment literature is that education is key to empowering women. This is because educated women are more likely to have the capacity to contend against or negotiate social institutions that are inimical to their interest and also participate in the labour market. There are others who have argued that social institutions explain gender differences in access to resources (Kabeer, 1999; Narayan, 2005; Goldstein and Udry, 2008; Wahhaj and Kanzianga, 2010), making social norms a key source of women's empowerment. Based on this, one will expect that women from Southern Africa, with relatively higher literacy rates and better capacity to negotiate social norms/institutions will have higher levels of economic empowerment (i.e. access to resources).

However, this is not the case. As per the results, West African women, with lower levels of literacy and ability to negotiate social norms are more economically empowered compared to their Southern African counterparts. This suggests that there could be other important factors that explain women's economic empowerment, besides the factors discussed in the literature. Summary statistics from the DHS data, together with data from the ILO and WEIGO, suggest that the higher levels of women's access to resources in West Africa is explained by the size of the informal sector and level of women's participation in the informal sector. The theoretical value of this finding could be a new research agenda that explores linkages between women's activities in the informal sector and women's empowerment. This could create a better understanding of how the informal economy influence and shapes the process of women's empowerment.

The study contributes to the debate on whether women's empowerment is best captured by an index or individual variables. Generally, a common approach in the literature has been the use of indices. The explanation being that women's empowerment is a multi-dimensional concept. Thus a reasonable means of capturing the different dimensions in a single variable is the use of an index. In this way, a variable that identifies with the theoretical concept discussed becomes plausible. However, it could be argued that the theoretical variable (i.e. the index) does not exist in practice. Thus, individual variables are better placed for purposes of policy. Judging from the results of the composite index and individual variables as discussed in Chapter 4 and 5, it cannot be said that the two are direct substitutes. The index gives an overall picture, whiles the individual variables paints a detailed and nuanced picture of the effect of women's empowerment on the outcome variable. So the argument need not be whether one should use an index or individual variables. The two used together has the advantage of giving a better understanding of the effect of women's empowerment on selected outcomes variables.

A key argument in the women's empowerment literature is that empowering women enhances their ability to negotiate for household resources with potentially favourable implications on household outcomes. Whiles the results in Chapter 4 and 5 support this line of argument, it also suggests that an even better approach is where both women and their partners are empowered together. Interestingly, there are few studies (Allendorf, 2007a; De Mel et al., 2009; Fafchamps et al., 2011) that have also found that including men in interventions to empower women, yields better results than when only women are targeted. Thus it may be important for this to be empahsised in the literature as well.

Finally, the findings of the study opens up a new research agenda that could be important for the women's empowerment literature. Surprisingly, the literature examining the instrumental effect of women's empowerment has focused mainly on the effect of women's empowerment on mean outcomes. Considering that the distribution of mean outcomes in the population (inequality) is also of interest to policy makers, we argue an indirect relationship between women's empowerment and child health inequality via women's access to resources. The results in Chapter 6 suggest that women's empowerment is related to child health inequality in some form. Against the background that the link between women's empowerment and inequality is less researched, the current results can be seen not only as new evidence but also an opening for further research.

7.3.2 Policy Implications

Besides contributing to the literature, the findings of the study have important implications for policy development and implementation. In Chapter 4, we use external sources of data to argue that differences in women's access to resources (economic empowerment) between West Africa and the rest of SSA is due to the extent of women's participation in the relatively large informal sector in the economies of West Africa. The importance of this argument is that it creates a window of opportunity that could be used by policy makers to develop appropriate policies to address women's access to resources. For example, policy makers could adopt a policy of protecting the informal sector from foreign participation and competition, whiles at the same time investing in the sector to promote growth. Such a policy could bolster women's access to resources considering that women tend to dominate the informal sector.

The findings also suggest that social norms are as important as women's access to resources in predicting outcomes such as household health. The simulation results further suggest that improvements in social norms are likely to result in better improvement in children and women's health compared to access to resources. Thus, policy makers may need to move away from the current practice of concentrating on policies that seek to improve women's access to resources to policies that seek a balance between social norms and women's access to resources. Addressing the negative effect of social norms could compliment the effect of policies that seeks to increase women's access to resources. As a result, the collective effect of women's empowerment on health outcomes could be higher than when only access to resources is emphasised.

Related to the need to seek a balance between the different dimensions of women's empowerment is the question of whether to emphasise investments in women's empowerment or traditional determinants of health. For example, the simulation results in the 3 empirical chapters suggest that investment in traditional health determinants (e.g. education, household wealth, access to water and sanitation access to health services) have a higher effect on household health compared to women's empowerment. Considering that issues on women's empowerment, especially social norms/institutions, are likely to take a long time to change (North, 1990; Williamson, 1998; 2000; Albiston, 2005), we advocate for traditional determinants of health to be given policy priority, whiles women's empowerment is pursued as a long term policy agenda. In this way there will be both short-term and long-term policy gains and improvements in household health.

The findings of the study also suggest that decisions made by couples together, has a higher effect on household health compared to when the decisions are made individually. The implications of this could be better outcomes if policy makers make conscious effort to target both men and women in policies aimed at empowering women for the purposes of improving household outcomes.

Finally, the findings of the study could be relevant to how policy interventions on household health are targeted. The study suggests that the effect of health determinants differ by group (age cohorts and health status). In practice however, policies on household health are often not targeted in this fashion. Thus, it may be essential that policies on household health (e.g. women and children's health) consider within group heterogeneity and use that as the basis to target sub-group needs. In this way, policies are likely to have a better impact compared to where groups such as children, women etc are assumed to be homogeneous in nature.

7.4 Limitations of the Study

The study has been carefully planned and executed using fairly robust and consistent methodologies. This notwithstanding, there are limitations. Although these limitations do not in any way affect the overall reliability and validity of the findings, it is important that they are discussed to inform readers. The absence of direct variables on social norms in the DHS data meant the use of proxies considered close to the concept of social norms. We reckon that access to and use of direct variables may give a deeper understanding than is currently the case. Secondly, it is possible to argue that the different dimensions of women's empowerment have inherent differences in terms of importance. Thus weighting the different dimension would have been appropriate. However, weighting was not possible in the computation of the composite women's empowerment index, since it was difficult to determine one, either based on theory or prior evidence. It is also important to state that the cross-sectional nature of the DHS data meant inability to examine important issues such as changes over-time. For example the use of a panel data set would have made it possible to examine changes in women's empowerment over time and how such changes has affected household health. Thus the current results should be interpreted in the light of these limitations. Finally we also caution on attempts to generalise since the findings may be applicable to the 20 countries used.

7.5 Areas for Further Research

Based on the findings of the study we propose that household surveys in developing countries such as the DHS extend their scope to collect data that can directly capture the concept of social norms. Secondly we suggest that future studies consider detailed examination of how community histories shape the process of women's empowerment. Thirdly, Further research may be crucial in improving our understanding of the link between women's participation in the informal sector and women's empowerment. Finally, detailed country level studies on the link between women's empowerment and inequality will be important in improving this extension to the literature.

APPENDIX 1
THE COMPOSITE WOMEN'S EMPOWERMENT INDEX AND SUB INDICES

1.0 Introduction

This appendix sets out the strategy used to compute the composite women's empowerment index (CWEI) and its associated sub-indices. Section 2 discusses the conceptual basis for the aggregation of input variables into sub-indices and subsequently a composite index. This is followed by a discussion of the specific variables used. Section 4 explains the weighting and aggregation method for the sub and composite indices. Section 5 discusses robustness and sensitivity to changes in the underlying assumptions of the sub and composite indices. Finally, the computed sub and composite indices are presented and discussed in Section 6. Most of the tables associated with this appendix are listed at the end of the appendix.

2.0 Composite Women's Empowerment Index: A Conceptual Justification

In general, women's empowerment as a concept is argued to be multi-dimensional (Kabeer, 1999; 2005; Kishor, 2000a; 2000b). Some of the dimensions identified in the literature include; women's autonomy, decision-making, mobility, domestic violence, access to resources etc (Schuler and Hashemi, 1994; Abadian, 1996; Kabeer, 1999; Mason and Smith, 2000; Kritz et al., 2000; Malhotra et al., 2002; Narayan, 2005). The multi-dimensional nature implies that it could be difficult if not impossible to find a single variable that can reasonably capture all the dimensions that may be relevant for a particular case (Kishor, 2000a; Estudillo et al., 2001; Malhotra et al., 2002). In practice, the solution to this challenge has been the use of indices.

Specifically, authors select a number of variables that reasonably capture the concept espoused by a particular dimension and subsequently aggregate those variables into an index, representing that particular dimension. Such indices are common in the women's empowerment literature (see: Kishor, 2000a; 2000b; Smith et al., 2003; Ahmed et al., 2010; Bhagowalia et al., 2010). To satisfy the multi-dimensional requirement of women's empowerment, others have aggregated the indices representing different dimensions into a composite index of women's empowerment. A typical example of such an index the Social Institutions and Gender Related Index (SIGI) (see: Branisa et al., 2009). Other composite women's empowerment indices include; Gender Empowerment Measure (GEM), Gender Related Development Index (GDI), Gender Equity Index, Gender Inequality Index (GII) etc (Branisa et al., 2009; Social Watch, 2009; UNDP, 2010; 2011).

As per the discussion in Chapter 3, women's empowerment is broadly categorised into two dimensions. The first being access to resources (i.e. women's economic power) and the second being the broader context of norms and beliefs that affect gender roles (referred to as social norms – see Chapter 3). For the purpose of this study and as discussed in Chapter 3, the second dimension is made up of four sub dimensions; (1) women's participation in family decisions (2) women's perception of violent behaviour by husband/partners (3) women's autonomy (4) societal preferences (see Chapter 3). Given that no single variable can adequately capture the concept espoused by any one of the dimensions of women's empowerment, we select from our dataset, variables that reasonably capture the concept of a particular dimension. An index is then computed from the selected variables to represent that dimension. Indices computed for the different dimension are then aggregated into a composite index to represent the multi-dimensional concept of women's empowerment.

3.0 Selection of Variables

This section looks at variables deemed to be appropriate to capture the underlying concept of each of the dimensions identified above. Considering that the concept captured by each dimension has already been explained in Chapter 3, this section deals mainly with the selection of relevant variables. It is important to note that variables selected in some instances, may be deemed as proxies rather than being exact measures of the concept inherent in the dimensions they represent. A summary of the variables used is contained in Table AP1-1 of this appendix.

Ibrahim and Alkire, (2007) discusses a criteria for choosing indicators of women's empowerment. They argue that the indicators should be (1) relevant and particularly consider areas where women have power deficits (2) internationally comparable (3) be able to assess both the intrinsic and instrumental aspect of women's empowerment (4) identify changes in agency and empowerment over time. (5) the indicators should have been used and tested before and found to be adequate measures of empowerment. Based on this criteria, the variables chosen are meant to capture as much as possible, (1) women's ability to exercise agency in the mist of social norms that prescribe gender roles and constrain women's empowerment (2) women's access to resources that enhances women's ability to exercise agency (i.e. make strategic life choices). These variables have been used in prior studies as measures of women's empowerment/bargaining power (see: Thomas, 1994; Handa, 1999; Hindin, 2000a;

2005b; 2011; Smith et al., 2003; Mullany et al., 2005; Allendorf, 2007a; 2007b; Kishor and Johnson, 2006).

3.1 Women's Access to Resources (Economic Power)

The variables chosen are meant to capture as much as possible, women's access to resources that enhances women's ability to exercise agency (i.e. make strategic life choices). The variables include:

A. Years of education differences between women and their partners

B. Whether a woman earns cash. The answers to this question are in a rank order from with 1 assumed to confer the lowest level of women's economic power
   1. Not Paid
   2. In-kind only
   3. Cash and In-kind
   4. Cash only

C. Whether woman is currently working, with answers being
   1. No
   2. Yes

3.2 Broader Context of Norms and Beliefs (Social Norms)

The variables selected are those assumed to capture aspects of women's empowerment, deemed to be influenced by the broader context of institutions- social norms (norms, values traditions etc) within a society. The dimensions of what we have referred to as social norms are participation in family decisions, perception on violent bahaviour by husband/partners, women's autonomy and societal preferences. The variables representing these dimensions have often been used in the literature to capture women's agency (see Section 3.5 of Chapter 3). Thus, these variables are not entirely new. The difference in terms of their use in the current context is the argument that issues such as participation in decision-making, violent behaviour by band/partners and women's autonomy, does not only give us an idea of women's exercise of agency, but also what society deems as acceptable or not in gendered relationships. The variables used are as follows:

3.2.1 Participation in Family Decisions

As already discussed in Chapter 3, family norms, values, traditions, beliefs etc (informal institutions) influences women's decision-making power in the household (Branisa et al., 2009). The DHS ask several questions that seek to ascertain women's decision-making power in the household. The questions include:

1. Who has final say on woman's own health?
2. Who has final say in making large household purchases?
3. Who has final say in making daily household purchases?
4. Who has final say on decision to visit family and relatives?

For each of the above questions, the woman is expected to choose any one of the following as an answer: (1) Someone else (2) Husband/Partner alone (3) Woman and Husband/Partner (4) Woman alone. We assume that option (1) represent a situation of no power to the woman with the reverse being true for option (4). This assumption is based on the argument that in several traditional societies, existing norms and traditions (informal institutions) may be used by the powerful (in most instances men) to perpetuate gender-based hegemonies to the disadvantage of women (Murthy, 1998; Jütting and Morrisson, 2005; Mabsout and van Staveren, 2010). In such instances, it is possible for a substantial proportion of family decisions to be made by men.[90] In such societies, women who get the opportunity to make family decisions all by themselves or together with their partners could be deemed as having some amount of family decision-making influence in their households.

3.2.2 Women's Perception of Violent Behaviour by Husband/Partners

This is measured by a set of questions that seeks to ascertain from women whether they approve of violent behaviour from their husband/partners, with a yes or no answer. It is assumed that a no answer will mean that women involved have the capacity to exercise agency and confront social norms and traditions that are inimical to their interest. Secondly, a no answer could also reflect prevailing social norms and traditions about how women are perceived and valued in society. For example, it has been argued that women agreeing to husband/partner violence may not necessarily mean that such

[90] The assertion that a substantial proportion of decisions in the household are most likely to be made by men is supported by the current data. Decisions ascribed to husband/partner alone records higher percentages in several decision-making areas across several countries (see Table AP1-12 of this Appendix).

women are in favour of such practices. It may only be a reflection of their helplessness and more importantly their internalization of social norms and traditions that approve of such practices (Kabeer, 1999; Malhotra et al., 2002). Thus, the four variables below are expected to capture social norms or traditions that seek to protect or otherwise of women's physical integrity. The questions used include:

1. Wife beating is justified if wife goes out without permission
2. Wife beating is justified if she neglects the children?
3. Wife beating is justified if she argues with the husband?
4. Wife beating is justified if she refuses sex?
5. Wife beating is justified if she burns food?

3.2.3 Women's Autonomy

This is measured by three variables that seek to ascertain from women, limitations on their freedom to seek medical care, with responses coded as 0 if the woman finds it a big problem and 1 if not a big problem. We assume that women who answer "not a big problem" have relatively better freedoms compared to those who answer "a big problem" The questions are:

1. Whether it is a big problem to get permission for medical help?
2. Whether it is a big problem for women to go alone to seek medical help?
3. Whether a woman thinks it is a big problem that there are no female medical care providers?

We interpret the requirement for women to seek permission before going for medical help as a limitation on women's ability to exercise their right to medical care. The issue of the availability of female medical providers being a condition for women's use of medical services is based on some traditional practices, where it is expected that female patients are treated only by female healthcare providers. In Northern Ghana for example, low levels of institutional deliveries are attributed to religious beliefs in some communities, where it is prohibited for male healthcare providers to attend to women in labour (Ministry of Health, 2009). Evidence from Nigeria suggest that Muslim women are less likely to go for antenatal services and deliver at a hospital if the health provider is a male (Ikeako et al., 2006). Such practices constitute a limitation on the freedoms of women to move and to seek healthcare. The intuition behind the last variable is on the basis that accompanying women to seek medical help may be part of existing social norms (informal institutions) used to limit the movement of women and therefore a constraint on their right to self-determination. Overall, constraints on women's autonomy may mean that actions taken by such women may not be congruent with their authentic interest and self desires (Alkire, 2005; Alkire and Chirkov, 2007)

3.3.3 Societal Preferences

The fourth dimension, societal preferences is measured by a set of three continuous variables.

1. Couple age differences
2. Number of wives
3. Age at first marriage

The choice of these variables is on the basis that they represent not just family or individual actions, but societal preferences. For instance, age at first marriage, couple age differences and number of wives are issues emphasised to a large extent by society compared to individuals. Evidence in Ghana suggest that, some traditional practices permit girls to be given out into marriage at very early ages in the mist of official legislations that prohibits such practices (Immigration and Refugee Board of Canada Ghana, 2006). Other authors have also argued that cultural norms of family systems influence what constitute an acceptable age at first marriage and spousal age difference (Hajnal, 1982; Davis, 1955; Skinner, 1997; Jin et al., 2005).

4.0 Computation of the Composite Women's Empowerment Index

4.1 Association Between Selected Variables

As a first step, associations between the variables selected for computing each sub-index is ascertained. This makes it possible to isolate those variables that may not be related to the underlying latent variable (i.e. the sub-indices). Standard Pearson correlation is used in the case of societal preferences since the three variables used are all on a continuous scale. A tetrachoric correlation method is used for women's perception of violence and autonomy, considering that the variables used are on a binary scale. In the case of participation in family decisions and women's economic power, a couple of the variables used are on an ordinal scale. Thus a Kendall's correlation will be appropriate in determining the level of correlation.

However, the large size of our dataset will mean extra investment in computing power in addition to several days for computations. To avoid this, we compare the results from a standard Pearson and Kendall's correlation on 10% of the sample. The results show marginal differences, with both suggesting acceptable levels of intra variable correlations. This gives the assurance that the results from a standard Pearson correlation for the two dimensions will not give misleading results. Thus we use standard Pearson correlation to calculate the intra variable correlations for Participation in family decisions and women's economic power. The results shown in Tables AP1-2 to AP1-6 suggest that all dimensions show a good level of intra variable correlation at $p<0.0001$. Although the correlation coefficients for societal preferences and women's access to resources are not as strong as those of participation in family decisions, perception of violence and women's autonomy, they are significant and useful for the purposes of constructing an index.

4.2 Aggregating Variables to Compute Sub-Indices

In this subsection, the variables of each dimension are aggregated to extract an underlying latent variable, which is supposed to account for the maximum variation in the individual variables. Principal component analysis (PCA) has often been used to aggregate variables in a manner that extract an underlying latent variable, in order to explain the maximum variation in the original set of variables. The advantage of PCA as a data reduction method is that, it is able to explain the variance-covariance structure of a set of variables via a linear combinations of existing variables. An additional advantage of PCA is that, one is able to judge the importance of each input variable to each latent variable extracted (i.e. principal component) via the magnitude of attached weights (i.e. factor loadings).

The underlying assumption for the use of standard PCA is that of multivariate normality of input variables with assumed linear relationships (Jolliffe, 2002; Kamanou, 2005). In the present case, some dimensions contain variables with binary responses (Women's perception of violence and autonomy), ordinal responses (participation in family decisions) and a combination of ordinal and continuous responses (women's economic power). Thus, the normality and linear assumption is violated, making the use of standard PCA inappropriate.[91] An alternative for dealing with the challenge associated with ordinal, binary and a combination of ordinal and continuous variables is polychoric PCA (Kolenikov and Angeles, 2009). With this method, a PCA for ordinal or binary variables is estimated based on an underlying correlation matrix from a polychoric correlation. In the case of a mixture of ordinal, binary and continuous variables, the PCA is estimated based on a correlation matrix from a polyserial correlation (see the appendices of Kolenikov and Angeles, 2009). Besides Kolenikov and Angeles, other authors have used polychoric PCA to compute indices of inequality and gender, due to the presence of ordinal and binary variables (Njong and Ningaye, 2008; Branisa et al., 2009).

Consistent with the authors above, we use polychoric PCA to estimate the underlying latent variable that captures the greatest level of variance in the variables representing each dimension of women's empowerment as follows.

Assuming x is a random variable having Z dimensions, with a Z x Z variance-covariance matrix $V[x] = \sum$. PCA can be used to ascertain the direction of the greatest variation of the liner combinations of the x's. The linear combination of the x's can be expressed as

$y_i = \beta_j x, \; j = 1................k$ …………………………… (AP1-1)

Where y_i is the principal component, β is a vector of weights for each inputs variable x. By solving the eigenproblem for the correlation matrix $\sum$, which is made up of λ and β as expressed in Equation (AP1-2) the solution to Equation (AP1-1) can be found.

$\Sigma\beta = \lambda\beta$ …………………………………………………….. (AP1-2)

Solving the eigenproblem for the correlation matrix in Equation (AP1-2) yields the principal component weights β, the linear combinations βx (i.e. factor scores) and eigen values $\lambda_1 \geq \lambda_2 \geq .... \geq \lambda_z$. Since it is possible to establish that $V[\beta x] = \lambda_k$, the

[91]The use of the binary and ordinal variables will create a difficulty for standard PCA, since these variables with their measurement, do not have an origin and or a standard unit of measurement. This implies that variances and covariances will have virtually no meaning. Considering that standard PCA relies on the covariance (correlation) matrix, the standard PCA will no longer be appropriate (Njong and Ningaye, 2008).

eigenvalues can be said to be the variances of the linear combinations. Thus the total variance from the variables used in one particular dimension will be equal to $\lambda_1 + \lambda_2 + \lambda_3 .... \lambda_z$ with the proportion of the total variance attributable to a particular PC being $\frac{\lambda_k}{\lambda_1 + \lambda_2 + \lambda_3 .... \lambda_z}$.[92]

Based on the Kaiser-Guttman rule, the first principal component (FPC) for each dimension is selected as a proxy for the common information contained in the variables making up that dimension.[93] In other words, the FPC is itself a sub-index representing the dimension from which it is extracted. For example, for the participation in family decisions dimension, the first principal component from the polychoric PCA is used as a proxy for the common information contained in the four variables used. The FPC extracted from the PCA is a weighted sum of the variables capturing much of the variation in the data in a standardized form (see Equation AP1-1). It is important to note that these weights are not assigned to the input variables apriori, since we do not have any theoretical basis to justify such. On the contrary, the data is allowed to determine what will be appropriate weights (factor loadings) via the PCA technique.[94]

The FPC account for 79.4%, 82.3%, 82.3%, 46.1 and 37.7% of the total variance for women's participation in family decisions, perceptions of violent bahaviour by partners, women's autonomy, societal preferences and women's access to resources respectively. The percentage of variance captured by the FPC in each dimension together with weights\factor loadings, are contained in Table AP1-7. Considering that the scored FPC is in a standardized form, $(1 > \chi > 1)$, interpretation could be difficult. Thus, each FPC is rescaled to lie between 0 and 1, such that values closer to 1 indicates that a woman has a higher/better position on that dimension compared to values closer to 0.

4.3 Aggregating Sub-Indices to Compute the Composite Index

Next, we compute a composite index from the sub-indices attributed to the various dimensions. Following the procedure in Branisa et al.,(2009), the CWEI is computed as an unweighted average of a non-linear function of the sub-indices. The reason for not

[92] The notation used follows (Njong and Ningaye, 2008) which is actually a simplification of the detailed notations contained in Kolenikov and Angeles, (2009).
[93] The Kaiser-Guttman rule state that for a factor to be retained, it must have an eigenvalue (i.e. total variance accounted for by each factor) ≥1 (Guttman, 1954; Kaiser, 1961).
[94] The weight assigned to each variable is obtained by analyzing the correlation structure of the data.

assigning weights to the various dimensions is based on the lack of evidence to support and defend such. Perhaps, a focus group discussion with relevant experts would have been appropriate in giving clues as to what will be appropriate weights for the different dimensions. However, this has not been possible. Thus, we assume equal weights for the different dimensions. The use of a non-linear function is based on the assumption that women's level of disempowerment will be correlated with their extent of deprivation (Branisa et al., 2009). Hence an increase in women's disempowerment will not only result in an increase in their levels of deprivation, but will happen in a more than proportionate manner. Thus, the use of a non-linear function, penalizes disempowerment in each dimension, whiles allowing for only partial compensation among sub-indices. The advantage in the use of a non-linear aggregation method lies in the fact that panelizing non-performing dimensions could incentivize policy makers to pay attention to that dimension to prevent poor ratings especially at the household or country level (OECD, 2008). Assuming that CWEI is denoted by (γ) a general notation for computing it is as in Equation AP1-3 below.

$$\gamma = 1(x) = \frac{1}{n}\sum_{i=1}^{n}\varphi(x_i,1) = \frac{1}{n}\sum_{i=1}^{n}(x_i - 1)^2 = \frac{1}{n}\sum_{i=1}^{n}(x_i)^2 \quad \text{.................. (AP1-3)}$$

Where x is a vector of sub-indices (women's participation in family decisions, women's perceptions of violent behaviour by their husband/partner, women's autonomy, societal preferences and women's access to resources), 1 is the goal of full women's empowerment, $\varphi(x_i,1)$ is inability to achieve full empowerment (i.e. deprivation) such that $\varphi(x_i,1) > 0$ if $x_i < 1$ and $\varphi(x_i,1) = 0$ if $x_i = 1$.

5.0 Sensitivity Analysis

In this section, we test formally how variation in the CWEI can be attributed to variations in the underlying assumptions used in computing the index. Principally, the underlying assumptions can be derived from (1) input variables used for the sub-indices (2) multivariate and weighting method adopted and (3) aggregation method used. Thus variations arising from these sources are tested to ascertain their influence on the composite index as follows:

5.1 Input Indicators

The composite index is re-computed using different variables. The result is compared to the original CWEI to ascertain the level of correlation. The variables used for the new index (age at first marriage, couple age and education differences and whether the woman works for cash) are exactly those used by Smith, et al., (2003). The rational for using the smith, et al., (2003) variables is that they are available in the DHS dataset.[95] The results show that the new index (let call it the Smith Index) is correlated with the CWEI (0.385 at $p<0.0001$). In addition, we calculate the correlation coefficient between the values of the CWEI and two other gender-related indices (SIGI and GII) for the countries captured in the CWEI. The results show a correlation coefficient between the CWEI and the SIGI as (0.232 at $p<0.325$) and between the CWEI and GII as (0.537 at $p<0.015$). Other possible comparisons could be the Gender Related Development Index (GDI) and Gender Empowerment Measure (GEM). The correlation coefficients suggest that the CWEI is related to the other three indices in some form but also captures other aspect of women's empowerment that the three gender-related indices (SIGI, GII and the Smith Index) do not capture. Using any of the thresholds suggested by McGillivray and White (1993) it can be concluded that CWEI is not redundant.[96]

5.2 Applied Weights

As indicated earlier on, no apriori weights were assigned in computing the sub-indices. Instead, the data is allowed to determine appropriate weights via PCA. In this section, we vary the methods used (i.e. from Polychoric PCA to standard PCA) and ascertain it's implication on CWEI and its underlying sub-indices. The eigenvectors in Table AP1-7 suggest negligible differences between the weights of the Polychoric PCA and Standard PCA. However, the percentage of variance in the data, as explained by the FPC suggests that the Polychoric PCA performs better than the standard PCA. The FPC from the polychoric PCA for the 4 dimensions are higher than the FPC from the standard PCA.[97] Notwithstanding the differences, in terms of variance contributed by the FPC, the correlation between the 2 sets of indices (i.e. from the polychoric PCA and the standard

---

[95] It should be noted that the variables used in Smith et al., (2003) are limited and therefore will not be able to capture the full essence of women's empowerment as discussed in the context of the current study. It is therefore possible for the comparison to be biased since the two indices measure different things.

[96] It has been suggested that in the case of a welfare measure, a coefficient of 0.9 and 0.7 will be appropriate as thresholds to separate redundancy from non-redundancy (McGillivray and White, 1993)

[97] The FPC from the polychoric PCA are 79.4%, 82.3%, 82.3%, 46.2 and 37.7% for participation in family decisions, perception on violent behaviour, autonomy, societal preferences and women's access to resources respectively, compared to 71.2%, 63.7%, 65.9% and 46.2 and 35.6% for standard PCA. The FPC for Societal preferences is the same irrespective of the weighting method, because the variables used are on a continuous scale.

PCA) is very high, suggesting little difference between the two methods. Table AP1-8 shows a correlation coefficient of 0.994 at p<0.000 between the composite index computed via polychoric PCA and standard PCA. The correlation between the underlying sub-indices from the 2 multivariate weighting methods, are also very high, suggesting that the 2 methods may not be different in terms of results (see Table AP1-8).

5.3 Aggregation Method.

The aggregation method used is a non-weighted, non-linear aggregation method. Alternatively, an additive aggregation method such as a simple average of the sub-indices could have been used. Thus we use a simple average aggregation method to aggregate the sub-indices and correlate it with the original index (i.e. the index based on geometric aggregation) to ascertain if there are significant differences. The correlation results indicate a correlation coefficient of 0.929 at p<0.000 between the two indices. This suggests that the results of the 2 aggregation methods are not significantly different.

In addition to the above tests, we estimate the effect of variables normally used in the literature as correlates of women's agency (women's age, religion education, household wealth, residence, monogamous marriages in the neigbourhood, preference for the girl child in the neighbourhood and differences in deaths among girls and boys in the neighbourhood) on the composite and sub-indices. The results in Table AP1- 18 suggest that the variables are mostly significantly correlated with the composite and sub-indices and with the expected sign. There are however a few instances where the sign is either counter intuitive or the correlation is insignificant. For example the results suggest that neither primary nor secondary education is likely to affect women's access to resources significantly, except tertiary education. Secondly, Household wealth is unlikely to lead to empowerment in societal preferences. This may not be strange, in that societal preferences may be rooted in social traditions that may not change irrespective of household wealth. It is even possible that the wealthy in society who benefit from these traditions will act to protect them. The signs may also be due to the variables used in computing the societal preference sub-index (number of wives, couple age difference and age at first marriage). It is not uncommon, especially in developing countries, to have men from wealthy households having a lot more wives who are far younger than them.

Overall, the results of the sensitivity analysis are indicative that the CWEI is not redundant. With the exception of the FPC's, the results of the index do not change immensely with variation in the underlying assumptions. Finally, correlations between the CWEI and two existing indices (SIGI and GII) suggest that the CWEI is not redundant but captures other aspects of women's empowerment that already existing indices do not capture.

6.0 Results

Summary statistics of the computed indices (composite and sub-indices) are presented in Table AP1-9. From Table AP1-9, there are two composite indices. The first is an aggregation of all the five sub-indices (participation in family decisions, perception of violent behaviour by husband/partner, women's autonomy, societal preferences and women's access to resources). The second is an aggregation of the dimensions on the broader institutional context of norms – social norms (participation in family decisions, perception of violent behaviour by men, women's autonomy and societal preferences). For simplicity, the second composite index is referred to as social norms index. The composite index of social norms follows the same geometric aggregation process. It is important to state that the index of social norms is computed mainly for use in our regression analysis. Thus, discussion on the indices at this point, is limited to the CWEI and the five sub-indices

From Table AP1-9, we observe that computation of CWEI leads to a reduction in the number of observations. A missing data check reveals that the reduction in the observations on CWEI is as a result of missing data in the variables used in computing some of the sub-indices (participation in family decisions, societal preferences and women's economic power). A possible solution to the missing data in this instance could be replacing the missing data through multiple imputations. However, multiple imputations is based on the assumption that the missing data is random. In the current case however, a couple of the reasons for missing data cannot be said to be random.[98] Thus, multiply imputing the missing data could create a bigger bias than one would want to correct. Besides, the sample for the CWEI is still large enough to be able to give

[98] The following reasons accounts for missing data in our dataset. (1) Where responses provided seem suspicious and beyond what is reasonably possible, for example outliers. Such responses are recoded as missing data (2) Where respondents indicates that they do not know the answer for the question, such responses are recoded missing (3) Where responses are coded as inconsistent within the survey, we recode such responses as missing since we are unable to use them (4) Where the survey codes an observation as missing.

reliable results. On this basis, we use the CWEI in its current form without multiply imputing the missing data.

The results in Table AP1-11 suggest that Swaziland and Guinea have the highest and least score on the CWEI respectively. The results also suggest better performance by Southern African countries in general on the CWEI. For example, the second best performing country on the CWEI, Namibia is also a Southern African country. In addition, the top 10 countries have 6 of them from Southern Africa (Swaziland, Namibia, Zimbabwe, Malawi, Zambia and Mozambique). Ghana (3rd) and Nigeria (7th) are the only two West African Countries in the top 10 on the CWEI. The other West African countries are found in the bottom 10, with six of them being part of the 7 least performing countries on the CWEI.

With the exception of women's access to resources, countries from Southern Africa perform relatively better than other countries on all other sub-indices. For example, the best 5 performing countries on the participation in family decision index have 4 of them being Southern African countries. This pattern is not different in the case of women's perception on violent behaviour by husband/partner, women's autonomy and societal preferences. It is also important to mention that Ghana from West Africa and Rwanda from East Africa are among the top 5 performing countries on participation in family decisions, Women's perception of violent behaviour by partners and societal preferences. On the contrary, West African countries perform better than East and Southern Africa on the women's access to resources sub-index. Four of the top 5 countries on this index are West African countries. Notwithstanding, the best performing country on the women's access to resources sub-index remains a Southern African country (Swaziland).

In addition to the country rankings in Table AP1-11, we compare the rankings of CWEI to that of the SIGI and GII for the countries in our datasets. The results in Table AP1-10 suggest that CWEI may be capturing aspects of women's empowerment not captured by the SIGI and GII, as the rankings tend to differ. However, the country rankings of the GII tend to be closer to the CWEI than the SIGI. Nonetheless, Southern African Countries continue to perform well. For example, among the 20 countries, Namibia happens to be the best performing country on the SIGI, with 4 of the 6 southern African countries being among the best 10. In the case of the GII, 4 of the 7 best performing countries are from Southern Africa. This seems to be the trend on other gender related indices such as GEM, GEI etc (see discussion in Chapter 2). The superior performance of Southern Africa compared to the rest of SSA, on issues of gender equality is also supported by available statistics from the World's Women 2010 report (United Nations, 2010b).

The relatively superior performance by Southern African countries on several gender inequality indices may be explained by the historical and economic antecedents of the Southern African region. One area that may likely explain this phenomenon is the history of liberation struggles in the Southern African Region (SAR). With the exception of Malawi, almost all the countries in SAR went through 1 liberation struggle or the other. It has been argued that in these struggles, women played an important role both as combatants and agents for gathering information (Kriger, 1991; Seidman, 1993). These roles provided women in some of these countries (e.g. South Africa, Namibia, Mozambique and Zimbabwe etc), the platform to adapt masculine roles (Bhebe and Ranger, 1996), improve their self-worth in society (Nhongo-Simbanegavi, 2000) and the foundation to engineer post-liberation women's movements, that will fight and demand for the main streaming of gender related issues. It is also argued that the social upheavals that characterized some of these conflicts emboldened women to challenge practices such as wife beating and other social norms that legitimized patriarchal authority (Kriger, 1991). Thus, the experience of the liberation struggles in these countries constituted a platform for mobilizing women to envision what their roles should be in society (Seidman, 1984).

The liberation struggle and its consequent mobilization of women meant a strong women's voice to push post-liberation governments to create opportunities for women. For example, in almost all the countries of the Southern African Development Community (SADC), policies that advocates for equal opportunity for women both in education and political representation are aggressively being pursued. It is therefore not a coincident, that Southern Africa tends to have a higher number of women in political office (i.e. parliamentarians and ministers) (United Nations, 2010b) and relatively better outcomes in women's education (see Tables AP1-15 and AP1-16 of this appendix).[99] The performance of Rwanda and Ghana on both the composite and social norms sub-indices may be due to unique country level actions. For example the focus of the current Rwandan government in pursuing policies that bridges the gender gap has been well document. In the case of Ghana, it is often referred to as one of Africa's success democratic and economic stories. Thus it may not be surprising that these two countries, though not in Sothern Africa, tends to do very well both on the composite and sub-indices on social norms.

With a relative advantage in the social norms index and educational attainment in general, a natural expectation will be for women in Southern Africa to dominate the women's access to resources sub-index. However, this is not the case, as countries from West Africa rather perform well on the women's access to resources dimension. The formal-informal dichotomy, in terms of the structure of the economies of SSA countries may provide some insights. The informal sector in SSA is believed to account for 50-75% of employment (Haan, 2006) and 72% of non-agricultural employment (International Labour Office, 2002; African Union, 2008; Verick, 2008). Where South Africa is excluded, the percentage of non-agricultural informal sector employment rises to 78%. In Ghana for example, it is believed that almost 90% of the labour force come from the informal sector (African Union, 2008). It is also estimated that the informal sector accounts for over 60% of Gross National Income (GNI) in countries such as Nigeria and Tanzania (Schneider, 2002; Verick, 2008), with about 93% of all new jobs in SSA in the 1990s, coming from the informal sector. Considering that women dominate the informal sector, the extent of women's participation in the informal sector in the different countries could be used to explain sub-regional differentials in women's access to resources.[100]

[99] Summary statistics from the DHS data suggest that mean years of education and the ratio of women to men's years of education is (3.22 and 0.627) for West Africa (4.49 and 0.715) for East and Central Africa and (5.59 and 0.802) for Southern Africa (see Table AP1-15). In addition, the adult literacy rate for women aged 15+ suggest that Southern African countries have a higher percentage of women who are literate compared to West Africa and East and Central Africa (see Tables AP1-15 and AP1-16 of this Appendix).

[100] "In most developing countries, informal employment is said to be generally a larger source of employment for women than with formal employment and also a larger source of employment for women than for men. It is estimated that about 84% of women non-agricultural workers in SSA are informally employed compared to 63% of men. The figure for Latin America is 58% for women and 48% for men with Asia having 65% for both women and men (WEIGO, 2012).

A summary of International Labour Office (ILO) and WEIGO data in Table AP1-17, suggest that, with the exception of Zambia, West African countries have a higher percentage of women in non-agricultural employment in the informal sector compared to East and Central Africa and Southern Africa. In addition, some of the lowest gender parity in non-agricultural employment in the informal sector is within Southern Africa (Mauritius, South Africa and Lesotho- see Table AP1-17). A summary of employment figures from the DHS datasets, also suggest a higher level of women's participation in the informal sector in West Africa (see Table AP1-15). The data suggest that whiles a higher percentage of women from Southern African countries are not paid for their work- 37.5% in Southern Africa compared to 27.8% in West Africa, a higher percentage of women in West Africa (51.1%) receive cash compared to 46.2% in Southern Africa. Juxtaposing these statistics on the fact that the use of cash is predominant in the informal sector, this could be a confirmation that women in West Africa are dominant in the informal sector compared to their counterpart from Southern Africa and East and Central Africa. The foregoing discussion may explain why women in West Africa, though with relatively lower levels of literacy have a higher score on the access to resources index compared to their East and Central African and Southern African neighbours.

7.0 Conclusion and Limitations

The systematic procedure adopted in the computation of the composite and sub-indices to a large extent assures us of the robustness of our indices. In addition, the correlation between the CWEI and the Smith index, SIGI and GII suggest that the CWEI captures some aspect of women's empowerment that the Smith Index, SIGI and GII do not capture. This perhaps, confirms the argument that existing indices on women's empowerment only capture some aspect of women's empowerment. The strength of the CWEI lies in the fact that it captures both economic (women's access to resources) and issues bordering on the broader context of norms (social norms/informal institutions) as discussed in Chapter 3.

There may be limitations with the current index that needs to be noted. The input variables used for computing the sub-indices are mainly proxies. This implies the possibility of such variables not capturing exactly the underlying concept being espoused. It is possible that questions that are directly related to social traditions, codes, values, norms, beliefs etc will produce an index that is more representative of women's empowerment compared to the current index. Thus, huge surveys such as the DHS could consider including questions that are directly related to traditional values and norms in societies. The use of equal weights for the different dimensions in the process of aggregation could also mean some form of bias in the resulting composite index. As already indicated, a form of focused group discussion would have been important in establishing appropriate weights for the different dimensions. However, several constraints could not make that possible. Notwithstanding the limitations identified, the systematic and robust procedure adopted in computing the index makes it reliable and good for the current purpose.

List of Tables to Appendix 1

Table AP1-1: Summary Statistics of Women's Empowerment Input Variables

Variables	Obs	Mean	SD	Measurement
Indicators for Family Decisions Index: Participation in Household Decision-Making in the Following Areas:				
Woman's Own Health	187,524	2.535	0.977	1=Someone Else, 2=Partner Alone, 3=Woman and Partner, 4=Woman Alone
Large HH Purchases	187,524	2.355	0.904	1=Someone Else, 2=Partner Alone, 3=Woman and Partner, 4=Woman Alone
Daily HH Purchases	187,524	2.630	1.058	1=Someone Else, 2=Partner Alone, 3=Woman and Partner, 4=Woman Alone
Family Visit	187,524	2.595	0.962	1=Someone Else, 2=Partner Alone, 3=Woman and Partner, 4=Woman Alone
Indicators for Violence Perception Index: Wife Beating is Justified if Woman				
Goes out No Permission	221,089	0.601	0.490	0=Yes, 1=No
Neglect the Child	221,089	0.589	0.492	0=Yes, 1=No
Argues with Husband	221,089	0.646	0.478	0=Yes, 1=No
Refuse Sex	221,089	0.679	0.467	0=Yes, 1=No
If She Burns Food	221,089	0.774	0.418	0=Yes, 1=No
Indicators for Autonomy Index: Does Women Find it to be a Big Problem for any of the Following				
Permission for Healthcare	234,680	0.810	0.393	0=Big Problem, 1=Not a Big Problem
Go for Healthcare Alone	234,680	0.688	0.463	0=Big Problem, 1=Not a Big Problem
Use Male Care Provider	234,680	0.732	0.443	0=Big Problem, 1=Not a Big Problem
Indicators for Societal Preferences Index				
Number of Wives	108,437	0.417	0.773	Continuous
Age at 1st Marriage	108,437	17.646	4.098	Continuous
Couple Age Difference	108,437	-21.732	14.468	Continuous
Indicators for Access to Economic Resources Index				
Couple Education Diff	119,261	-1.230	3.631	Continuous
Type of Earnings	119,261	2.679	1.313	1=Not Paid, 2=In-kind Only, 3=Cash and In-kind, 4=Cash
Is Woman Working	119,261	0.912	0.283	0=No, 1=Yes

Source: Author's Calculations via DHS Data

Table AP1-2 Correlation Matrix for Indicators of Family Decisions

	Household Decision-making on			
	Own Health	**Large Purchases**	**Small Purchases**	**Family Visits**
Woman's Own Health	1			
Large Household Purchase	0.613***	1		
Small Household Purchase	0.576***	0.719***	1	
Family Visits by Woman	0.576***	0.601***	0.605***	1

Source: Author's calculations. Note *** is significant at p<0.01. Observation= 187,524

Table AP1-3 Correlation Matrix for Indicators of Violence Perceptions

	Wife Beating Justified if Woman				
	No Permission	**Neglect child**	**Argues Partner**	**No Sex**	**Burns Food**
No Permission	1				
Neglect Child	0.88***	1			
Argues Partner	0.82***	0.824***	1		
No Sex	0.760***	0.727***	0.803***	1	
Burns Food	0.720***	0.753***	0.747***	0.753***	1

Source: Author's calculations. Note *** is significant at p<0.01. Observation= 221,089

Table AP1-4 Correlation Matrix for Indicators of Women's Autonomy

	Does the Woman Have a Problem with Any of the Following?		
	Permission to Seek Healthcare	**Seeking Healthcare Alone**	**No Female Healthcare Provider**
Permission to Seek Healthcare	1		
Seeking Healthcare Alone	0.712***	1	
No Female Healthcare Provider	0.729***	0.763***	1

Source: Author's calculations. Note *** is significant at p<0.01. Observation= 234,680

Table AP1-5 Correlation Matrix for Indicators of Societal Preferences

Variables	**Number of Wives**	**Age at First Marriage**	**Couple Age Differences**
Number of Wives	1		
Age at First Marriage	-0.082***	1	
Couple Age Differences	-0.233***	0.246***	1

Source: Author's calculations. Note *** is significant at p<0.01. Observation= 108,437

Table AP1-6: Correlation Matrix for Indicators of Woman's Access to Resources

Variables	**Couple Education Diff**	**Earnings Type**	**Woman Working**
Couple Education Diff	1		
Earnings Type	-0.015***	1	
Woman Working	-0.023***	0.069***	1

Source: Author's calculations. Note *** is significant at p<0.01. Observation= 119,261

Table AP1-7: Weights Comparison: Output from Polychoric and Standard PCA

Variables	Polychoric PCA			Standard PCA	
	Eigen Vectors	Scoring Weights		Eigen Vectors	Scoring Weights
Family Decisions On:					
Woman's Own Health	.487			0.4833	0.4833
Someone else		-0.8331			
Husb/Partner alone		-0.2996			
Woman/Partner		0.0441			
Woman Alone		0.4915			
Large Household Purchases	0.515			0.5175	0.5175
Someone else		-0.8417			
Husb/Partner alone		-0.2603			
Woman/Partner		0.1234			
Woman Alone		0.5805			
Small Household Purchases	0.512			0.5113	0.5113
Someone else		-0.8409			
Husb/Partner alone		-0.3260			
Woman/Partner		-0.0116			
Woman Alone		0.4680			
Family Visits by Woman	0.485			0.4869	0.4869
Someone else		-0.8294			
Husb/Partner alone		-0.3393			
Woman/Partner		0.0125			
Woman Alone		0.4956			
Variance of FPC	**79.43%**			**71.21%**	
Observations	**187,524**			**187,524**	
Wife Beating Justified if Woman					
Goes out without Permission	0.455			0.4640	0.4640
Yes		-0.4630			
No		0.2736			
Neglect the Child	0.455			0.4616	0.4616
Yes		-0.4529			
No		0.2814			
Argues with the Husband	0.456			0.4648	0.4648
Yes		-0.5021			
No		0.2459			
Refuses Sex	0.439			0.4377	0.4377
Yes		-0.5108			
No		0.2164			
Burns Food	0.431			0.4049	0.4049
Yes		-0.5981			
No		0.1531			
Variance of FPC	**82.33%**			**63.70%**	
Observations	**221,089**			**221,089**	
Does Woman Has a Problem					
Seeking Permission for Healthcare	0.570			0.5597	0.5597
Big Problem		-0.8204			
Not a big problem		0.1874			
Seeking Healthcare Alone	0.579			0.5817	0.5817
Big Problem		-0.6625			
Not a big problem		0.2934			
If there is no Female Health Provider	0.583			0.5902	0.5902
Big Problem		-0.7263			
Not a big problem		0.2566			

Variance of FPC	**82.31%**			**65.99%**	
Observations	**234,680**			**234,680**	
Societal Norms					
Number of Wives	-0.522	-0.5221		-0.5221	-0.5221
Age at First marriage	0.540	0.5399		0.5399	0.5399
Couple Age Diff	0.660	0.6602		0.6602	0.6602
Variance of FPC	**46.15%**			**46.15%**	
Observations	**108,437**			**108,437**	
Access to Resources					
Couple Education Diff	-0.052	-0.0524		-0.1295	-0.1295
Earnings Type	0.708			0.7101	0.7101
Not Paid		-1.0670			
In-kind Only		-0.6259			
In-kind & Cash		-0.4766			
Cash Only		0.3403			
Woman is Working	0.704			0.6920	0.6920
No		-1.4902			
Yes		0.0684			
Variance of FPC	**37.69**			**35.58**	
Observations	**119,261**			**119,261**	

Source: Author's Calculations Via DHS datasets

Table AP1-8: Correlation Coefficients Between Polychoric PCA and Standard PCA Indices

Indices	**Coefficients**	**P-Value**
Composite Women's Empowerment Index	0.994	0.000
Participation in Family Decisions	0.995	0.000
Perception of Violent Behaviour By Men	1.00	0.000
Women's Autonomy	0.999	0.000
Societal Preferences	1.00	0.000
Women's Economic Power	0.976	0.000

Source: Author's Calculations Via DHS datasets

Table AP1-9: Summary Statistics of Women Empowerment Indices

Indices	**Obs**	**Mean**	**SD**
Composite Women's Empowerment Index (A)	69,623	.4898	.1576
Composite Index of Social Norms (B)	102,783	.4743	.1761
Participation in Family Decisions (C)	187,524	.5245	.2669
Perception of Violent Behaviour by Men (D)	221,089	.6625	.3732
Women's Autonomy (E)	234,680	.7486	.3495
Societal Preferences (F)	108,437	.5253	.0649
Women's Economic Power (G)	119,261	.6829	.2270

Source: Author's Computation via DHS Data

Table AP1-10: Comparison of Composite Women's Empowerment Index with the SIGI and Gender Inequality Index

Countries	Empowerment		SIGI		GII	
	Rank	**Value**	**Rank**	**Value**	**Rank**	**Value**
Swaziland	1	0.68378	6	0.84345	3	0.454
Namibia	2	0.61595	1	0.92498	2	0.534
Ghana	3	0.59365	4	0.88731	9	0.402
Rwanda	4	0.55861	8	0.83141	1	0.547
Zimbabwe	5	0.55675	10	0.813	6	0.417
Malawi	6	0.55272	5	0.85677	7	0.406
Nigeria	7	0.53410	15	0.78009	NDA	NDA
Zambia	8	0.51657	14	0.78061	11	0.373
Mozambique	9	0.50563	12	0.800046	10	0.398
Tanzania	10	0.48488	3	0.88756	NDA	NDA
Uganda	11	0.48141	11	0.81282	5	0.423
Senegal	12	0.47477	2	0.88959	4	0.434
DRC	13	0.46396	NDA	NDA	14	0.29
Niger	14	0.46030	9	0.82441	16	0.276
Mali	15	0.44847	18	0.66051	15	0.288
Sierra Leone	16	0.44841	19	0.65755	13	0.338
Burkina Faso	17	0.41602	7	0.83839	8	0.404
Ethiopia	18	0.39760	17	0.76675	NDA	NDA
Cameroon	19	0.36951	13	0.78349	12	0.361
Guinea	20	0.28252	16	0.77197	NDA	NDA

Source: Author's calculations via DHS data. The SIGI and the GII used in this table are the 2009 and 2011 versions respectively.[101]

[101] Note that the values of the SIGI index also lies between 0 and 1 with values closer to 0 indicating more empowerment. To make this consistent with the CWEI index, we subtract the original country values of the SIGI from 1, so that values closer to 1 will mean a higher level of women's empowerment compared to values closer to 0.

Table AP1-11: Country Rankings of the Composite Women's Empowerment Index and its Sub-Indices

Countries	Empowerment		Family Decisions		Violence		Autonomy		Societal Norms		Access to Resources	
	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value
Swaziland	1	0.68378	4	0.67988	2	0.91301	1	0.92979	3	0.56363	1	0.84455
Namibia	2	0.61595	1	0.71017	3	0.81357	12	0.82178	1	0.59550	8	0.72743
Ghana	3	0.59365	5	0.67467	5	0.80139	10	0.83403	4	0.55346	2	0.80053
Rwanda	4	0.55861	12	0.53272	4	0.81344	2	0.90623	2	0.57220	20	0.55370
Zimbabwe	5	0.55675	2	0.68938	6	0.74281	5	0.86141	5	0.55058	10	0.71096
Malawi	6	0.55272	8	0.59665	1	0.94149	16	0.78825	7	0.54822	18	0.60601
Nigeria	7	0.53410	11	0.54445	8	0.71416	13	0.82023	14	0.51773	3	0.77745
Zambia	8	0.51657	3	0.68037	11	0.60124	7	0.84615	6	0.54924	11	0.69886
Mozambique	9	0.50563	10	0.55578	9	0.68125	3	0.89033	11	0.53580	14	0.63188
Tanzania	10	0.48488	14	0.51037	10	0.65098	4	0.86801	10	0.54054	17	0.60793
Uganda	11	0.48141	7	0.63477	12	0.58731	9	0.83702	9	0.54158	13	0.65430
Senegal	12	0.47477	20	0.32634	15	0.53611	6	0.85263	16	0.50521	9	0.72160
DRC	13	0.46396	13	0.51341	14	0.53624	15	0.79557	8	0.54627	12	0.68668
Niger	14	0.46030	17	0.44201	18	0.49160	11	0.83085	19	0.48670	7	0.73206
Mali	15	0.44847	18	0.43704	16	0.53115	17	0.78700	17	0.50180	4	0.76828
Sierra Leone	16	0.44841	9	0.59121	13	0.55745	8	0.83744	15	0.51451	19	0.58023
Burkina Faso	17	0.41602	19	0.42185	17	0.51840	14	0.81247	18	0.50105	16	0.61945
Ethiopia	18	0.39760	6	0.66685	19	0.48262	18	0.50716	12	0.52794	15	0.62195
Cameroon	19	0.36951	16	0.46996	7	0.71664	19	-1.29E-08	13	0.52158	6	0.74121
Guinea	20	0.28252	15	0.49772	20	0.36351	20	-1.29E-08	20	0.46623	5	0.74517

Source: Author's calculations based on DHS Data

Table AP1-12: Percentage Distribution of Woman's Participation in Family Decision-making

Countries	**Women's Participation in the Following Decision-making Areas in %**															
	Own Health				**Large Household Purchases**				**Daily Household Purchases**				**Family Visits**			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Ghana	0.44	32.22	43.53	23.81	0.75	39.32	40.31	19.63	0.78	20.26	34.02	44.94	0.58	17.15	58.97	23.30
Burkina Faso	23.48	58.84	7.42	10.25	24.07	54.86	9.79	11.27	23.19	44.07	10.18	22.55	22.04	47.89	11.97	18.10
Cameroon	27.00	39.06	11.32	22.63	30.81	36.17	16.09	16.93	28.78	26.16	15.54	29.52	24.37	29.31	18.68	27.64
Dem Rep. Congo	21.00	38.08	12.26	28.66	23.83	35.59	20.23	20.35	23.63	26.87	17.25	32.25	19.97	35.13	18.61	26.30
Ethiopia	0.51	32.62	48.06	18.81	0.59	40.19	41.86	17.36	0.59	17.33	26.90	55.17	0.38	21.37	65.67	12.59
Guinea	17.32	41.65	23.32	17.71	18.89	39.22	26.60	15.29	18.76	33.02	29.03	19.18	17.80	34.11	31.27	16.81
Malawi	0.51	45.10	37.55	16.83	0.53	69.75	20.98	8.74	0.68	46.54	17.86	34.92	0.62	32.60	42.15	24.63
Mali	18.97	63.33	5.33	12.36	20.23	60.25	6.77	12.75	19.84	53.39	7.54	19.23	18.44	51.05	7.60	22.90
Mozambique	18.61	22.71	13.29	45.39	23.99	38.88	21.31	15.82	23.11	23.00	13.98	39.91	19.53	23.04	27.28	30.16
Namibia	0.14	16.87	40.21	42.78	0.37	24.28	52.15	23.21	0.34	18.70	40.62	40.34	0.34	21.89	54.14	23.64
Niger	15.65	57.66	6.49	20.19	18.16	64.85	5.40	11.58	17.20	61.55	6.73	14.53	15.93	57.53	8.32	18.22
Nigeria	0.29	57.38	33.67	8.67	0.26	62.38	31.96	5.41	0.27	51.76	32.93	15.04	0.21	45.76	43.70	10.33
Sierra Leone	0.57	48.00	39.44	11.99	0.57	49.87	39.15	10.42	0.74	36.11	37.41	25.74	0.23	38.85	47.02	13.90
Rwanda	28.49	18.95	15.92	36.64	32.84	20.07	18.03	18.03	32.69	15.44	16.09	35.77	27.21	11.68	24.38	36.74
Senegal	34.85	47.68	4.12	13.34	44.37	42.52	5.65	7.45	45.38	35.16	6.29	13.18	37.93	35.74	10.18	16.14
Swaziland	0.99	29.27	32.84	36.90	0.94	35.81	43.44	19.81	1.19	16.76	24.27	57.79	0.89	46.00	31.89	21.21
Tanzania	18.51	27.71	10.70	43.08	24.82	44.37	14.67	16.14	24.34	35.32	13.00	27.34	20.91	32.43	23.98	22.68
Uganda	0.49	37.62	39.08	22.82	0.36	48.07	35.48	16.09	0.41	32.70	29.65	37.24	0.19	35.42	43.06	21.34
Zambia	0.79	32.39	35.88	30.94	0.42	41.95	44.16	13.47	0.30	18.95	19.88	60.86	0.16	31.51	44.85	23.48
Zimbabwe	2.26	16.80	59.02	21.92	2.76	8.64	63.64	24.97	3.19	10.56	52.16	34.10	2.62	9.34	72.68	15.35

Source: Author's calculations based on DHS Dataset. Note: 1 is Someone else, 2 is Husband/Partner alone, 3 is Woman and Husband/Partner and 4 is Woman alone

Table AP1-13: Percentage Distribution of Women's Perception on Wife Beating and Autonomy to Seek Healthcare

Countries	**Wife beating is justified if the wife does any of the following:**										**Is it a big problem getting medical help on the following?**					
	No Permission		**Neglect Child**		**Argues Husban**		**Refuses Sex**		**Burns Food**		**Permission**		**Go Alone**		**Female Provider**	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**BP**	**NBP**	**BP**	**NBP**	**BP**	**NBP**
Ghana	24.18	75.82	28.66	71.34	22.44	77.56	14.51	85.49	9.55	90.45	8.38	91.62	19.98	80.02	21.84	78.16
Burkina Faso	55.96	44.04	58.65	41.35	57.47	42.53	40.00	60.00	27.12	72.88	15.83	84.17	25.15	74.85	15.54	84.46
Cameroon	33.29	66.71	45.46	54.54	26.36	73.64	19.94	80.06	18.05	81.95	86.61	13.39	75.78	24.22	84.30	15.70
DRC	54.93	45.07	57.20	42.80	49.49	50.51	41.85	58.15	28.75	71.25	21.18	78.82	26.05	73.95	14.24	85.76
Ethiopia	57.84	42.16	59.47	40.53	51.87	48.13	39.45	60.55	50.34	49.66	28.49	71.51	54.56	45.44	65.43	34.57
Guinea	76.61	23.39	73.91	26.09	61.91	38.09	66.52	33.48	39.60	60.40	85.97	14.03	76.17	23.83	84.43	15.57
Malawi	5.69	94.31	7.34	92.66	5.59	94.41	6.25	93.75	4.70	95.30	11.18	88.82	31.10	68.90	21.79	78.21
Mali	58.85	41.15	50.54	49.46	48.87	51.13	56.27	43.73	21.63	78.37	18.99	81.01	24.13	75.87	20.85	79.15
Mozambique	35.17	64.83	37.03	62.97	32.41	67.59	32.83	67.17	22.15	77.85	7.04	92.96	17.49	82.51	8.62	91.38
Namibia	21.64	78.36	29.35	70.65	17.76	82.24	13.43	86.57	13.73	86.27	10.28	89.72	26.53	73.47	17.13	82.87
Niger	56.15	43.85	51.11	48.89	46.77	53.23	58.09	41.91	42.63	57.37	9.37	90.63	25.40	74.60	16.40	83.60
Nigeria	35.21	64.79	33.19	66.81	29.40	70.60	28.19	71.81	17.90	82.10	14.38	85.62	19.30	80.70	20.50	79.50
Sierra Leone	50.65	49.35	51.30	48.70	55.13	44.87	39.45	60.55	24.63	75.37	7.95	92.05	19.81	80.19	21.31	78.69
Rwanda	25.66	74.34	40.96	59.04	6.68	93.32	14.35	85.65	10.28	89.72	3.19	96.81	16.53	83.47	8.74	91.26
Senegal	54.00	46.00	51.80	48.20	53.13	46.87	50.16	49.84	24.67	75.33	5.82	94.18	18.62	81.38	20.11	79.89
Swaziland	9.61	90.39	11.35	88.65	17.89	82.11	3.54	96.46	3.02	96.98	1.93	98.07	11.35	88.65	8.03	91.97
Tanzania	41.59	58.41	43.97	56.03	43.35	56.65	28.86	71.14	18.38	81.62	5.57	94.43	25.39	74.61	9.20	90.80
Uganda	52.88	47.12	57.20	42.80	41.10	58.90	31.86	68.14	24.63	75.37	7.73	92.27	25.60	74.40	16.04	83.96
Zambia	43.46	56.54	43.91	56.09	42.67	57.33	37.96	62.04	32.93	67.07	4.09	95.91	25.23	74.77	17.42	82.58
Zimbabwe	33.51	66.49	31.52	68.48	26.89	73.11	24.85	75.15	12.92	87.08	6.78	93.22	24.41	75.59	10.90	89.10

Source: Author's calculations based on DHS Dataset

Table AP1-14: Mean and Percentage Distribution of Indicators of Societal Preferences and Women's Access to Resources

Countries	**Societal Preferences**				**Women's Economic Power**					
	Couple Age Diff	**Number of Wives**	**Age @ 1st Marriage**	**Couple Educ Diff**	**Is Woman Working**		**Type of Earnings for Women**			
	Mean	**Mean**	**Mean**	**Mean**	**No**	**Yes**	**Not Paid**	**In-kind**	**Cash & In-kind**	**Cash Only**
Ghana	-17.077	0.258	18.995	-2.155	24.80	75.20	14.23	4.52	21.38	59.87
Burkina Faso	-25.847	0.776	17.396	-0.155	13.54	86.46	53.78	17.59	4.65	23.99
Cameroon	-22.210	0.465	17.468	-1.471	40.87	59.13	11.16	13.73	30.67	44.44
DRC	-17.494	0.276	18.187	-3.145	38.03	61.97	20.99	11.49	35.90	31.61
Ethiopia	-20.506	0.180	16.275	-1.198	70.54	29.46	37.68	6.59	5.05	50.68
Guinea	-29.225	1.231	16.217	-1.254	22.07	77.93	12.72	14.74	27.92	44.63
Malawi	-15.497	0.176	17.392	-1.765	43.21	56.79	46.62	2.90	9.90	40.59
Mali	-27.473	0.459	16.563	-0.559	42.47	57.53	13.92	11.81	19.19	55.08
Mozambique	-17.206	0.366	17.236	-1.729	29.71	70.29	41.01	29.19	6.23	23.56
Namibia	-13.379	0.085	22.549	0.089	56.88	43.12	28.95	1.59	3.01	66.45
Niger	-26.693	0.758	15.769	-0.417	60.60	39.40	19.13	7.88	9.88	63.11
Nigeria	-24.212	0.448	17.541	-1.412	41.30	58.70	20.43	2.36	12.81	64.40
Sierra Leone	-24.922	0.450	17.325	-1.470	29.49	70.51	69.18	3.58	5.78	21.46
Rwanda	-12.761	0.240	20.032	-0.455	35.88	64.12	54.98	12.00	16.32	16.71
Senegal	-27.529	0.526	17.475	-0.060	64.19	35.81	19.08	4.50	7.46	68.96
Swaziland	-18.135	0.322	21.149	-0.224	59.18	40.82	3.72	1.12	3.63	91.52
Tanzania	-18.483	0.316	18.035	-0.979	25.61	74.39	59.47	6.74	5.50	28.29
Uganda	-15.421	0.416	17.478	-2.240	19.41	80.59	29.81	17.69	30.38	22.11
Zambia	-16.656	0.162	17.909	-1.929	51.54	48.46	32.44	2.52	10.15	54.88
Zimbabwe	-17.761	0.187	18.643	-0.853	63.29	36.71	24.66	2.03	10.48	62.83

Source: Author's calculations based on DHS Dataset

Table AP1-15: Sub-Regional Comparison on Education and Earnings

Statistics	West Africa	East & Central Africa	Southern Africa
Mean years of women's education	3.22	4.49	5.59
Mean couple education differences	-0.866	-1.536	-1.405
Ratio of women to men's education	0.627	0.715	0.802
Earnings Type			
% Not paid	27.8	37.03	37.45
% In-kind only	8.1	11.53	8.32
% Cash and In-kind	12.98	20.76	7.96
% Cash only	51.14	30.67	46.27

Source: Author's calculations based on DHS Dataset.

Table AP1-16: Female Adult Literacy Rates and Gender Parity in SSA (2010)

Countries	Literacy Rates	Gender Parity Rates
DRC	57	0.7
Ghana	61.2	0.8
Guinea	30	0.6
Malawi	68.5	0.8
Mali	20.3	0.5
Mozambique	42.8	0.6
Namibia	88.5	1
Nigeria	50.4	0.7
Rwanda	67.5	0.9
Senegal (2009)	38.7	0.6
Sierra Leone	31.4	0.6
Swaziland	86.8	1
Tanzania	67.5	0.9
Uganda	64.6	0.8
Zambia	61.7	0.8
Zimbabwe	89.9	0.9

Source: From the World Development Indicators Database (World Bank, 2012)

Table AP1-17: Employment in the Informal Sector as a Percentage of Non-Agricultural Employment

Countries	Gender Segregated Percentages		
	Men	Women	Gender Parity
Cote de' Iviore - 2008	60.5	82.8	1.37
Urban Ethiopia- 2004	36.3	47.9	1.32
Lesotho- 2008	49.9	48.1	0.96
Liberia- 2010	33.4	65.7	1.97
Madagascar- 2005	40.7	63.8	1.57
Mali- 2004	62.9	79.6	1.27
Mauritius- 2009	13.9	8.2	0.59
South Africa- 2010	18.6	16.8	0.90
Tanzania- 2005-06	53.2	49.8	0.94
Uganda- 2010	57.9	62.5	1.07
Zambia- 2008	60.9	70.3	1.15
Zimbabwe- 2004	31.2	53.1	1.70
Namibia- 2008	41.1	47	1.14

Source: ILO and WEIGO

Table AP1-18: Determinants of Women's Empowerment

Variables	Composite Index		Family Decisions		Partner Violence		Autonomy		Societal Preferences		Access to Resources	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**
Woman's Age	0.007	[0.000]***	0.013	[0.000]***	0.004	[0.001]***	0.007	[0.001]***	0.005	[0.000]***	0.006	[0.001]***
Woman Age Sq	-0.000	[0.000]***	-0.000	[0.000]***	-0.000	[0.000]**	-0.000	[0.000]***	-0.000	[0.000]***	-0.000	[0.000]***
Non Christian	-0.009	[0.001]***	-0.022	[0.001]***	-0.013	[0.002]***	-0.017	[0.002]***	-0.011	[0.000]***	0.021	[0.002]***
Women's Education												
Primary Educ	0.013	[0.002]***	0.021	[0.002]***	0.003	[0.004]	0.031	[0.002]***	0.013	[0.001]***	-0.005	[0.002]**
Secondary Educ	0.049	[0.002]***	0.034	[0.002]***	0.082	[0.004]***	0.057	[0.003]***	0.033	[0.001]***	0.001	[0.003]
Tertiary Educ	0.095	[0.003]***	0.059	[0.003]***	0.161	[0.006]***	0.073	[0.004]***	0.060	[0.001]***	0.037	[0.004]***
Wealth Quintiles												
Poorest	0.028	[0.002]***	0.060	[0.003]***	0.004	[0.004]	0.006	[0.002]**	-0.002	[0.001]***	0.011	[0.002]***
Poorer	0.012	[0.002]***	0.007	[0.002]***	0.001	[0.004]	0.025	[0.003]***	-0.001	[0.001]**	0.020	[0.003]***
Middle	0.018	[0.002]***	0.010	[0.002]***	0.004	[0.004]	0.038	[0.003]***	-0.003	[0.001]***	0.030	[0.003]***
Richer	0.039	[0.002]***	0.011	[0.002]***	0.025	[0.004]***	0.054	[0.003]***	-0.005	[0.001]***	0.074	[0.003]***
Richest	0.073	[0.002]***	0.016	[0.003]***	0.071	[0.005]***	0.073	[0.004]***	-0.002	[0.001]**	0.130	[0.003]***
Rural Residence	-0.035	[0.002]***	-0.007	[0.002]***	-0.021	[0.004]***	-0.031	[0.003]***	-0.002	[0.001]***	-0.059	[0.002]***
NSCP Monogamy	0.058	[0.004]***	0.037	[0.004]***	0.135	[0.010]***	0.014	[0.006]**	0.059	[0.001]***	0.028	[0.005]***
NSCD Gender	0.012	[0.002]***	0.013	[0.002]***	-0.002	[0.005]	0.026	[0.003]***	0.003	[0.001]***	0.006	[0.003]**
NSCD Gender Death	0.019	[0.004]***	-0.003	[0.004]	0.009	[0.008]	0.019	[0.006]***	0.002	[0.001]	0.014	[0.005]***
Country FE	**Yes**		**Yes**		**Yes**		**Yes**		**Yes**		**Yes**	
Constant	0.393	[0.009]***	0.373	[0.009]***	0.599	[0.018]***	0.681	[0.014]***	0.420	[0.003]***	0.634	[0.012]***
Observations	62673		97428		94533		97869		96422		66989	
R^2	0.354		0.209		0.164		0.418		0.298		0.236	
Adj. R^2	0.354		0.209		0.164		0.417		0.297		0.236	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Country fixed effects are controlled for but not report. Reported standard errors are based on a cluster robust covariance matrix. Note NSCP Monogamy is non-self cluster proportion on monogamous marriages; NSCD Gender is non-self difference in preference for girl or boy child; NSCD Gender Death is non-self cluster differences in deaths among boys and girls. Note that the difference is in favour of the female child.

APPENDIX 2

ESTIMATIONS BASED ON HEALTH EXPENDTURE AND GNI PER CAPITA

Table AP2-1: Effect of Composite Women's Empowerment index on Child Health Status

Variables	Health Expenditure/Capita				GNI/Capita			
	HAZ		WHZ		HAZ		WHZ	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**
Comp Empowerment Index	0.077	[0.064]	0.295	[0.065]***	0.103	[0.064]	0.295	[0.066]***
Child Age (months)								
12-23	-1.222	[0.024]***	-0.132	[0.023]***	-1.221	[0.024]***	-0.131	[0.023]***
24-35	-1.533	[0.029]***	0.114	[0.024]***	-1.533	[0.029]***	0.114	[0.024]***
36-47	-1.584	[0.033]***	0.246	[0.027]***	-1.583	[0.033]***	0.246	[0.027]***
48-49	-1.288	[0.035]***	0.158	[0.029]***	-1.287	[0.035]***	0.157	[0.029]***
Female Child	0.262	[0.017]***	0.041	[0.016]**	0.263	[0.017]***	0.041	[0.016]**
Size at Birth								
Average and Above	0.321	[0.025]***	0.239	[0.026]***	0.320	[0.025]***	0.239	[0.026]***
Very Large	0.512	[0.036]***	0.374	[0.029]***	0.516	[0.036]***	0.374	[0.029]***
Woman's Education								
Primary	-0.003	[0.025]	0.270	[0.019]***	-0.004	[0.025]	0.269	[0.019]***
Secondary	0.126	[0.035]***	0.261	[0.032]***	0.139	[0.034]***	0.256	[0.032]***
Tertiary	0.256	[0.070]***	0.385	[0.067]***	0.270	[0.070]***	0.375	[0.067]***
Partner's Education								
Primary	-0.040	[0.024]*	0.311	[0.024]***	-0.048	[0.024]**	0.312	[0.024]***
Secondary	0.028	[0.031]	0.229	[0.029]***	0.033	[0.031]	0.228	[0.029]***
Tertiary	-0.048	[0.057]	0.308	[0.049]***	-0.044	[0.057]	0.307	[0.049]***
Woman's Height	0.039	[0.002]***	-0.004	[0.001]***	0.040	[0.002]***	-0.004	[0.001]***
Age at First Birth	-0.001	[0.003]	-0.003	[0.002]	-0.001	[0.003]	-0.003	[0.002]
Female Household Head	0.045	[0.030]	-0.003	[0.025]	0.045	[0.030]	-0.004	[0.025]
No. of Children in HH	-0.043	[0.010]***	-0.048	[0.009]***	-0.043	[0.010]***	-0.048	[0.009]***
No. of Women in HH	0.025	[0.010]**	0.003	[0.009]	0.025	[0.010]**	0.002	[0.009]
Wealth Index	0.201	[0.015]***	-0.015	[0.014]	0.194	[0.015]***	-0.012	[0.014]
NSCPH- Pipe Water	0.013	[0.071]	0.080	[0.058]	0.019	[0.071]	0.079	[0.058]
NSCPH- Flush Toilet	-0.189	[0.124]	-0.003	[0.110]	-0.166	[0.124]	0.000	[0.110]
NSCPW- Antenatal Visits	0.205	[0.034]***	0.158	[0.032]***	0.213	[0.035]***	0.152	[0.033]***
NSCPW- Health Fac Deliv	0.198	[0.035]***	0.016	[0.034]	0.195	[0.035]***	0.019	[0.034]
Rural Residence	-0.068	[0.029]**	0.035	[0.028]	-0.070	[0.029]**	0.038	[0.028]
Log Health Exp/Capita	0.146	[0.018]***	0.015	[0.015]				
Log GNI/Capita					0.124	[0.021]***	0.035	[0.016]**
Constant	-7.728	[0.260]***	-0.401	[0.194]**	-8.048	[0.279]***	-0.539	[0.208]***
Observations	37086		36987		37086		36987	
R^2	0.181		0.053		0.180		0.053	
Adj. R^2	0.180		0.052		0.180		0.052	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Country fixed effects are controlled for but not report. Reported standard errors are based on a cluster robust covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women.

Table AP2-2: Effect of Social Norms and Access to Resources Index on Child Health Status

Variables	Health Expenditure/Capita				GNI/Capita			
	HAZ		WHZ		HAZ		WHZ	
	Beta	SE	Beta	SE	Beta	SE	Beta	SE
Social Norms Index	0.000	[0.053]	0.311	[0.054]***	0.019	[0.053]	0.316	[0.054]***
Economic Power Index	0.259	[0.051]***	-0.258	[0.049]***	0.268	[0.051]***	-0.270	[0.048]***
Child Age (months)								
12-23	-1.222	[0.024]***	-0.131	[0.022]***	-1.222	[0.024]***	-0.130	[0.022]***
24-35	-1.535	[0.029]***	0.117	[0.024]***	-1.535	[0.029]***	0.117	[0.024]***
36-47	-1.584	[0.033]***	0.247	[0.027]***	-1.583	[0.033]***	0.247	[0.027]***
48-49	-1.290	[0.035]***	0.162	[0.029]***	-1.290	[0.035]***	0.161	[0.029]***
Female Child	0.263	[0.017]***	0.041	[0.016]**	0.263	[0.017]***	0.041	[0.016]**
Size at Birth								
Average and Above	0.322	[0.025]***	0.238	[0.026]***	0.321	[0.025]***	0.238	[0.026]***
Very Large	0.509	[0.036]***	0.379	[0.029]***	0.513	[0.036]***	0.379	[0.029]***
Woman's Education								
Primary	0.014	[0.025]	0.246	[0.019]***	0.014	[0.025]	0.244	[0.019]***
Secondary	0.152	[0.034]***	0.227	[0.031]***	0.165	[0.034]***	0.219	[0.031]***
Tertiary	0.288	[0.070]***	0.342	[0.067]***	0.304	[0.070]***	0.326	[0.067]***
Partner's Education								
Primary	-0.044	[0.024]*	0.316	[0.024]***	-0.051	[0.024]**	0.317	[0.024]***
Secondary	0.006	[0.031]	0.260	[0.029]***	0.011	[0.031]	0.261	[0.029]***
Tertiary	-0.081	[0.056]	0.355	[0.049]***	-0.077	[0.056]	0.356	[0.049]***
Woman's Height	0.039	[0.001]***	-0.003	[0.001]***	0.039	[0.002]***	-0.004	[0.001]***
Age at First Birth	0.000	[0.003]	-0.004	[0.002]	0.000	[0.003]	-0.004	[0.002]
Female Household Head	0.047	[0.030]	-0.005	[0.025]	0.047	[0.030]	-0.006	[0.025]
No. of Children in HH	-0.044	[0.010]***	-0.047	[0.009]***	-0.044	[0.010]***	-0.047	[0.009]***
No. of Women in HH	0.025	[0.010]**	0.004	[0.009]	0.025	[0.010]**	0.002	[0.009]
Wealth Index	0.193	[0.015]***	-0.005	[0.014]	0.187	[0.015]***	-0.001	[0.014]
NSCPH- Pipe Water	0.017	[0.071]	0.076	[0.059]	0.023	[0.071]	0.076	[0.059]
NSCPH- Flush Toilet	-0.183	[0.124]	-0.012	[0.110]	-0.162	[0.124]	-0.006	[0.110]
NSCPW- Antenatal Visits	0.203	[0.034]***	0.161	[0.033]***	0.212	[0.035]***	0.153	[0.033]***
NSCPW- Health Fac Deliv	0.200	[0.035]***	0.014	[0.034]	0.196	[0.035]***	0.018	[0.034]
Rural Residence	-0.054	[0.030]*	0.015	[0.028]	-0.056	[0.030]*	0.018	[0.028]
Log Health Exp/Capita	0.136	[0.018]***	0.029	[0.015]*				
Log GNI/Capita					0.110	[0.021]***	0.055	[0.016]***
Constant	-7.820	[0.259]***	-0.297	[0.194]	-8.095	[0.278]***	-0.498	[0.207]**
Observations	37086		36987		37086		36987	
R^2	0.181		0.054		0.181		0.054	
Adj. R^2	0.181		0.053		0.180		0.053	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Country fixed effects are controlled for but not report. Reported standard errors are based on a cluster robust covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women.

Table AP2-3: Effect of Composite Women's Empowerment Index on Women's Health Status – Based on Health Expenditure per Capita

Variables	**Health Facility Delivery**		**4+ Antenatal Visits**		**Modern Contraceptive**		**Women's BMI**	
	Beat	**SE**	**Beat**	**SE**	**Beat**	**SE**	**Beat**	**SE**
Comp Empowerment Index	0.204	[0.021]***	0.081	[0.027]***	0.166	[0.015]***	1.262	[0.139]***
Woman's Age in Years	0.012	[0.004]***	0.019	[0.003]***	-0.004	[0.002]	0.062	[0.021]***
Woman's Age in Years Sq	-0.000	[0.000]***	-0.000	[0.000]***	0.000	[0.000]	-0.000	[0.000]
Birth Order								
2nd Order Birth	-0.102	[0.010]***	-0.038	[0.011]***	0.041	[0.008]***	0.227	[0.051]***
3rd Order Birth	-0.124	[0.011]***	-0.068	[0.010]***	0.043	[0.007]***	0.485	[0.066]***
4th Order Birth	-0.187	[0.013]***	-0.101	[0.012]***	0.048	[0.007]***	0.521	[0.071]***
Woman's Education								
Primary	0.107	[0.008]***	0.074	[0.008]***	0.090	[0.006]***	0.455	[0.041]***
Secondary	0.192	[0.010]***	0.147	[0.010]***	0.120	[0.009]***	0.774	[0.078]***
Tertiary	0.285	[0.026]***	0.235	[0.022]***	0.111	[0.017]***	1.174	[0.169]***
Partner's Education								
Primary	0.050	[0.008]***	0.138	[0.007]***	0.086	[0.007]***	0.290	[0.046]***
Secondary	0.091	[0.009]***	0.174	[0.010]***	0.078	[0.008]***	0.274	[0.064]***
Tertiary	0.033	[0.016]**	0.239	[0.015]***	0.041	[0.012]***	0.376	[0.111]***
No. of Adult women in HH	0.013	[0.003]***	-0.015	[0.003]***	-0.005	[0.002]***	-0.050	[0.019]***
Sex of Head of Household	0.045	[0.008]***	0.035	[0.009]***	-0.005	[0.005]	0.275	[0.055]***
Age of Head of Household	0.001	[0.000]***	0.001	[0.000]***	-0.001	[0.000]***	0.004	[0.002]***
Wealth Index	0.138	[0.005]***	0.045	[0.005]***	0.039	[0.003]***	1.036	[0.034]***
NSCPW- Family Planning Wker	0.455	[0.034]***	0.097	[0.037]***	0.250	[0.024]***	-0.135	[0.196]
NSCPC- Fully Vaccinated	0.642	[0.019]***	0.397	[0.018]***	0.119	[0.012]***	0.272	[0.103]***
NSCPH- Pipe Water	0.136	[0.026]***	0.129	[0.024]***	-0.038	[0.015]**	0.041	[0.150]
NSCPH- Flush Toilet	-0.081	[0.037]**	-0.001	[0.040]	0.037	[0.022]*	0.030	[0.244]
Rural Residence	-0.167	[0.008]***	-0.077	[0.008]***	-0.015	[0.005]***	-0.381	[0.056]***
Non Christian	-0.034	[0.006]***	-0.001	[0.006]	-0.042	[0.005]***		
Log Health Exp/Capita	-0.006	[0.010]	0.142	[0.006]***	0.043	[0.005]***	0.932	[0.043]***
Woman is Pregnant							0.940	[0.050]***
Observations	42966		41705		43012		42944	
R^2							0.174	
pseudo R^2	0.228		0.138		0.128			

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Reported standard errors are based on a cluster robust covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women and NSCPC is non-self cluster proportion of children.

Table AP2-4: Effect of Composite Women's Empowerment Index on Women's Health Status – Based on GNI per Capita

Variables	**Health Facility Delivery**		**4+ Antenatal Visits**		**Modern Contraceptive**		**Women's BMI**	
	Beat	**SE**	**Beat**	**SE**	**Beat**	**SE**	**Beat**	**SE**
Comp Empowerment Index	0.203	[0.021]***	0.098	[0.025]***	0.174	[0.015]***	1.376	[0.139]***
Woman's Age in Years	0.012	[0.004]***	0.020	[0.003]***	-0.003	[0.002]	0.064	[0.021]***
Woman's Age in Years Sq	-0.000	[0.000]***	-0.000	[0.000]***	0.000	[0.000]	-0.000	[0.000]
Birth Order								
2nd Order Birth	-0.102	[0.010]***	-0.038	[0.011]***	0.041	[0.008]***	0.221	[0.051]***
3rd Order Birth	-0.124	[0.011]***	-0.069	[0.011]***	0.042	[0.007]***	0.477	[0.066]***
4th Order Birth	-0.187	[0.013]***	-0.102	[0.012]***	0.047	[0.007]***	0.510	[0.071]***
Woman's Education								
Primary	0.107	[0.008]***	0.071	[0.008]***	0.090	[0.006]***	0.445	[0.041]***
Secondary	0.193	[0.010]***	0.148	[0.011]***	0.126	[0.009]***	0.788	[0.078]***
Tertiary	0.286	[0.026]***	0.231	[0.023]***	0.120	[0.017]***	1.153	[0.168]***
Partner's Education								
Primary	0.050	[0.008]***	0.132	[0.007]***	0.084	[0.007]***	0.260	[0.047]***
Secondary	0.091	[0.009]***	0.177	[0.010]***	0.081	[0.008]***	0.301	[0.064]***
Tertiary	0.034	[0.016]**	0.240	[0.015]***	0.044	[0.012]***	0.391	[0.111]***
No. of Adult women in HH	0.013	[0.003]***	-0.017	[0.003]***	-0.005	[0.002]***	-0.061	[0.019]***
Sex of Head of Household	0.045	[0.008]***	0.034	[0.009]***	-0.003	[0.005]	0.271	[0.055]***
Age of Head of Household	0.001	[0.000]***	0.001	[0.000]***	-0.001	[0.000]***	0.004	[0.002]**
Wealth Index	0.138	[0.005]***	0.044	[0.005]***	0.037	[0.003]***	1.027	[0.034]***
NSCPW- Family Planning Wker	0.454	[0.034]***	0.117	[0.037]***	0.251	[0.024]***	-0.024	[0.196]
NSCPC- Fully Vaccinated	0.642	[0.019]***	0.378	[0.018]***	0.109	[0.012]***	0.184	[0.103]*
NSCPH- Pipe Water	0.136	[0.026]***	0.131	[0.024]***	-0.035	[0.015]**	0.061	[0.151]
NSCPH- Flush Toilet	-0.081	[0.037]**	0.013	[0.040]	0.043	[0.022]*	0.149	[0.245]
Rural Residence	-0.168	[0.008]***	-0.075	[0.008]***	-0.016	[0.005]***	-0.372	[0.057]***
Non Christian	-0.034	[0.005]***	-0.005	[0.006]	-0.042	[0.005]***		
Log GNI/Capita	-0.007	[0.012]	0.152	[0.007]***	0.033	[0.006]***	0.989	[0.055]***
Woman is Pregnant							0.929	[0.050]***
Observations	42966		41705		43012		42944	
R^2							0.174	
pseudo R^2	0.228		0.138		0.126			

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Reported standard errors are based on a cluster robust covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women and NSCPC is non-self cluster proportion of children.

Table AP2-5: Effect of Social Norms and Access to Resources Index on Women's Health Status – Based on Health Expenditure per Capita

Variables	**Health Facility Delivery**		**4+ Antenatal Visits**		**Modern Contraceptive**		**Women's BMI**	
	Beat	**SE**	**Beat**	**SE**	**Beat**	**SE**	**Beat**	**SE**
Social Norms Index	0.141	[0.018]***	0.044	[0.025]*	0.151	[0.013]***	0.965	[0.114]***
Economic Power Index	0.098	[0.013]***	0.076	[0.015]***	-0.003	[0.010]	0.336	[0.097]***
Woman's Age in Years	0.012	[0.004]***	0.020	[0.003]***	-0.004	[0.002]*	0.062	[0.021]***
Woman's Age in Years Sq	-0.000	[0.000]***	-0.000	[0.000]***	0.000	[0.000]	-0.000	[0.000]
Birth Order								
2nd Order Birth	-0.103	[0.010]***	-0.038	[0.011]***	0.042	[0.008]***	0.227	[0.051]***
3rd Order Birth	-0.125	[0.011]***	-0.070	[0.010]***	0.044	[0.007]***	0.485	[0.066]***
4th Order Birth	-0.189	[0.013]***	-0.103	[0.012]***	0.050	[0.007]***	0.520	[0.071]***
Woman's Education								
Primary	0.109	[0.008]***	0.076	[0.008]***	0.088	[0.006]***	0.458	[0.042]***
Secondary	0.195	[0.010]***	0.149	[0.010]***	0.117	[0.009]***	0.778	[0.079]***
Tertiary	0.286	[0.026]***	0.237	[0.022]***	0.109	[0.017]***	1.178	[0.169]***
Partner's Education								
Primary	0.050	[0.008]***	0.138	[0.007]***	0.086	[0.007]***	0.292	[0.046]***
Secondary	0.089	[0.009]***	0.172	[0.010]***	0.081	[0.008]***	0.277	[0.064]***
Tertiary	0.031	[0.016]**	0.237	[0.015]***	0.046	[0.012]***	0.381	[0.112]***
No. of Adult women in HH	0.012	[0.003]***	-0.015	[0.003]***	-0.005	[0.002]**	-0.051	[0.019]***
Sex of Head of Household	0.045	[0.008]***	0.035	[0.009]***	-0.005	[0.005]	0.277	[0.055]***
Age of Head of Household	0.001	[0.000]***	0.001	[0.000]***	-0.001	[0.000]***	0.004	[0.002]**
Wealth Index	0.136	[0.005]***	0.043	[0.005]***	0.041	[0.003]***	1.038	[0.034]***
NSCPW- Family Planning Wker	0.456	[0.034]***	0.097	[0.037]***	0.250	[0.024]***	-0.128	[0.196]
NSCPC- Fully Vaccinated	0.646	[0.020]***	0.402	[0.018]***	0.116	[0.012]***	0.274	[0.103]***
NSCPH- Pipe Water	0.137	[0.026]***	0.130	[0.024]***	-0.037	[0.015]**	0.046	[0.150]
NSCPH- Flush Toilet	-0.079	[0.037]**	-0.000	[0.040]	0.035	[0.022]	0.031	[0.244]
Rural Residence	-0.165	[0.008]***	-0.073	[0.008]***	-0.018	[0.005]***	-0.382	[0.056]***
Non Christian	-0.037	[0.005]***	-0.004	[0.006]	-0.039	[0.005]***		
Log Health Exp/Capita	-0.008	[0.010]	0.139	[0.006]***	0.046	[0.005]***	0.934	[0.043]***
Woman is Pregnant							0.940	[0.050]***
Observations	42966		41705		43012		42944	
R^2							0.174	
pseudo R^2	0.228		0.138		0.128			

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Reported standard errors are based on a cluster robust covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women and NSCPC is non-self cluster proportion of children.

Table AP2-6: Effect of Social Norms and Access to Resources Index on Women's Health Status – Based on GNI per Capita

Variables	Health Facility Delivery		4+ Antenatal Visits		Modern Contraceptive		Women's BMI	
	Beat	**SE**	**Beat**	**SE**	**Beat**	**SE**	**Beat**	**SE**
Social Norms Index	0.140	[0.018]***	0.064	[0.024]***	0.158	[0.014]***	1.098	[0.113]***
Economic Power Index	0.099	[0.013]***	0.067	[0.014]***	-0.002	[0.010]	0.281	[0.094]***
Woman's Age in Years	0.012	[0.004]***	0.020	[0.003]***	-0.004	[0.002]	0.063	[0.021]***
Woman's Age in Years Sq	-0.000	[0.000]***	-0.000	[0.000]***	0.000	[0.000]	-0.000	[0.000]
Birth Order								
2^{nd} Order Birth	-0.102	[0.010]***	-0.039	[0.011]***	0.042	[0.008]***	0.222	[0.051]***
3^{rd} Order Birth	-0.125	[0.011]***	-0.070	[0.011]***	0.043	[0.007]***	0.479	[0.066]***
4^{th} Order Birth	-0.189	[0.013]***	-0.104	[0.012]***	0.049	[0.007]***	0.513	[0.071]***
Woman's Education								
Primary	0.110	[0.008]***	0.073	[0.008]***	0.089	[0.006]***	0.443	[0.042]***
Secondary	0.195	[0.010]***	0.150	[0.010]***	0.124	[0.009]***	0.786	[0.079]***
Tertiary	0.287	[0.026]***	0.232	[0.022]***	0.117	[0.017]***	1.150	[0.168]***
Partner's Education								
Primary	0.050	[0.008]***	0.132	[0.007]***	0.084	[0.007]***	0.260	[0.047]***
Secondary	0.088	[0.009]***	0.175	[0.010]***	0.084	[0.008]***	0.308	[0.064]***
Tertiary	0.031	[0.016]**	0.238	[0.015]***	0.048	[0.012]***	0.400	[0.111]***
No. of Adult women in HH	0.013	[0.003]***	-0.017	[0.003]***	-0.005	[0.002]**	-0.061	[0.019]***
Sex of Head of Household	0.045	[0.008]***	0.035	[0.009]***	-0.004	[0.005]	0.272	[0.055]***
Age of Head of Household	0.001	[0.000]***	0.001	[0.000]***	-0.001	[0.000]***	0.004	[0.002]**
Wealth Index	0.136	[0.005]***	0.042	[0.005]***	0.039	[0.003]***	1.032	[0.034]***
NSCPW- Family Planning Wker	0.454	[0.034]***	0.117	[0.037]***	0.252	[0.024]***	-0.016	[0.196]
NSCPC- Fully Vaccinated	0.647	[0.019]***	0.383	[0.018]***	0.105	[0.012]***	0.176	[0.103]*
NSCPH- Pipe Water	0.137	[0.026]***	0.132	[0.024]***	-0.035	[0.015]**	0.065	[0.151]
NSCPH- Flush Toilet	-0.080	[0.037]**	0.014	[0.040]	0.041	[0.022]*	0.147	[0.245]
Rural Residence	-0.165	[0.008]***	-0.072	[0.008]***	-0.020	[0.005]***	-0.379	[0.056]***
Non Christian	-0.037	[0.005]***	-0.007	[0.006]	-0.040	[0.005]***		
Log GNI/Capita	-0.010	[0.012]	0.149	[0.006]***	0.036	[0.006]***	0.997	[0.054]***
Woman is Pregnant							0.929	[0.050]***
Observations	42966		41705		43012		42944	
R^2							0.174	
pseudo R^2	0.228		0.138		0.126			

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Reported standard errors are based on a cluster robust covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women and NSCPC is non-self cluster proportion of children.

Table AP2-7: Effect of Composite Women's Empowerment Index on Women's Nutrition – Multinomial Logit Estimates – Based on Health Expenditure per Capita

Variables	CED		Over Weight		Obese	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**
Composite Index (CWEI)	-0.053	[0.010]***	0.067	[0.012]***	0.027	[0.004]***
Woman's Age in Years	-0.003	[0.002]*	0.009	[0.002]***	0.004	[0.001]***
Woman's Age in Years Sq	0.000	[0.000]**	-0.000	[0.000]***	-0.000	[0.000]***
Birth Order						
2nd Order Birth	-0.006	[0.005]	0.016	[0.007]**	0.004	[0.003]
3rd Order Birth	-0.012	[0.006]**	0.018	[0.007]***	0.011	[0.004]***
4th Order Birth	-0.008	[0.007]	0.025	[0.007]***	0.014	[0.003]***
Woman's Education						
Primary	-0.025	[0.003]***	0.025	[0.005]***	0.010	[0.002]***
Secondary	-0.018	[0.006]***	0.033	[0.007]***	0.016	[0.003]***
Tertiary	-0.024	[0.012]**	0.047	[0.012]***	0.016	[0.005]***
Partner's Education						
Primary	-0.026	[0.003]***	0.017	[0.005]***	-0.003	[0.002]
Secondary	-0.020	[0.004]***	0.019	[0.005]***	0.000	[0.002]
Tertiary	-0.014	[0.009]	0.021	[0.009]**	0.000	[0.003]
No. of Adult women in HH	-0.002	[0.001]	-0.003	[0.002]*	-0.001	[0.001]
Sex of Head of Household	-0.008	[0.004]*	0.020	[0.005]***	0.004	[0.002]*
Age of Head of Household	0.000	[0.000]	0.000	[0.000]**	0.000	[0.000]*
Wealth Index	-0.022	[0.003]***	0.045	[0.002]***	0.018	[0.001]***
NSCPW- Family Planning Worker	0.016	[0.018]	-0.021	[0.023]	0.014	[0.007]*
NSCPC- Fully Vaccinated	-0.049	[0.008]***	-0.002	[0.011]	0.002	[0.004]
NSCPH- Pipe Water	-0.013	[0.012]	0.037	[0.013]***	-0.003	[0.005]
NSCPH- Flush Toilet	0.038	[0.020]*	-0.044	[0.016]***	-0.004	[0.005]
Rural Residence	-0.001	[0.005]	-0.030	[0.005]***	-0.008	[0.002]***
Woman is Pregnant	-0.058	[0.004]***	0.057	[0.005]***	0.006	[0.002]***
Health Expenditure/Capita	-0.013	[0.004]***	0.047	[0.003]***	0.021	[0.001]***
Observations	42944		42944		42944	
pseudo R^2	0.092		0.092		0.092	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and is significant at p< 0.1. Country fixed effects are controlled for but not report. Reported standard errors are based on a cluster robust covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women and NSCPC is non-self cluster proportion of children.

Table AP2-8: Effect of Women's Empowerment of on Women's Nutrition – Multinomial Logit Estimates – Based on GNI per Capita

Variables	**CED**		**Over Weight**		**Obese**	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**
Composite Index (CWEI)	-0.055	[0.010]***	0.073	[0.012]***	0.028	[0.004]***
Woman's Age in Years	-0.003	[0.002]*	0.009	[0.002]***	0.004	[0.001]***
Woman's Age in Years Sq	0.000	[0.000]**	-0.000	[0.000]***	-0.000	[0.000]***
Birth Order						
2nd Order Birth	-0.006	[0.005]	0.016	[0.007]**	0.004	[0.003]
3rd Order Birth	-0.012	[0.006]**	0.017	[0.007]***	0.011	[0.004]***
4th Order Birth	-0.008	[0.007]	0.024	[0.007]***	0.014	[0.003]***
Woman's Education						
Primary	-0.025	[0.003]***	0.025	[0.005]***	0.010	[0.002]***
Secondary	-0.018	[0.006]***	0.035	[0.007]***	0.016	[0.003]***
Tertiary	-0.024	[0.012]**	0.050	[0.012]***	0.015	[0.005]***
Partner's Education						
Primary	-0.025	[0.003]***	0.016	[0.005]***	-0.003	[0.002]
Secondary	-0.020	[0.004]***	0.021	[0.005]***	0.001	[0.002]
Tertiary	-0.014	[0.009]	0.023	[0.009]***	0.000	[0.003]
No. of Adult women in HH	-0.002	[0.001]	-0.004	[0.002]**	-0.001	[0.001]
Sex of Head of Household	-0.008	[0.004]*	0.021	[0.005]***	0.003	[0.002]*
Age of Head of Household	0.000	[0.000]	0.000	[0.000]**	0.000	[0.000]
Wealth Index	-0.021	[0.003]***	0.044	[0.002]***	0.018	[0.001]***
NSCPW- Family Planning Worker	0.015	[0.018]	-0.017	[0.023]	0.015	[0.007]**
NSCPC- Fully Vaccinated	-0.047	[0.008]***	-0.009	[0.011]	-0.001	[0.004]
NSCPH- Pipe Water	-0.013	[0.012]	0.039	[0.013]***	-0.003	[0.005]
NSCPH- Flush Toilet	0.036	[0.020]*	-0.037	[0.016]**	0.001	[0.006]
Rural Residence	-0.001	[0.005]	-0.030	[0.005]***	-0.008	[0.002]***
Woman is Pregnant	-0.057	[0.004]***	0.056	[0.005]***	0.006	[0.002]***
GNI Per Capita	-0.013	[0.005]***	0.045	[0.004]***	0.022	[0.001]***
Observations	42944		42944		42944	
pseudo R^2	0.091		0.091		0.091	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and is significant at p< 0.1. Country fixed effects are controlled for but not report. Reported standard errors are based on a cluster robust covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women and NSCPC is non-self cluster proportion of children.

Table AP2-9: Sampling Characteristics of DHS Data by Country

Country	**Year of Data Collection**	**No. of Clusters**	**No. of Households**	**Average Household per Cluster**
Senegal	2005	337	7,859	23
Ghana	2008	412	12,360	30
Swaziland	2007	275	5,550	20
Namibia	2006	498	9,970	20
Zimbabwe	2006	400	10,800	27
Cameroon	2004	446	11,556	26
Sierra Leone	2008	353	7,766	22
Mali	2006	410	13,965	34
Uganda	2006	368	9,864	27
Guinea	2005	297	7,500	25
Nigeria	2008	888	36,800	41
Burkina Faso	2003	400	10,000	25
Tanzania	2005	475	10,312	22
DRC	2007	300	9,002	30
Zambia	2007	320	8,000	25
Malawi	2010	849	27,345	32
Mozambique	2003	604	14,475	24
Ethiopia	2005	540	14,500	27
Rwanda	2005	462	10,644	23
Niger	2004	345	8,418	24

Source: Author’s compilation from country DHS reports

Table AP2-10: Test of Validity of Instrumental Variables for Composite Women's Empowerment Index – Child Health Models

Variables	Empowerment Index		Height for Age		Weight for Height	
	Beta	SE	Beta	SE	Beta	SE
Couple Age Ratio	0.081	[0.005]***	0.025	[0.056]	0.005	[0.055]
NSCPW - Monogamy	0.028	[0.004]***	0.039	[0.048]	0.084	[0.039]**
NSCPW - Christians	0.011	[0.006]*	0.243	[0.054]***	0.226	[0.050]***
NSCD- Gender Preference	0.001	[0.002]	-0.060	[0.019]***	0.046	[0.017]***
NSCD- Gender Death Diff	0.011	[0.003]***	-0.057	[0.036]	0.058	[0.032]*
Child Age (months)						
12-23	0.003	[0.002]**	-1.240	[0.023]***	-0.151	[0.019]***
24-35	0.008	[0.002]***	-1.559	[0.025]***	0.079	[0.019]***
36-47	0.009	[0.002]***	-1.569	[0.030]***	0.180	[0.021]***
48-49	0.016	[0.003]***	-1.309	[0.030]***	0.090	[0.025]***
Female Child	0.002	[0.001]	0.236	[0.014]***	0.079	[0.014]***
Size at Birth						
Average and Above	0.007	[0.002]***	0.331	[0.023]***	0.271	[0.022]***
Very Large	-0.003	[0.002]	0.483	[0.030]***	0.478	[0.029]***
Woman's Education						
Primary	-0.006	[0.002]***	0.042	[0.024]*	0.118	[0.020]***
Secondary	0.007	[0.003]**	0.130	[0.032]***	0.166	[0.027]***
Tertiary	0.033	[0.005]***	0.310	[0.062]***	0.262	[0.058]***
Partner's Education						
Primary	0.010	[0.002]***	0.009	[0.024]	0.100	[0.022]***
Secondary	0.032	[0.003]***	0.028	[0.029]	0.088	[0.026]***
Tertiary	0.046	[0.004]***	0.020	[0.046]	0.114	[0.041]***
Woman's Height	0.000	[0.000]**	0.037	[0.001]***	0.003	[0.001]***
Age at First Birth	0.002	[0.000]***	-0.000	[0.002]	0.001	[0.002]
Female Household Head	0.021	[0.002]***	0.024	[0.024]	-0.009	[0.019]
No. of Children in HH	-0.003	[0.001]***	-0.035	[0.009]***	-0.041	[0.007]***
No. of Women in HH	-0.005	[0.001]***	0.005	[0.009]	0.020	[0.008]**
Wealth Index	0.021	[0.001]***	0.215	[0.012]***	0.024	[0.010]**
NSCPH- Pipe Water	0.011	[0.006]*	0.074	[0.071]	0.012	[0.050]
NSCPH- Flush Toilet	0.028	[0.009]***	-0.119	[0.099]	-0.103	[0.085]
NSCPW- Antenatal Visits	0.011	[0.003]***	0.084	[0.034]**	0.084	[0.030]***
NSCPW- Health Facility Delivery	0.039	[0.003]***	0.189	[0.033]***	0.066	[0.033]**
Rural Residence	-0.017	[0.002]***	-0.034	[0.025]	-0.009	[0.023]
Country Fixed Effect	Yes		Yes		Yes	
Constant	0.358	[0.019]***	-6.472	[0.234]***	-1.589	[0.173]***
Observations	34587		50077		49916	
R^2	0.348		0.187		0.079	
Adj. R^2	0.347		0.186		0.078	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Country fixed effects are controlled for but not report. Reported standard errors are based on a cluster robust covariance matrix. NSCPH is non-self cluster proportion of households, NSCPW is non-self cluster proportion of women and NSCD is non-self cluster difference

Table AP2-11: Robustness Checks Test of Endogeneity of Composite Women's Empowerment Index

IV Tests	**Child Health Models**		**Women's Health Models**		
	Height for Age Z-Score	**Weight for Height Z-score**	**Health Facility Delivery**	**4+ Antenatal services**	**Women's BMI**
Hansen J Statistic	1.944	n/a	2.070	n/a	1.554
Hansen J P-value	0.378	n/a	0.150	n/a	0.213
Cragg-Donald F-Stats	129.02	291.93	n/a	n/a	n/a
First Stage F-Statistics	143.02	313.25	63.68	13.15	14.53
Stock-Yogo 5%/10% Bias	13.91	16.38	n/a	n/a	n/a
Endogeneity Stat – Chi2	0.009	0.957	0.77	0.52	0.799
Endogeneity – P-value	0.923	0.328	0.379	0.471	0.3713

Source: Author's calculations. Note that n/a means the test was not performed. In addition use of modern contraceptives is not included because it had no valid instrument.

Table AP2-12: Test of Validity of Instruments for Composite Women's Empowerment – Women's Health Models

Variables	**Empowerment**		**Place of Delivery**		**4+ Antenatal Visits**		**M Contraceptives**		**Women's BMI**	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**
Couple Age Ratio	0.056	[0.006]***	0.008	[0.057]	-0.125	[0.054]**	0.199	[0.063]***	-1.008	[0.132]***
NSCPW - Monogamy	0.041	[0.005]***	0.214	[0.040]***	-0.118	[0.038]***	0.361	[0.046]***	1.029	[0.105]***
NSCPW - Christians	0.010	[0.006]*	0.213	[0.048]***	0.371	[0.054]***	0.111	[0.051]**	0.416	[0.123]***
NSCD- Gender Preference	0.010	[0.002]***	0.100	[0.021]***	-0.029	[0.017]*	0.199	[0.024]***	0.005	[0.041]
NSCD- Gender Death Diff	0.015	[0.005]***	0.065	[0.045]	0.013	[0.043]	0.090	[0.045]**	-0.072	[0.097]
Woman's Age in Years	0.008	[0.001]***	0.053	[0.008]***	0.063	[0.008]***	-0.010	[0.008]	0.142	[0.017]***
Woman's Age in Years Sq	-0.000	[0.000]***	-0.001	[0.000]***	-0.001	[0.000]***	0.000	[0.000]	-0.001	[0.000]***
Birth Order: 2nd Order	-0.003	[0.002]	-0.267	[0.025]***	-0.133	[0.023]***	0.154	[0.024]***	0.228	[0.044]***
Birth Order: 3rd Order	-0.008	[0.003]***	-0.356	[0.027]***	-0.199	[0.023]***	0.195	[0.024]***	0.461	[0.059]***
Birth Order: 4th Order	-0.020	[0.003]***	-0.501	[0.026]***	-0.283	[0.027]***	0.263	[0.025]***	0.460	[0.057]***
Woman's Educ: Primary	0.003	[0.002]*	0.309	[0.018]***	0.189	[0.017]***	0.252	[0.021]***	0.389	[0.041]***
Woman's Educ: Secondary	0.022	[0.002]***	0.528	[0.024]***	0.313	[0.021]***	0.395	[0.024]***	0.640	[0.065]***
Woman's Educ: Tertiary	0.057	[0.005]***	0.820	[0.071]***	0.603	[0.060]***	0.381	[0.045]***	0.944	[0.149]***
Partner's Educ: Primary	0.006	[0.002]***	0.199	[0.017]***	0.239	[0.018]***	0.186	[0.022]***	0.214	[0.046]***
Partner's Educ: Secondary	0.024	[0.003]***	0.272	[0.020]***	0.292	[0.021]***	0.229	[0.026]***	0.268	[0.052]***
Partner's Educ: Tertiary	0.025	[0.004]***	0.223	[0.037]***	0.454	[0.036]***	0.245	[0.041]***	0.435	[0.092]***
No. of Adult women in HH	-0.007	[0.001]***	0.015	[0.008]*	-0.018	[0.006]***	-0.015	[0.007]**	-0.017	[0.016]
Sex of Head of Household	0.026	[0.002]***	0.082	[0.019]***	0.037	[0.018]**	-0.105	[0.019]***	0.065	[0.042]
Age of Head of Household	-0.000	[0.000]	0.001	[0.001]**	-0.000	[0.001]	-0.002	[0.001]***	-0.004	[0.001]***
Wealth Index	0.027	[0.001]***	0.403	[0.012]***	0.211	[0.011]***	0.200	[0.011]***	1.061	[0.030]***
NSCPW- Family Planning Worker	0.020	[0.007]***	0.591	[0.070]***	0.702	[0.079]***	0.508	[0.079]***	-0.076	[0.182]
NSCPC- Fully Vaccinated	0.035	[0.004]***	1.319	[0.046]***	1.192	[0.041]***	0.402	[0.044]***	-0.152	[0.082]*
NSCPH- Pipe Water	0.015	[0.006]**	0.263	[0.060]***	0.244	[0.052]***	-0.127	[0.054]**	0.237	[0.132]*
NSCPH- Flush Toilet	0.021	[0.008]***	-0.259	[0.071]***	-0.224	[0.073]***	-0.103	[0.069]	0.145	[0.204]
Rural Residence	-0.027	[0.002]***	-0.457	[0.020]***	-0.111	[0.020]***	-0.148	[0.019]***	-0.265	[0.048]***
Woman is Pregnant									0.981	[0.042]***
Country Fixed Effects	Yes		Yes		Yes		Yes		Yes	
Constant	0.325	[0.013]***	-1.977	[0.131]***	-1.344	[0.131]***	-1.801	[0.142]***	19.747	[0.316]***
Observations	39586		59928		58283		59999		58743	
R^2 /pseudo R^2	0.345		0.299		0.208		0.227		0.200	

Source: Author's calculations. Note that *** is significant at p<0.01, ** is significant at p<0.05 and * is significant at p< 0.1. Country fixed effects are controlled for but not report. Reported standard errors are based on a cluster robust covariance matrix. NSCPH is non-self cluster proportion of households, whiles NSCPW is non-self cluster proportion of women and NSCPC is non-self cluster proportion of children.

REFERENCES

Abadian, S. (1996). Women's autonomy and its impact on fertility. *World Development,* 24(12)**,** 1793-1809.

Abor, P. A., Abekah-Nkrumah, G., Sakyi, K., Adjasi, C. K. D. & Abor, J. (2011). The socio-economic determinants of maternal health care utilization in Ghana. *International Journal of Social Economics,* 38(7)**,** 628-648.

AbouZahr, C. & Tessa, W. (2001). Maternal Mortality at End of a Decade: Signs of Progress. *Bulletin of the World Health Organization,* 79(6)**,** 32–34.

AbouZahr, C. & Tessa, W. (2003). Maternal Mortality in 2000: Estimates Developed by WHO/UNICEF/UNFPA. Geneva: WHO.

Adamolekun, L. (1990). Institutional Perspectives on Africa's Development Crisis *International Journal of Public Sector Management,* 3(2)**,** 5 - 16.

Addai, I. (2000). Determinants of Use of Maternal and Child Health Services in Rural Ghana. *Journal of Biosocial Science,* 32(01)**,** 1-15.

Adetunji, J. A. (1994). Infant mortality in Nigeria: effects of place of birth, mother's education and region of residence. *Journal of Biosocial Science,* 26(04)**,** 469-477.

African Development Forum (2008). Action on Gender Equality, Women's Empowerment and Ending Violence Against Women in Africa. Achieving Gender Equality and Women's Empowerment in Africa Progress Report. *African Development Forum (ADF VI).* Addis Ababa, Ethiopia 19-21 November 2008.

African Union (2008). Study on the Informal Sector in Africa. *Sixth Ordinary Session of the Labor and Social Affairs Commission of the African Union.* Addis Ababa.

Agarwal, B. (1997). "Bargaining" and Gender Relations: Within and Beyond the Household. *Feminist Economics,* 3(1)**,** 1-51.

Ahmed, M. (2006). Intra-household Bargaining and Investment in Child Health,. *Department of Economics Carleton College Unpublished Paper.* Northfield Minnesota

Ahmed, S., Creanga, A. A., Gillespie, D. G. & Tsui, A. O. (2010). Economic Status, Education and Empowerment: Implications for Maternal Health Service Utilization in Developing Countries. *PLoS ONE,* 5(6)**,** e11190.

Akazili, J., Gyapong, J. & McIntyre, D. (2011). Who pays for health care in Ghana. *Int J Equity Health,* 10**,** 26.

Akresh, R., Walque, D. d. & Kazianga, H. (2012). Alternative Cash Transfer Delivery Mechanisms: Impacts on Routine Preventative Health Clinic Visits in Burkina Faso. *IZA Discussion Paper No. 6321.* Bonn, Germany: IZA.

Albiston, C. R. (2005). Bargaining in the Shadow of Social Institutions: Competing Discourses and Social Change in Workplace Mobilization of Civil Rights. *Law & Society Review,* 39(1)**,** 11-50.

Alderman, H. (1990). Nutrition Status in Ghana and its Determinants. *Cornell Food and Nutrition Policy Program. Working Paper.* Ithaca, New York: Cornell University.

Alexander, G. R. & Korenbrot, C. C. (1995). The Role of Prenatal Care in Preventing Low Birth Weight. *The Future of Children,* 5(1)**,** 103-120.

Alkire, S. (2005). Subjective quantitative studies of human agency. *Social Indicators Research,* 74(1)**,** 217-260.

Alkire, S. & Chirkov, V. (2007). Testing a New Indicator in Kerala. *In:* Pillai, N. V. & Alkire, A. (eds.) *Measuring Individual Agency or Empowerment: A Study in Kerala. Chapter 4 MPRA Paper No. 9289.*

Allendorf, K. (2007a). Couples' Reports of Women's Autonomy and Health-care Use in Nepal. *Studies in Family Planning,* 38(1)**,** 35-46.

Allendorf, K. (2007b). Do Women's Land Rights Promote Empowerment and Child Health in Nepal? *World Development,* 35(11)**,** 1975-1988.

Allendorf, K. (2010). The Quality of Family Relationships and Use of Maternal Health-care Services in India. *Studies in Family Planning,* 41(4)**,** 263-276.

Almond, D., Chay, K. Y. & Lee, D. S. (2005). The Costs of Low Birth Weight. *The Quarterly Journal of Economics,* 120(3)**,** 1031-1083.

Amoah, A. G. (2003). Sociodemographic Variations in Obesity among Ghanaian Adults. *Public Health Nutrition* 6(8)**,** 751–757.

Ampofo, A. A. (2001). "When Men Speak Women Listen": Gender Socialisation and Young Adolescents' Attitudes to Sexual and Reproductive Issues. *African Journal of Reproductive Health / La Revue Africaine de la Sant Reproductive,* 5(3)**,** 196-212.

Antecol, H. (2003). Why is there Cross-Country Variation in Female Labor Force Participation Rates?: The Role of Male Attitudes toward Family and Sex Roles. *Working Paper Series/ Claremont McKenna College, No.03, 03.* Claremont McKenna College.

Appleton, S. (1996). Women-headed households and household welfare: An empirical deconstruction for Uganda. *World Development,* 24(12)**,** 1811-1827.

Arnold, F. (1992). Sex Preference and Its Demographic and Health Implications. *International Family Planning Perspectives,* 18(3)**,** 93-101.

Arnold, F. (1997). Gender Preferences for Children. *DHS Comparative Studies No. 23.* Calverton, MD: Macro International.

Arnold, F., Choe, M. K. & Roy, T. K. (1998). Son Preference, the Family-Building Process and Child Mortality in India. *Population Studies,* 52(3)**,** 301-315.

Asiyanbola, A. R. (2005). Patriarchy, male dominance, the role and women empowerment in Nigeria. *Union for the Study of Population - International Population Conference.* France, 18-23, 2005.

Ataguba, J., Akazili, J. & McIntyre, D. (2011). Socioeconomic-related health inequality in South Africa: evidence from General Household Surveys. *International Journal for Equity in Health,* 10(1)**,** 48.

Axinn, W. G. & Barber, J. S. (2001). Mass Education and Fertility Transition. *American Sociological Review,* 66(4)**,** 481-505.

Babalola, S. & Fatusi, A. (2009). Determinants of use of maternal health services in Nigeria - looking beyond individual and household factors. *BMC Pregnancy and Childbirth,* 9(1)**,** 43.

Baden, S., Green, C., Ottoo-Oyortey, N. & Peasgood, T. (1994). Background paper on gender issues in Ghana. *Report prepared for the West and North African Department, Report No. 19.* London: DFID.

Bassole, L. (2007). Child Malnutrition in Senegal: Does Access to Public Infrastructure Really Matter? A Quantile Regression Analysis. CERDI-CNRS, Université d'Auvergne Job Market Paper.

Baum, C. F., Schaffer, M. E. & Stillman, S. (2007). ivreg2: Stata module for extended instrumental variables/2SLS, GMM and AC/HAC, LIML, and k-class regression. Statistical Software Components S425401. Downloadable from http://ideas.repec.org/c/boc/bocode/s425401.html. Boston: Boston College, Department of Economics.

Becker, G. (1981). Treatise on the Family Cambridge, MA: Harvard University Press.

Becker, S., Fonseca-Becker, F. & Schenck-Yglesias, C. (2006). Husbands' and wives' reports of women's decision-making power in Western Guatemala and their effects on preventive health behaviors. *Social Science & Medicine,* 62(9)**,** 2313-2326.

Beegle, K., Frankenberg, E. & Thomas, D. (2001). Bargaining Power within Couples and Use of Prenatal and Delivery Care in Indonesia. *Studies in Family Planning,* 32(2)**,** 130-146.

Behrman, J. R. & Deolalikar, A. B. (1988). Health and Nutrition, Chapter 14 *In:* Chenery, H. & Srinivasan, T. N. (eds.) *Handbook of Development Economics.* Elsevier, Amsterdam.

Behrman, J. R. & Rosenzweig, M. R. (2004). Returns to Birthweight. *Review of Economics and Statistics,* 86(2)**,** 586-601.

Bhagowalia, P., Menon, P., Quisumbing, A. R. & Soundararajan, V. (2010). Unpacking the Links Between Women's Empowerment and Child Nutrition: Evidence Using Nationally Representative Data From Bangladesh. *Agricultural & Applied Economics Association 2010 AAEA,CAES, & WAEA Joint Annual Meeting (July 25-27).* Denver, Colorado.

Bhebe, N. & Ranger, T. O. (1996). *Society in Zimbabwe's liberation war*: Heinemann Library.

Birdsall, N. (2007). Do No Harm: Aid, Weak Institutions and the Missing Middle in Africa. *Development Policy Review,* 25(5)**,** 575-598.

Bitew, F. H. & Telake, D. S. (2010). Undernutrition among Women in Ethiopia: Rural-Urban Disparity. *DHS Working Papers No. 77.* Calverton, Maryland, USA: ICF Macro.

Black, R. E., Allen, L. H., Bhutta, Z. A., Caulfield, L. E., de Onis, M., Ezzati, M., Mathers, C. & Rivera, J. (2008). Maternal and child undernutrition: global and regional exposures and health consequences. *The Lancet,* 371(9608)**,** 243-260.

Black, R. E., Morris, S. S. & Bryce, J. (2003). Where and why are 10 million children dying every year? *The Lancet,* 361(9376)**,** 2226-2234.

Blackden, C. M. & Woden, Q. (2006). Gender, time use and poverty: Introduction. *In:* Blackden, C. M. & Woden, Q. (eds.) *Gender, time use and poverty in Sub-Saharan Africa.* Washington DC: The World Bank.

Blackden, M., Canagarajah, S., Klasen, S. & Lawson, D. (2006). *Gender and growth in Sub-Saharan Africa: Issues and evidence*: Research Paper, UNU-WIDER, United Nations University (UNU).

Bloom, D. E., Sachs, J. D., Collier, P. & Udry, C. (1998). Geography, Demography, and Economic Growth in Africa. *Brookings Papers on Economic Activity,* 1998(2)**,** 207-295.

Bloom, S. S., Lippeveld, T. & Wypij, D. (1999). Does Antenatal Care Make a Difference to Safe Delivery? A Study in Urban Uttar Pradesh, India. *Health Policy and Planning,* 14(1)**,** 38-48.

Bloom, S. S., Wypij, D. & Gupta, M. d. (2001). Dimensions of Women's Autonomy and the Influence on Maternal Health Care Utilization in a North Indian City. *Demography,* 38(1)**,** 67-78.

Bodnar, L. M., Siega-Riz, A. M., Simhan, H. N., Himes, K. P. & Abrams, B. (2010). Severe obesity, gestational weight gain, and adverse birth outcomes. *The American Journal of Clinical Nutrition,* 91(6)**,** 1642-1648.

Bollen, K. A., Glanville, J. L. & Stecklov, G. (2001). Socioeconomic Status and Class in Studies of Fertility and Health in Developing Countries. *Annual Review of Sociology***,** (27) 153-185.

Brakohiapa, L. A., Bille, A., Quansah, E., Kishi, K., Yartey, J., Harrison, E., Armar, M. A. & Yamamoto, S. (1988). Does Prolonged Brestfeeding Adversely Affect a Child's Nutritional Status? *The Lancet,* 332(8608)**,** 416-418.

Branisa, B., Klasen, S. & Ziegler, M. (2009). Background Paper: The Construction of the Social Institutions and Gender Index (SIGI). 37073 Goettingen, Germany: University of Goettingen, Department of Economics, Platz der Goettinger Sieben 3.

Buekens, P. (2001). Over-medicalisation of maternal care in developing countries. *Studies in Health Services Organisation and Policy,* 17**,** 195-206.

Burgard, S. (2004). Race and pregnancy-related care in Brazil and South Africa. *Social Science & Medicine,* 59(6)**,** 1127-1146.

Buvinić, M. & Gupta, G. R. (1997). Female-Headed Households and Female-Maintained Families: Are They Worth Targeting to Reduce Poverty in Developing Countries? *Economic Development and Cultural Change,* 45(2)**,** 259-280.

Caldwell, J. & Caldwell, P. (1993). Roles of Women, Families and Communities in Preventing Illness and Providing Health Services in Developing Countries. *In:* Preston, J. N. G. a. S. H. (ed.) *The Epidemiologic Transition: Policy and Planning Implications for Developing Countries.* Washington D.C: National Academy Press:252-271.

Caldwell, J. C. (1986). Routes to Low Mortality in Poor Countries. *Population and Development Review,* 12(2)**,** 171-220.

Cameron, A. C. & Trivedi, P. K. (2009). *Microeconometrics using stata* (Vol. 5): Stata Press College Station, TX.

Campa, P., Casarico, A. & Profeta, P. (2010). Gender Culture and Gender Gap in Employment. *CESifo Economic Studies*.

Campbell, J. C. (2002). Health consequences of intimate partner violence. *The Lancet,* 359(9314)**,** 1331-1336.

Campbell, O. M. R. & Graham, W. J. (2006). Strategies for reducing maternal mortality: getting on with what works. *The Lancet,* 368(9543)**,** 1284-1299.

Case, A., Fertig, A. & Paxson, C. (2005). The lasting impact of childhood health and circumstance. *J Health Econ,* 24(2)**,** 365-89.

Castro-Leal, F., Dayton, J., Demery, L. & Mehra, K. (2000). Public spending on health care in Africa: do the poor benefit? *Bull World Health Organ,* 78(1)**,** 66-74.

Celik, Y. & Hotchkiss, D. R. (2000). The socio-economic determinants of maternal health care utilization in Turkey. *Social Science & Medicine,* 50(12)**,** 1797-1806.

Chakraborty, N., Islam, M. A., Chowdhury, R. I., Bari, W. & Akhter, H. H. (2003). Determinants of the use of maternal health services in rural Bangladesh. *Health Promotion International,* 18(4)**,** 327-337.

Chang, C. J., Wu, C. H., Chang, C. S., Yao, W. J., Yang, Y. C., Wu, J. S. & Lu, F. H. (2003). Low body mass index but high percent body fat in Taiwanese subjects: implications of obesity cutoffs. *International journal of obesity and related metabolic disorders : journal of the International Association for the Study of Obesity,* 27(2)**,** 253-9.

Chen, L. C., Huq, E. & D'Souza, S. (1981). Sex Bias in the Family Allocation of Food and Health Care in Rural Bangladesh. *Population and Development Review,* 7(1)**,** 55-70.

Chen, Y. & Li, H. (2009). Mother's education and child health: Is there a nurturing effect? *Journal of Health Economics,* 28(2)**,** 413-426.

Chirwa, E. W. & Ngalawa, H. P. (2008). Determinants of Child Nutrition in Malawi. *South African Journal of Economics,* 76(4)**,** 628-640.

Chopra, M. & Darnton-Hill, I. (2006). Responding to the crisis in sub-Saharan Africa: the role of nutrition. *Public Health Nutrition,* 9(05)**,** 544-550.

Chopra, M., Lawn, J. E., Sanders, D., Barron, P., Karim, S. S. A., Bradshaw, D., Jewkes, R., Karim, Q. A., Flisher, A. J., Mayosi, B. M., Tollman, S. M., Churchyard, G. J. & Coovadia, H. (2009). Achieving the health Millennium Development Goals for South Africa: challenges and priorities. *The Lancet,* 374(9694)**,** 1023-1031.

Christiaensen, L. & Alderman, H. (2004). Child Malnutrition in Ethiopia: Can Maternal Knowledge Augment the Role of Income? *Economic Development and Cultural Change,* 52(2)**,** 287-312.

Cleland, J., Bernstein, S., Ezeh, A., Faundes, A., Glasier, A. & Innis, J. (2006). Family planning: the unfinished agenda. *The Lancet,* 368(9549)**,** 1810-1827.

Cogill, B. (2003). Anthropometric Indicators Measurement Guide. *Food and Nutrition Technical Assistance Project* Washington, D.C.: FANTA, Academy for Educational Development.

Cohen, G. R., Curet, L. B., Levine, R. J., Ewell, M. G., Morris, C. D., Catalano, P. M., Clokey, D. & Klebanoff, M. A. (2001). Ethnicity, nutrition, and birth outcomes in nulliparous women. *American Journal of Obstetrics and Gynecology,* 185(3)**,** 660-667.

Cole, T. J., Bellizzi, M. C., Flegal, K. M. & Dietz, W. H. (2000). Establishing a standard definition for child overweight and obesity worldwide: international survey. *BMJ,* 320(7244)**,** 1240.

Collier, P. & Gunning, J. W. (1999). Why Has Africa Grown Slowly? *The Journal of Economic Perspectives,* 13(3)**,** 3-22.

Contreras, D. & Plaza, G. (2010). Cultural Factors in Women's Labor Force Participation in Chile. *Feminist Economics,* 16(2)**,** 27-46.

Crawford, Y. (1994). *The African Colonial State in Comparative Perspective*. New Haven: Conn.: Yale University Press.

Cummings, S. R., Black, D. M., Nevitt, M. C., Browner, W. S., Cauley, J. A., Genant, H. K., Mascioli, S. R., Scott, J. C., Seeley, D. G., Steiger, P. & Vogt, T. M. (1990). Appendicular Bone Density and Age Predict Hip Fracture in Women. *JAMA: The Journal of the American Medical Association,* 263(5)**,** 665-668.

Dagne, E. (2010). Role of socio-demographic factors on utilization of maternal health care services in Ethiopia. UMEA UNIVERSITET.

Dake, F. A., Tawiah, E. O. & Badasu, D. M. (2011). Sociodemographic correlates of obesity among Ghanaian women. *Public Health Nutrition,* 14(07)**,** 1285-1291.

Davis, K. (1955). Institutional patterns favoring high fertility in underdeveloped areas. *Biodemography and Social Biology,* 2(1)**,** 33-39.

de-Graft, A. A. (2010). Culture, diet and the maternal body: Ghanaian women's perspective on food, fat and childbearing. *In:* Unnithan-Kumar, M. & Tremayne, S. (eds.) *Fatness and the Maternal Body: Women's Experiences of Corporeality and the Shaping of Social Policy.* Oxford: Berghahn Books.

De Mel, S., McKenzie, D. & Woodruff, C. (2009). Are women more credit constrained? Experimental evidence on gender and microenterprise returns. *American Economic Journal: Applied Economics***,** 1-32.

de Onis, M. (2001). Child growth and development. *In:* Semba, R. & Bloem, M. (eds.) *Nutrition and Health in Developing Countries.* Totowa, NJ: Humana Press, .

de Onis, M. & Blössner, M. (2003). The World Health Organization Global Database on Child Growth and Malnutrition: methodology and applications. *International Journal of Epidemiology,* 32(4)**,** 518-526.

de Onis, M., Onyango, A. W., Borghi, E., Garza, C. & Yang, H. (2006). Comparison of the World Health Organization (WHO) Child Growth Standards and the National Center for Health Statistics/WHO international growth reference: implications for child health programmes. *Public Health Nutrition,* 9(07)**,** 942-947.

Deaton, A. & Grosh, M. E. (2002). Consumption. *In:* ed., Grosh, M. & Glewwe, P. (eds.) *In Designing Household Survey Questionaires for Developing Countries: Lesson from 15 Years of Living Standards Measurement Study.* Washington, DC: WorldBank.

Derose, L. F., Wu, L. & Dodoo, F. N.-A. (2010). Inferring gender-power: women's schooling and relative spousal influence in childbearing in Ghana. *Genus,* 66(2)**,** 69-91.

Desai, S. & Alva, S. (1998). Maternal education and child health: Is there a strong causal relationship? *Demography,* 35(1)**,** 71-81.

Desai, S. & Johnson, K. (2005). Women's Decision-making and Child Health: Familial and Social Hierarchies. *In:* Sunita, K. (ed.) *A Focus on Gender: Collected Papers on Gender Using DHS Data.* Calverton, Maryland, USA ORC Macro.

Deurenberg-Yap, M., Schmidt, G., van Staveren, W. A. & Deurenberg, P. (2000). The paradox of low body mass index and high body fat percentage among Chinese, Malays and Indians in Singapore. *International Journal of Obesity,* 24(8)**,** 1011-1017.

Dodd, V. L. (2005). Implications of Kangaroo Care for Growth and Development in Preterm Infants. *Journal of Obstetric, Gynecologic, & Neonatal Nursing,* 34(2)**,** 218-232.

Doss, C. (2006). The Effects of Intrahousehold Property Ownership on Expenditure Patterns in Ghana. *Journal of African Economies,* 15(1)**,** 149-180.

Doss, C. (2011). Intrahousehold bargaining and resource allocation in developing countries. *Background Paper: World Development Report 2012, Gender Equality and Development.* Jackson Institute for Global Affairs, Yale University.

Duflo, E. (2003). Grandmothers and Granddaughters: Old Age Pensions and Intrahousehold Allocation in South Africa. *The World Bank Economic Review,* 17(1)**,** 1-25.

Durrant, V. L. & Sathar, Z. A. (2000). Greater Investments in Children through Women's Empowerment: A Key to Demographic Change in Pakistan?" *Population Council Policy Research Division Working Papers, No. 137.* New York: The Population Council.

Easterly, W. (1999). Life During Growth. *Journal of Economic Growth,* 4(3)**,** 239-276.

Easterly, W. & Levine, R. (1997). Africa's Growth Tragedy: Policies and Ethnic Divisions*. *Quarterly Journal of Economics,* 112(4)**,** 1203-1250.

Eckhardt, C. L., Adair, L. S., Caballero, B., Avila, J., Kon, I. Y., Wang, J. & Popkin, B. M. (2003). Estimating Body Fat from Anthropometry and Isotopic Dilution: A Four-Country Comparison. *Obesity,* 11(12)**,** 1553-1562.

Elo, I. T. (1992). Utilization of maternal health-care services in Peru: the role of women's education. *Health Transition Review : The cultural, social, and behavioural determinants of health,* 2(1)**,** 49-69.

England, P. (2000). Conceptualising women's empowerment in countries of the North. *In:* Presser, H. P. & Sen, G. (eds.) *Women's Empowerment and Demographic Processes: Moving Beyond Cairo.* London: Oxford: Oxford University Press.

Engle, P. (1999). The role of caring practices and resources for care in child survival, growth and development: South and Southeast Asia. *Asian Development Review,* 17(12)**,** 132-167.

Engle, P. L., Bentley, M. & Pelto, G. (2000). The role of care in nutrition programmes: current research and a research agenda. *Proceedings of the Nutrition Society,* 59(01)**,** 25-35.

Engle, P. L., Menon, P. & Haddad, L. (1999). Care and Nutrition: Concepts and Measurement. *World Development,* 27(8)**,** 1309-1337.

Erreygers, G. (2009a). Correcting the concentration index. *Journal of Health Economics,* 28(2)**,** 504-515.

Erreygers, G. (2009b). Correcting the concentration index: a reply to Wagstaff. *Journal of Health Economics,* 28(2)**,** 521-524.

Estudillo, J., Quisumbing, A. & Otsuka, K. (2001). Gender Differences in Land Inheritance, Schooling and Lifetime Income: Evidence from the Rural Philippines. *Journal of Development Studies,* 37(4)**,** 23-48.

Ezzati, M., Lopez, A. D., Rodgers, A., Vander Hoorn, S. & Murray, C. J. L. (2002). Selected major risk factors and global and regional burden of disease. *The Lancet,* 360(9343)**,** 1347-1360.

Fafchamps, M., Kebede, B. & Quisumbing, A. R. (2009). Intrahousehold Welfare in Rural Ethiopia*. *Oxford Bulletin of Economics and Statistics,* 71(4)**,** 567-599.

Fafchamps, M., McKenzie, D. J., Quinn, S. & Woodruff, C. (2011). When is capital enough to get female microenterprises growing? Evidence from a randomized experiment in Ghana. *CEPR Discussion Paper No. 8466.* London, UK: Centre for Economic Policy Research.

Falkner, F. & Tanner, J. (1986). *Human growth: A comprehensive treatise* (2nd ed. Vol. 3). New York: Plenum Press.

FAO (2011). The state of foood and agriculture 2010-2011: Women in agriculture, Closing the gender gap for development. Rome: Food and Agricultural Organisation.

Fay, M., Leipziger, D., Wodon, Q. & Yepes, T. (2005). Achieving child-health-related Millennium Development Goals: The role of infrastructure. *World Development,* 33(8)**,** 1267-1284.

Ferreira, F. H. G. & Ravallion, M. (2008). Global Poverty and Inequality: A Review of the Evidence. *Policy Research Working Paper 4623.* Washington DC: The World Bank Development Research Group Poverty Team.

Filmer, D. & Pritchett, L. H. (2001). Estimating Wealth Effects Without Expenditure Data—Or Tears: An Application To Educational Enrollments In States Of India*. *Demography,* 38(1)**,** 115-132.

Fogel, R. & Costa, D. (1997). A theory of technophysio evolution, with some implications for forecasting population, health care costs, and pension costs. *Demography,* 34(1)**,** 49-66.

Folbre, N. (1994). *Who Pays for the Kids: Gender and the structures of constraints*. New York: Routledge Press.

Fortin, N. M. (2005). Gender Role Attitudes and the Labour-market Outcomes of Women across OECD Countries. *Oxford Review of Economic Policy,* 21(3)**,** 416-438.

Fosu, G. B. (1994). Childhood morbidity and health services utilization: Cross-national comparisons of user-related factors from DHS data. *Social Science & Medicine,* 38(9)**,** 1209-1220.

Fowles, E. R. (2004). Prenatal Nutrition and Birth Outcomes. *Journal of Obstetric, Gynecologic, & Neonatal Nursing,* 33(6)**,** 809-822.

Friedemann-Sanchez, G. (2006). Assets in intrahousehold bargaining among women workers in Colombia's cut-flower industry. *Feminist Economics,* 12(1-2)**,** 247-269.

Fulton-Kehoe, D., Hamman, R. F., Baxter, J. & Marshall, J. (2001). A Case-Control Study of Physical Activity and Non-Insulin Dependent Diabetes Mellitus (NIDDM): The San Luis Valley Diabetes Study. *Annals of Epidemiology,* 11(5)**,** 320-327.

Furr, L. A. & Dnas, N. (2006). The effects of social autonomy on BMI scores: a study of women in Nepal. *CNAS Journal,* 33(1).

Furuta, M. & Salway, S. (2006). Women's Position within the Household as a Determinant of Maternal Health Care Use in Nepal. *International Family Planning Perspectives,* 32(1)**,** 17-27.

Gabrysch, S. & Campbell, O. (2009). Still too far to walk: Literature review of the determinants of delivery service use. *BMC Pregnancy and Childbirth,* 9(1)**,** 34.

Gage, A. J. (1995). Women's Socioeconomic Position and Contraceptive Behavior in Togo. *Studies in Family Planning,* 26(5)**,** 264-277.

Gage, A. J. (2007). Barriers to the utilization of maternal health care in rural Mali. *Social Science & Medicine,* 65(8)**,** 1666-1682.

Gebreselassie, A. (2008). Factors Affecting Maternal Health Care Seeking Behavior in Rwanda. Calverton, Maryland, USA: Macro International Inc.

Glei, D. A., Goldman, N. & Rodriguez, G. (2003). Utilization of care during pregnancy in rural Guatemala: does obstetrical need matter? *Social Science & Medicine,* 57(12)**,** 2447-2463.

Goldani, M. Z., Barbieri, M. A., Silva, A. A. M. & Bettiol, H. (2004). Trends in Prenatal Care Use and Low Birthweight in Southeast Brazil. *American Journal of Public Health,* 94(8)**,** 1366-1371.

Goldstein, M. & Udry, C. (2008). The Profits of Power: Land Rights and Agricultural Investment in Ghana. *Journal of Political Economy,* 116(6)**,** 981-1022.

Goody, J. & Goody, E. (1966). Cross-cousin marriage in Northern Ghana. *Man,* 1(3)**,** 343-355.

Government of Sierra Leone (2004). Povert Reduction Strategy Papers of Sierra Leone: A National Programme for Food Security, Job Creation and Good Governance (2005-2007), . Freetown.

Govindasamy, P. & Malhotra, A. (1996). Women's position and family planning in Egypt. *Studies in Family Planning***,** 328-340.

Graham, W. J. (1991). Maternal Mortality Level, Trends and Data Deficiencies. *In:* R. G. Feachem and D. T. Jamison (ed.) *Disease and Mortality in Sub-Saharan Africa.* Oxford: Oxford University Press, Oxford.

Graham, W. J., Bell, J. S. & Bullough, C. H. (2001). Can skilled attendance at delivery reduce maternal mortality in developing countries ? *Studies in Health Services Organisation and Policy,* 17(97-130.).

Gupta, M. D. (1987). Selective Discrimination against Female Children in Rural Punjab, India. *Population and Development Review,* 13(1)**,** 77-100.

Guttman, L. (1954). Some necessary conditions for common-factor analysis. *Psychometrika,* 19(2)**,** 149-161.

Gwatkin, D. R., Rustein, S., Johnson, K., Pande, R. & Wagstaff, A. (2003). Initial Country-Level Information about Socio-Economic Differentials in Health, Nutrition and Population, vols. I and II. Washington, DC: World Bank. *Health, Population, and Nutrition Division*.

Haan, H. C. (2006). *Training for work in the informal micro-enterprise sector: Fresh evidence from sub-Sahara Africa* (Vol. 3): Springer.

Haddad, L. (1999). Women's Status: Levels, Determinants, Consequences for Malnutrition, Interventions, and Policy. *Asian Development Review,* 17 (1,2)**,** 96-131.

Haddad, L., Hoddinot, J. & Alderman, H. (1997). Intrahousehold resource allocation: Policy issues and research methods. Baltimore MD USA: International Food Policy Research Institute.

Haddad, L. & Hoddinott, J. (1994). Women's income and boy-girl anthropometric status in the Côte d'Ivoire. *World Development,* 22(4)**,** 543-553.

Haidar, J. & Kogi-Makau, W. (2009). Gender differences in the household-headship and nutritional status of pre-school children. *East African medical journal,* 86(2)**,** 69-73.

Hajnal, J. (1982). Two Kinds of Preindustrial Household Formation System. *Population and Development Review,* 8(3)**,** 449-494.

Handa, S. (1999). Maternal Education and Child Height. *Economic Development and Cultural Change,* 47(2)**,** 421-439.

Hashemi, S. M., Schuler, S. R. & Riley, A. P. (1996). Rural credit programs and women's empowerment in Bangladesh. *World Development*, 24(4)**,** 635-653.

Herbst, J. (2000). *States and Power in Africa:Comparative Lessons in Authority and Control*. Princeton: N.J.: Princeton University Press.

Higgins, P. A. & Alderman, H. (1997). Labor and Women's Nutrition: The Impact of Work Effort and Fertility on Nutritional Status in Ghana. *The Journal of Human Resources,* 32(3)**,** 577-595.

Hindin, M. J. (2000a). Women's autonomy, women's status and fertility-related behavior in Zimbabwe. *Population Research and Policy Review,* 19(3)**,** 255-282.

Hindin, M. J. (2000b). Women's power and anthropometric status in Zimbabwe. *Social Science & Medicine,* 51(10)**,** 1517-1528.

Hindin, M. J. (2005a). Women's Autonomy, Status and Nutrition in Zimbabwe, Zambia and Malawi. *In:* Kishor, S. (ed.) *A Focus on Gender: Collected Papers on Gender Using DHS Data.* Calverton, Maryland, USA: ORC Macro.

Hindin, M. J. (2005b). Women's input into household decisions and their nutritional status in three resource-constrained settings. *Public Health Nutrition: ,* 9(4)**,** 485–493.

Hindin, M. J. & Muntifering, C. J. (2011). Women's Autonomy and Timing of Most Recent Sexual Intercourse in Sub-Saharan Africa: A Multi-Country Analysis. *Journal of Sex Research,* 48(6)**,** 511-519.

Hoddinott, J. & Haddad, L. (1995). Does Female Income Share Influence Household Expenditures? Evidence From Cote d'Ivoire. *Oxford Bulletin of Economics and Statistics,* 57(1)**,** 77-96.

Holdsworth, M., Gartner, A., Landais, E., Maire, B. & Delpeuch, F. (2004). Perceptions of healthy and desirable body size in urban Senegalese women. *Int J Obes Relat Metab Disord,* 28(12)**,** 1561-1568.

Hong, R. (2007). Effect of economic inequality on chronic childhood undernutrition in Ghana. *Public Health Nutrition,* 10(04)**,** 371-378.

Horton, S. (1986). Child nutrition and family size in the Philippines. *Journal of Development Economics,* 23(1)**,** 161-176.

Hossain, M. B., Phillips, J. F. & Pence, B. (2007). The Effect of Women's Status on Infant and Child Mortality in Four Rural Areas of Bangladesh. *Journal of Biosocial Science,* 39(03)**,** 355-366.

Hosseinpoor, A. R., Van Doorslaer, E., Speybroeck, N., Naghavi, M., Mohammad, K., Majdzadeh, R., Delavar, B., Jamshidi, H. & Vega, J. (2006). Decomposing socioeconomic inequality in infant mortality in Iran. *International Journal of Epidemiology,* 35(5)**,** 1211-1219.

Hou, X. & Ma, N. (2012). The effect of women decision-making power on maternal health services uptake: evidence from Pakistan. *Health Policy and Planning,* 28(2)**,** 176-84.

House, S. H. (2007). Nurturing the Brain Nutritionally and Emotionally From Before Conception to Late Adolescence. *Nutrition and Health,* 19(1-2)**,** 143-161.

Hu, F. B., Leitzmann, M. F., Stampfer, M. J., Colditz, G. A., Willett, W. C. & Rimm, E. B. (2001). Physical Activity and Television Watching in Relation to Risk for Type 2 Diabetes Mellitus in Men. *Arch Intern Med,* 161(12)**,** 1542-1548.

Ibrahim, S. & Alkire, S. (2007). Agency and Empowerment: A Proposal for Internationally Comparable Indicators. *Oxford Development Studies,* 35(4)**,** 379-403.

Idler, E. L. & Kasl, S. V. (1995). Self-Ratings of Health: Do they also Predict change in Functional Ability? *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences,* 50B(6)**,** S344-S353.

IFC Macro. (2012). *Measure DHS STATcompiler* [Online]. Measure DHS. Available: www.statcompiler.com [Accessed 22 July 2012].

Ikeako, L. C., Onah, H. E. & Iloabachie, G. C. (2006). Influence of formal maternal education on the use of maternityservices in Enugu, Nigeria. *Journal of Obstetrics & Gynaecology,* 26(1)**,** 30-34.

Imdad, A. & Bhutta, Z. A. (2012). Maternal Nutrition and Birth Outcomes: Effect of Balanced Protein-Energy Supplementation. *Paediatric and Perinatal Epidemiology,* 26**,** 178-190.

IMF (2011). Regional Economic Outlook: Sub-Saharan Africa Sustaining the Expansion. *World Economic and Financial Surveys.* Washington: Internaltional Monetary Fund.

IMF (2012). Sub-Saharan Africa: Sustaining Growth amid Global Uncertainty. *World Economic and Financial Surveys Regional Economic Outlook.* Washington, DC: International Monetary Fund.

Immigration and Refugee Board of Canada Ghana (2006). Forced marriages; prevalence of such marriages; whether a woman can refuse such a marriage, and the consequences of the refusal; available state protection and redress (2004-2006). *GHA101618.E, available at: http://www.unhcr.org/refworld/docid/45f1473720.html [accessed 20 April 2012]*

International Labour Office (2002). ILO compendium of official statistics on employment in the informal sector," *STAT Working Paper, 2002 – No.1.* Geneva: International Labour Office.

Jaglal, S. B., Kreiger, N. & Darlington, G. (1993). Past and recent physical activity and risk of hip fracture. *American journal of epidemiology,* 138(2)**,** 107-118.

Jaglal, S. B., Kreiger, N. & Darlington, G. A. (1995). Lifetime occupational physical activity and risk of hip fracture in women. *Annals of Epidemiology,* 5(4)**,** 321-324.

Jasinski, J. L. (2004). Pregnancy and Domestic Violence. *Trauma, Violence, & Abuse,* 5(1)**,** 47-64.

Jayaraman, A., Chandrasekhar, S. & Gebreselassie, T. (2008). Factors Affecting Maternal Health Care Seeking Behavior in Rwanda. *DHS Working Paper Series No. 59.* Calverton, Maryland USA: OR Macro.

Jejeebhoy, S. & Sathar, S. (2001). Women's Autonomy in India and Pakistan: The Influence of Religion and Region. *Population and Development Review,* 27(4)**,** 687-712.

Jejeebhoy, S. j. (1995). Women’s Education, Autonomy, and Reproductive Behaviour: Experience from Four Developing Countries. *International Studies in Demography* IUSSP. Oxford: Clarendon Press.

Jenkins, S. (1988). Calculating income distribution indices from microdata. *National Tax Journal,* 41(1)**,** 139-42.

Jin, X., Li, S. & Feldman, M. W. (2005). Marriage form and age at first marriage: A comparative study in three counties in contemporary rural China. *Biodemography and Social Biology,* 52(1-2)**,** 18-46.

Jolliffe, I. T. (2002). *Principal Component Analysis* (Second ed.). Verlag New York: Springer.

Joy, S., Istwan, N., Rhea, D., Desch, C. & Stanziano, G. (2009). The impact of maternal obesity on the incidence of adverse pregnancy outcomes in high-risk term pregnancies. *American journal of perinatology,* 26(5)**,** 345-9.

Jütting, J. & Morrisson, C. (2005). Changing Social Institutions to Improve the Status of Women in Developing Countries. *OECD Development Center Policy Brief No. 27.* Paris, France: OECD.

Kabeer, N. (1999). Resources, Agency, Achievements: Reflections on the Measurement of Women's Empowerment. *Development and Change,* 30(3)**,** 435-464.

Kabeer, N. (2002). Women, Wages and Intrahousehold Power Relations in Urban Bangladesh. *Development and Change,* 28(2)**,** 261-302.

Kabeer, N. (2005). Gender Equality and Women's Empowerment: A Critical Analysis of the Third Millennium Development Goal. *Gender and Development,* 13(1)**,** 13-24.

Kabir, M., Iliyasu, Z., Abubakar, I. & Sani, A. (2005). Determinants of utilization of antenatal care services in Kumbotso village, Northern Nigeria. *Tropical doctor,* 35(2)**,** 110-110.

Kabubo-Mariara, J., Ndenge, G. K. & Mwabu, D. K. (2009). Determinants of Children's Nutritional Status in Kenya: Evidence from Demographic and Health Surveys. *Journal of African Economies,* 18(3)**,** 363-387.

Kaiser, H. F. (1961). A Note on Guttman's Lower Bound for the Number of Common Factors. *British Journal of Statistical Psychology,* 14(1)**,** 1-2.

Kakwani, N. C. (1977). Measurement of tax progressivity: an international comparison. *The Economic Journal,* 87(345)**,** 71-80.

Kakwani, N. C., Wagstaff, A. & Van Doorslaer, E. (1997). Socioeconomic inequalities in health: Measurement, computation, and statistical inference. *Journal of Econometrics,* 77(1)**,** 87-103.

Kamal, N. & Zunaid, K. (2006). Education and women's Empowerment in Bangladesh. *Working Paper 11.*: Centre for Health, Population and Development at Independent University Bangladesh, Dhaka.

Kamanou, G. (2005). Methods of factor analysis for ordinal categorical data and application to poverty data. *The Many Dimensions of Poverty.* Brazil.

Katz, E. (1997). The intra-household economics of voice and exit. *Feminist Economics,* 3(3)**,** 25-46.

Khan, K. S., Wojdyla, D., Say, L., Glmezoglu, A. M. & Van Look, P. F. A. (2006). WHO analysis of causes of maternal death: a systematic review. *The Lancet,* 367(9516)**,** 1066-1074.

King, E. M., Klassen, S. & Porter, M. (2009). Women and Development. *In:* Lomborg, B. (ed.) *Global Crisis, Global Solutions.* 2nd ed. Cambridge: Cambridge University Press.

Kinney, M. V., Kerber, K. J., Black, R. E., Cohen, B., Nkrumah, F., Coovadia, H., Nampala, P. M., Lawn, J. E., on behalf of the Science in Action: Saving the lives of Africa's mothers, n. & children working, g. (2010). Sub-Saharan Africa's Mothers, Newborns, and Children: Where and Why Do They Die? *PLoS Med,* 7(6)**,** e1000294.

Kishor, S. (2000a). Empowerment of women in Egypt and links to the survival and health of their infants. *In:* Presser, H. & Sen, G. (eds.) *Women's Empowerment and Demographic Processes: Moving Beyond Cairo, .* New York: Oxford University Press.

Kishor, S. (2000b). Women's contraceptive use in Egypt: What do direct measures of empowerment tell us? . *Paper prepared for presentation at the annual meeting of the Population Association of America March 23-25, 2000.* Los Angeles, California.

Kishor, S. & Johnson, K. (2006). Reproductive health and domestic violence: are the poorest women uniquely disadvantaged? *Demography,* 43(2)**,** 293-307.

Koenker, R. & Bassett Jr, G. (1978). Regression quantiles. *Econometrica: journal of the Econometric Society***,** 33-50.

Koenker, R. & Hallock, K. F. (2001). Quantile Regression. *The Journal of Economic Perspectives,* 15(4)**,** 143-156.

Koenker, R. & Machado, J. A. F. (1999). Goodness of Fit and Related Inference Processes for Quantile Regression. *Journal of the American Statistical Association,* 94(448)**,** 1296-1310.

Kolenikov, S. & Angeles, G. (2009). Socioeconomic Status Measurement with Discrete Proxy Variables: Is Principal Component Analysis a Reliable Answer? *Review of Income and Wealth,* 55(1)**,** 128-165.

Kriger, N. J. (1991). *Zimbabwe's guerrilla war: peasant voices*: Cambridge University Press.

Kritz, M. M., Makinwa-Adebusoye, P. & Gurak, D. T. (2000). The Role of Gender Context in Shaping Reproductive Behavior in Nigeria. *In:* Presser, H. & Sen, G. (eds.) *Women's Empowerment and Demographic Process: Moving Beyound Cairo, .* New York: Oxford University Press.

Lartey, A. (2008). Maternal and child nutrition in Sub-Saharan Africa: challenges and interventions. *Proceedings of the Nutrition Society,* 67(01)**,** 105-108.

Lavy, V., Strauss, J., Thomas, D. & de Vreyer, P. (1996). Quality of health care, survival and health outcomes in Ghana. *Journal of Health Economics,* 15(3)**,** 333-357.

Lawn, J. E., Cousens, S. & Zupan, J. (2005). 4 million neonatal deaths: When? Where? Why? *The Lancet,* 365(9462)**,** 891-900.

Lawson, D. (2004). Determinants of Health Seeking Behavior in Uganda. Is it Just Income and User Fees that are Important? *Working Paper Series. Paper No. 6.* Institute for Development Policy and Management, University of Manchester.

Lawson, D. & Appleton, S. (2007). Child Health in Uganda: Policy Determinants and Measurement. *The European Journal of Development Research,* 19(2), 210-233.

Lerman, R. I. & Yitzhaki, S. (1989). Improving the accuracy of estimates of Gini coefficients. *Journal of Econometrics,* 42(1), 43-47.

Lewin, K. M. & Sabates, R. (2011). Changing Patterns of Access to Education in Anglophone and Francophone Countries in Sub Saharan Africa: Is Education for All Pro-Poor? *CREATE PATHWAYS TO ACCESS Research Monograph No. 52.* University of Sussex Centre for International Education.

Lindelow, M. (2006). Sometimes more equal than others: how health inequalities depend on the choice of welfare indicator. *Health Economics,* 15(3), 263-279.

Linnemayr, S., Alderman, H. & Ka, A. (2008). Determinants of malnutrition in Senegal: Individual, household, community variables, and their interaction. *Economics & Human Biology,* 6(2), 252-263.

Lokshin, M. & Ravallion, M. (2005). Self-rated power and welfare in Russia. *In:* Narayan, D. (ed.) *Measuring Empowerment: Cross-Disciplinary Perspectives.* Washington DC; The World Bank.

Lundberg, S. & Pollak, R. A. (1993). Separate Spheres Bargaining and the Marriage Market. *The Journal of Political Economy,* 101(6), 988-1010.

Lundberg, S. J., Pollak, R. A. & Wales, T. J. (1997). Do Husbands and Wives Pool Their Resources? Evidence from the United Kingdom Child Benefit. *The Journal of Human Resources,* 32(3), 463-480.

Mabsout, R. & van Staveren, I. (2010). Disentangling Bargaining Power from Individual and Household Level to Institutions: Evidence on Women Position in Ethiopia. *World Development,* 38(5), 783-796.

Magadi, M., Madise, N. & Diamond, I. (2001). Factors associated with Unfavourable Birth Outcomes in Kenya *Journal of Biosocial Science,* 33(02), 199-225.

Maine, D. & Rosenfield, A. (1999). The Safe Motherhood Initiative: why has it stalled? *American Journal of Public Health,* 89(4), 480-482.

Malhotra, A. & Mather, M. (Year). Do schooling and work empower women in developing countries? Gender and domestic decisions in Sri Lanka. *In:* Sociological Forum, 1997. Springer, 599-630.

Malhotra, A., Schuler, S. R. & Boender, C. (2002). Measuring Women's Empowerment as a Variable in International Development. Gender and Development Group of the World Bank, World Bank's Social Development Group and Norwegian trust fund.

Malik, M. & Bakir, A. (2007). Prevalence of overweight and obesity among children in the United Arab Emirates. *Obesity Reviews,* 8(1), 15-20.

Manser, M. & Brown, M. (1980). Marriage and household decision-making: A bargaining analysis. *International Economic Review*, 31-44.

Martorell, R. & Habicht, J. (1986). Growth in Early Childhood in Developing Countries. *In:* Falkner, F. & Tanner, J. (eds.) *Human Growth: A Comprehensive Treatise Vol 3 2nd Edition.* New York: Plenum Press.

Mason, K. (2005). Measuring Women's Empoerment: Learning from Cross-National Research. *In:* Narayan, D. (ed.) *Measuring Women's Empowerment: Cross Disciplinary Perspectives.* Washington DC: The World Bank.

Mason, K. O. & Smith, H. L. (2000). Husbands' versus Wives' Fertility Goals and Use of Contraception: The Influence of Gender Context in Five Asian Countries. *Demography,* 37(3), 299-311.

Mathews, S. A. & Gubhaju, B. (2004). Contextual influences on the use of antenatal care in Nepal. *DHS Geogrphic Studies 2.* Calverton, Marylan USA: Measure DHS OR Macro.

Matsumura, M. & Gubhaju, B. (2001). Women's Status, Household Structure and the Utilization of Maternal Health Services in Nepal. *Asia-Pacific Population Journal,* 16(1).

McElroy, M. B. & Horney, M. J. (1981). Nash-Bargained Household Decisions: Toward a Generalization of the Theory of Demand. *International Economic Review,* 22(2), 333-349.

McGillivray, M. & White, H. (1993). Measuring development? The UNDP's human development index. *Journal of International Development,* 5(2), 183-192.

Mekonnen, Y. & Mekonnen, A. (2003). Factors Influencing the Use of Maternal Healthcare Services in Ethiopia. *Journal of Health, Population, and Nutrition* 21(4), 374-82.

Mendez, M. A. & Adair, L. S. (1999). Severity and Timing of Stunting in the First Two Years of Life Affect Performance on Cognitive Tests in Late Childhood. *The Journal of Nutrition,* 129(8), 1555-1562.

Mensch, B. S., Ibrahim, B. L., Lee, S. M. & El-Gibaly, O. (2003). Gender-role Attitudes among Egyptian Adolescents. *Studies in Family Planning,* 34(1), 8-18.

Ministry of Health (2009). Pulling Together, Achieving More: Independent Review of the Health Sector Programme of Work 2008. Accra: Ministry of Health, Ghana.

Moghadam, V. M. (2005). The'feminization of Poverty'and Women's Human Rights. " *Papers in Women's Studies and Gender Research,* No. 2.

Mohan, B., Kumar, N., Aslam, N., Rangbulla, A., Kumbkarni, S., Sood, N. K. & Wander, G. S. (2004). Prevalence of sustained hypertension and obesity in urban and rural school going children in Ludhiana. *Indian Heart J,* 56(4), 310-4.

Montgomery, M. R., Gragnolati, M., Burke, K. A. & Paredes, E. (2000). Measuring Living Standards with Proxy Variables. *Demography,* 37(2), 155-174.

Morasae, E., Forouzan, A., Majdzadeh, R., Asadi-Lari, M., Noorbala, A. & Hosseinpoor, A. (2012). Understanding determinants of socioeconomic inequality in mental health in Iran's capital, Tehran: a concentration index decomposition approach. *International Journal for Equity in Health,* 11(1)**,** 18.

Morrisson, C. & Jütting, J. (2004). The Impact of Social Institutions on the Economic Role of Women in Developing Countries. *Working Paper No. 234.* Paris: OECD Development Centre

Moss, T. & Majerowicz, S. (2012). No Longer Poor: Ghana's New Income Status and Implications of Graduation from IDA. *Center for Global development Working Paper 300.* Washington: Center for Global Development.

Mrisho, M., Schellenberg, J. A., Mushi, A. K., Obrist, B., Mshinda, H., Tanner, M. & Schellenberg, D. (2007). Factors affecting home delivery in rural Tanzania. *Tropical Medicine & International Health,* 12(7)**,** 862-872.

Muhuri, P. K. & Preston, S. H. (1991). Effects of Family Composition on Mortality Differentials by Sex Among Children in Matlab, Bangladesh. *Population and Development Review,* 17(3)**,** 415-434.

Mullany, B. C., Hindin, M. J. & Becker, S. (2005). Can women's autonomy impede male involvement in pregnancy health in Katmandu, Nepal? *Social Science & Medicine,* 61(9)**,** 1993-2006.

Murphy, C. C., Schei, B., Myhr, T. L. & Du Mont, J. (2001). Abuse: a risk factor for low birth weight? A systematic review and meta-analysis. *CMAJ,* 164(11)**,** 1567-72.

Murthy, R. K. (1998). Viewpoint Power, institutions and gender relations: Can gender training alter the equations? *Development in Practice,* 8(2)**,** 203-211.

Mwabu, G. (2009). The Production of Child Health in Kenya: A Structural Model of Birth Weight. *Journal of African Economies,* 18(2)**,** 212-260.

Mwangome, M., Prentice, A., Plugge, E. & Nweneka, C. (2010). Determinants of Appropriate Child Health and Nutrition Practices among Women in Rural Gambia. *J HEALTH POPUL NUTR,* 28(2)**,** 167-172.

Narayan, D. (2005). Conceptual Framework and Methodological Challenges. *In:* Narayan, D. (ed.) *Measuring empowerment: Cross-disciplinary perspectives.* New York.

Navaneetham, K. & Dharmalingam, A. (2002). Utilization of maternal health care services in Southern India. *Social Science & Medicine,* 55(10)**,** 1849-1869.

Nhongo-Simbanegavi, J. (2000). *For better or worse?: women and ZANLA in Zimbabwe's liberation struggle*: Weaver Press Harare.

Nichols, D. L., Sanborn, C. F., Bonnick, S. L., Ben-Ezra, V., Gench, B. & DiMarco, N. M. (1994). The effects of gymnastics training on bone mineral density. *Medicine and science in sports and exercise,* 26(10)**,** 1220-5.

Nisar, N. & White, F. (2003). Factors affecting utilization of antenatal care among reproductive age group women (15-49 years) in an urban squatter settlement of Karachi. *JOURNAL-PAKISTAN MEDICAL ASSOCIATION,* 53(2)**,** 47-53.

Njong, A. M. & Ningaye, P. (2008). Characterizing weights in the measurement of multidimensional poverty: An application of data-driven approaches to Cameroonian data,. *OPHI Working Paper 21.* University of Dschang, Faculty of Economics and Management, Cameroon.

Nkonki, L. L., Chopra, M., Doherty, T. M., Jackson, D. & Robberstad, B. (2011). Explaining household socio-economic related child health inequalities using multiple methods in three diverse settings in South Africa. *Int J Equity Health,* 10(1)**,** 13.

North, D. C. (1990). *Institutions, institutional change and economic performance*. Cambridge, UK: Cambridge university press.

Nyanzi, B., Nyanzi, S., Wolff, B. & Whitworth, J. (2005). Money, men and markets: Economic and sexual empowerment of market women in southwestern Uganda. *Culture, Health & Sexuality: An International Journal for Research, Intervention and Care,* 7(1)**,** 13 - 26.

O'Donnell, O., van Doorslaer, E. & Lindelow, M. (2008). *Analysing Health Equity Using Household Survey Data: A Guide to Techniques and their Implementartion*. Washington DC: The World Bank.

O'Donnell, O., Van Doorslaer, E., Rannan-Eliya, R. P., Somanathan, A., Adhikari, S. R., Harbianto, D., Garg, C. C., Hanvoravongchai, P., Huq, M. N. & Karan, A. (2007). The incidence of public spending on healthcare: comparative evidence from Asia. *The World Bank Economic Review,* 21(1)**,** 93-123.

OECD (2008). Handbook on Constructing Composite Indicators : Methodology and User Guide. Paris, France: OECD.

Okojie, C. & Shimeles, A. (2006). Inequality in sub-Saharan Africa: a synthesis of recent research on the levels, trends, effects and determinants of inequality in its different dimensions London: The Inter-Regional Inequality Facility. Overseas Development Institute

Osmani, S. & Sen, A. (2003). The hidden penalties of gender inequality: fetal origins of ill-health. *Economics and Human Biology,* 1**,** 105-121.

Overbosch, G. B., Nsowah-Nuamah, N. N. N., van den Boom, G. J. M. & Damnyag, L. (2004). Determinants of Antenatal Care Use in Ghana. *Journal of African Economies,* 13(2)**,** 277-301.

Paluska, S. A. & Schwenk, T. L. (2000). Physical Activity and Mental Health: Current Concepts. *Sports Medicine,* 29(3)**,** 167-180.

Panis, C. W. A. & Lillard, L. A. (1995). Child Mortality in Malaysia: Explaining Ethnic Differences and the Recent Decline. *Population Studies,* 49(3)**,** 463-479.

Paredes, I., Hidalgo, L., Chedraui, P., Palma, J. & Eugenio, J. (2005). Factors associated with inadequate prenatal care in Ecuadorian women. *International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics,* 88(2)**,** 168.

Parkhurst, J. O., Penn-Kekana, L., Blaauw, D., Balabanova, D., Danishevski, K., Rahman, S. A., Onama, V. & Ssengooba, F. (2005). Health systems factors influencing maternal health services: a four-country comparison. *Health Policy,* 73(2)**,** 127-138.

Patel, A. M., Leonard, W. R., Reyes-García, V., McDade, T., Huanca, T., Tanner, S. & Vadez, V. (2007). Parental preference, bargaining power, and child nutritional status: Evidence from the Bolivian Amazon. *Tsimane' Amazonian Panel Study Working Paper No. 31.* Evanston I11, USA: Department of Anthropology, Northwestern University.

Pelletier, D. L. & Frongillo, E. A. (2003). Changes in Child Survival Are Strongly Associated with Changes in Malnutrition in Developing Countries. *The Journal of Nutrition,* 133(1)**,** 107-119.

Pfohl, M. & Schatz, H. (2001). Strategies for the prevention of type 2 diabetes. *Exp Clin Endocrinol Diabetes,* 109(Suppl 2)**,** S240,S249.

Pitt, M. M. & Rosenzweig, M. R. (1985). Health and Nutrient Consumption Across and Within Farm Households. *The Review of Economics and Statistics,* 67(2)**,** 212-223.

Pongou, R., Ezzati, M. & Salomon, J. A. (2006). Household and community socioeconomic and environmental determinants of child nutritional status in Cameroon. *BMC public health,* 6**,** 98.

Preston, S. H. (1975). The Changing Relation between Mortality and Level of Economic Development. *Population Studies,* 29(2)**,** 231-248.

Prista, A., Maia, J. A. R., Damasceno, A. & Beunen, G. (2003). Anthropometric indicators of nutritional status: implications for fitness, activity, and health in school-age children and adolescents from Maputo, Mozambique. *The American Journal of Clinical Nutrition,* 77(4)**,** 952-959.

Puoane, T., Steyn, K., Bradshaw, D., Laubscher, R., Fourie, J., Lambert, V. & Mbananga, N. (2002). Obesity in South Africa: The South African Demographic and Health Survey. *Obesity,* 10(10)**,** 1038-1048.

Quisumbing, A. R. (1994). Intergenerational transfers in Philippine rice villages : Gender differences in traditional inheritance customs. *Journal of Development Economics,* 43(2)**,** 167-195.

Quisumbing, A. R. & Brière, B. d. l. (2000). Women's Assets and Intrahousehold Allocation in Rural Bangladesh: Testing Measures of Bargaining Power. *FCND Discussion Paper 86.* Food Consumption and Nutrition Division of the International Food Policy Research Institute Washington, D.C. 20006 U.S.A.

Quisumbing, A. R., Brown, L. R., Feldstein, H. S., Haddad, L. & Peña, C. (1995). *Women: The key to food security*: International Food Policy Research Institute Washington, DC.

Quisumbing, A. R. & Maluccio, J. A. (2003). Resources at Marriage and Intrahousehold Allocation: Evidence from Bangladesh, Ethiopia, Indonesia, and South Africa*. *Oxford Bulletin of Economics and Statistics,* 65(3)**,** 283-327.

Rahman, M., Haque, S., Mostofa, M., Tarivonda, L. & Shuaib, M. (2011). Wealth inequality and utilization of reproductive health services in the Republic of Vanuatu: insights from the multiple indicator cluster survey, 2007. *International Journal for Equity in Health,* 10(1)**,** 58.

Rasmussen, S. A. & Galuska, D. A. (2010). Prepregnancy obesity and birth defects: what's next? *The American Journal of Clinical Nutrition,* 91(6)**,** 1539-1540.

Razak, F., Anand, S. S., Shannon, H., Vuksan, V., Davis, B., Jacobs, R., Teo, K. K., McQueen, M., Yusuf, S. & Investigators, f. t. S. (2007). Defining Obesity Cut Points in a Multiethnic Population. *Circulation,* 115(16)**,** 2111-2118.

Rico, E., Fenn, B., Abramsky, T. & Watts, C. (2011). Associations between maternal experiences of intimate partner violence and child nutrition and mortality: findings from Demographic and Health Surveys in Egypt, Honduras, Kenya, Malawi and Rwanda. *Journal of Epidemiology and Community Health,* 65(4)**,** 360-367.

Rivara, F. P., Anderson, M. L., Fishman, P., Bonomi, A. E., Reid, R. J., Carrell, D. & Thompson, R. S. (2007). Intimate Partner Violence and Health Care Costs and Utilization for Children Living in the Home. *Pediatrics,* 120(6)**,** 1270-1277.

Ronsmans, C. & Graham, W. J. (2006). Maternal mortality: who, when, where, and why. *The Lancet,* 368(9542)**,** 1189-1200.

Rosato, M., Laverack, G., Grabman, L. H., Tripathy, P., Nair, N., Mwansambo, C., Azad, K., Morrison, J., Bhutta, Z., Perry, H., Rifkin, S. & Costello, A. (2008). Community participation: lessons for maternal, newborn, and child health. *The Lancet,* 372(9642)**,** 962-971.

Rosenweig, M. & Schultz, T. P. (1982). The behaviour of mother as inputs to child health. *In:* in V. Fuchs (ed) (ed.) *Economic Aspects of Health.* Chicago: University of Chicago Press.

Rosenzweig, M. R. & Schultz, T. P. (1983). Estimating a Household Production Function: Heterogeneity, the Demand for Health Inputs, and Their Effects on Birth Weight. *Journal of Political Economy,* 91(5)**,** 723-746.

Ross, J. & Blanc, A. (2012). Why Aren't There More Maternal Deaths? A Decomposition Analysis. *Maternal and Child Health Journal,* 16(2)**,** 456-463.

Roy, T. & Niranjan, S. (2004). Indicators of women‚Äôs empowerment in India. *Asia-Pacific Population Journal,* 19(3)**,** 23-38.

Rubalcava, L. & Thomas, D. (2000). Family bargaining and welfare. *Labour and Population Programe Working Paper Series No. RAND/DRU-2342-NICHD/NSF.* DTIC Document.

Rubin, K., Schirduan, V., Gendreau, P., Sarfarazi, M., Mendola, R. & Dalsky, G. (1993). Predictors of axial and peripheral bone mineral density in healthy children and adolescents, with special attention to the role of puberty. *The Journal of Pediatrics,* 123(6)**,** 863-870.

Rutstein, S. O. & Johnson, K. (2004). The DHS Wealth Index. *DHS Comparative Report No. 6.* Calverton, Maryland: ORC Macro.

Rutstein, S. O. & Rojas, G. (2006). Guide to DHS Statistics. *Demographic and Health Surveys.* Calverton, Maryland: ORC Macro.

Sahn, D. E. (1994). The Contribution of Income to Improved Nutrition in Cote d'Ivoire. *Journal of African Economies,* 3(1)**,** 29-61.

Sahn, D. E. & Alderman, H. (1997). On the determinants of nutrition in Mozambique: The importance of age-specific effects. *World Development,* 25(4)**,** 577-588.

Sahn, D. E. & Stifel, D. C. (2000). Poverty Comparisons Over Time and Across Countries in Africa. *World Development,* 28(12)**,** 2123-2155.

Sahn, D. E. & Stifel, D. C. (2002). Parental Preferences for Nutrition of Boys and Girls: Evidence from Africa. *Journal of Development Studies,* 39(1)**,** 21-45.

Sahn, D. E. & Stifel, D. C. (2003a). Exploring Alternative Measures of Welfare in the Absence of Expenditure Data. *the Review of Income and Wealth,* 49(4)**,** 463-489.

Sahn, D. E. & Stifel, D. C. (2003b). Urban-Rural Inequality in Living Standards in Africa. *Journal of African Economies,* 12(4)**,** 564-597.

Sahn, D. E. & Younger, S. D. (2000). Expenditure incidence in Africa: microeconomic evidence. *Fiscal Studies,* 21(3)**,** 329-347.

Sahn, D. E. & Younger, S. D. (2009). Measuring intra-household health inequality: explorations using the body mass index. *Health Economics,* 18(S1)**,** S13-S36.

Sahn, D. E., Younger, S. D. & Genicot, G. (2003). The Demand for Health Care Services in Rural Tanzania. *Oxford Bulletin of Economics and Statistics,* 65(2)**,** 241-260.

Sarkar, N. N. (2008). The impact of intimate partner violence on women's reproductive health and pregnancy outcome. *Journal of Obstetrics & Gynaecology,* 28(3)**,** 266-271.

Schneider, F. (2002). Size and Measurement of the Informal Economy in 110 Countries Around the World *Paper presented at the Workshop of Australian National Tax Centre.* ANU, Canberra, Australia July 17.

Schuler, S. R. & Hashemi, S. M. (1994). Credit Programs, Women's Empowerment, and Contraceptive use in Rural Bangladesh. *Studies in Family Planning,* 25(2)**,** 65-76.

Secker, D. J. & Jeejeebhoy, K. N. (2007). Subjective Global Nutritional Assessment for children. *The American Journal of Clinical Nutrition,* 85(4)**,** 1083-1089.

Seidell, J. C. (2000). Obesity, Insulin Resistance and Diabetes ,A Worldwide Epidemic. *British Journal of Nutrition,* 83(SupplementS1)**,** S5-S8.

Seidman, G. W. (1984). Women in Zimbabwe: Postindependence Struggles. *Feminist Studies***,** 419-440.

Seidman, G. W. (1993). " No Freedom without the Women": Mobilization and Gender in South Africa, 1970-1992. *Signs***,** 291-320.

Sen, A. (1999). *Development as Freedom.* . Oxford: Oxford University Press.

Sen, G. & Batliwala, S. (2000). Empowering women for reproductive rights *In:* Presser, H. & Sen, G. (eds.) *Women's empowerment and demographic process.* Oxford: Oxford University Press.

Sesso, H. D., Paffenbarger, R. S. & Lee, I.-M. (2000). Physical Activity and Coronary Heart Disease in Men : The Harvard Alumni Health Study. *Circulation,* 102(9)**,** 975-980.

Sethuraman, K. (2008). The Role of Women's Empowerment and Domestic Violence in Child Growth and Under Nutrition in a Tribal and Rural Community in South India. *UNU Wider Reserch Paper No. 2008/15.* Helsinki: UNU WIDER World Institute for Development Economics Reserch.

Sethuraman, K., Lansdown, R. & Sullivan, K. (2006). Women's empowerment and domestic violence: The role of sociocultural determinants in maternal and child undernutrition in tribal and rural communities in South India. *Food & Nutrition Bulletin,* 27(2)**,** 128-143.

Sharps, P. W., Laughon, K. & Giangrande, S. K. (2007). Intimate Partner Violence and the Childbearing Year. *Trauma, Violence, & Abuse,* 8(2)**,** 105-116.

Shroff, M., Griffiths, P., Adair, L., Suchindran, C. & Bentley, M. (2009). Maternal autonomy is inversely related to child stunting in Andhra Pradesh, India. *Maternal & Child Nutrition,* 5(1)**,** 64-74.

Silverman, J. G., Decker, M. R., Reed, E. & Raj, A. (2006). Intimate partner violence victimization prior to and during pregnancy among women residing in 26 U.S. states: Associations with maternal and neonatal health. *American Journal of Obstetrics and Gynecology,* 195(1)**,** 140-148.

Skinner, G. W. (1997). Family systems and demographic processes, pp. 53-95, . *In:* Kertzer, D. I. & Fricke, T. (eds.) *Anthropological demography: Toward a new synthesis.* Chicago: University of Chicago Press.

Smith, L. C., Ramakrishnan, U., Ndiaye, A., Haddad, L. & Martorell, R. (2003). The Importance of Women’s Status for Child Nutrition in Developing Countries. *Sustainable Solutions for Ending Hunger and Poverty.* Washington, DC: International Food Policy Research Institute, Department of International Health, Emory University.

Social Watch (2009). Gender Equity Index for 2009. Social Watch.

Staiger, D. & Stock, J. H. (1997). Instrumental Variables Regression with Weak Instruments. *Econometrica,* 65**,** 557-586.

StataCorp (2009). Stata SE for Mac. 11.2 ed. College Stattion , Texas.

Stein, H. (2000). Economic Development and the Anatomy of Crisis in Africa: From Colonialism through Structural Adjustment. *Occasional Paper.* Centre of African Studies, University of Copenhagen.

Stephenson, R. & Tsui, A. O. (2002). Contextual influences on reproductive health service use in Uttar Pradesh, India. *Studies in Family Planning,* 33(4)**,** 309-320.

Stock, J. H. & Yogo, M. (2005). Testing for weak instruments in linear IV regression *In:* Andrews, D. W. K. & Stock, J. H. (eds.) *Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothenberg.* Cambridge: Cambridge University Press.

Stover, J. & Ross, J. (2010). How Increased Contraceptive Use has Reduced Maternal Mortality. *Maternal and Child Health Journal,* 14(5)**,** 687-695.

Strauss, J. (1990). Households, Communities, and Preschool Children's Nutrition Outcomes: Evidence from Rural Côte d'Ivoire. *Economic Development and Cultural Change,* 38(2)**,** 231-261.

Strauss, J. & Thomas, D. (1995). Chapter 34 Human resources: Empirical modeling of household and family decisions. *In:* Jere, B. & Srinivasan, T. N. (eds.) *Handbook of Development Economics.* Elsevier.

Subramanian, S. V., Ackerson, L. K., Davey Smith, G. & John, N. A. (2009). Association of Maternal Height With Child Mortality, Anthropometric Failure, and Anemia in India. *JAMA: The Journal of the American Medical Association,* 301(16)**,** 1691-1701.

The Economist. (2011). *Africa's Impressive Growth* [Online]. Available: http://www.economist.com/blogs/dailychart/2011/01/daily_chart [Accessed 18th April 2013].

Thomas, D. (1990). Intra-Household Resource Allocation: An Inferential Approach. *The Journal of Human Resources,* 25(4)**,** 635-664.

Thomas, D. (1994). Like Father, like Son; Like Mother, like Daughter: Parental Resources and Child Height. *The Journal of Human Resources,* 29(4)**,** 950-988.

Thomas, D., Contreras, D. & Frankenberg, E. (1997). Child Health and the Distribution of Household Resources at Marriage. RAND, Santa Monica, California, and University of California at Los Angeles, Department of Economics.

Thomas, D., Lavy, V. & Strauss, J. (1996). Public policy and anthropometric outcomes in the Cote d'Ivoire. *Journal of Public Economics*, 61(2)**,** 155-192.

Tilak, J. B. G. (2009). Basic Education and Development in Sub-Saharan Africa. *Journal of International Cooperation in Education,* 12(1)**,** 5-17.

Tolhurst, R., Amekudzi, Y. P., Nyonator, F. K., Bertel Squire, S. & Theobald, S. (2008). "He will ask why the child gets sick so often": The gendered dynamics of intra-household bargaining over healthcare for children with fever in the Volta Region of Ghana. *Social Science & Medicine*, 66(5)**,** 1106-1117.

Trapp, E. M. & Menken, J. (2005). Assessing Child Nutrition: Problems with Anthropometric Measures as a Proxy for Child Health in Malnourished Populations *IBS Working Paper.* Colorado Boulder: Research Program on Population Processes POP2005-06. Institute of Behavioural Science, University of Colorado.

Udry, C. (1996). Gender, Agricultural Production, and the Theory of the Household. *The Journal of Political Economy,* 104(5)**,** 1010-1046.

UNDP (2005). Taking Action: Achieving Gender Equality and Empowering Women. UN Millennium Project Task Force on Education and Gender Equality 2005. London: United Nations Development Programme.

UNDP (2010). Human Development Report: The Real Wealth of Nations, Pathways to Human Development. New York: United Nations.

UNDP (2011). Sustainability and Equity: A Better Future for All. *Human Development Report 2011.* New York: United Nations Development Programme.

UNICEF (1998). The State of the World's Children. New York: Oxford University Press.

United Nations (2010a). The Millennium Development Goals Report 2010. New York: United Nations.

United Nations (2010b). The World's Women 2010: Trends and Statistics. *In:* Mrkić, S., Johnson, T. & Rose, M. (eds.) *ST/ESA/STAT/SER.K/19.* New York: Department of Economic and Social Affairs.

United Nations (2011). The Millennium Development Goals Report 2010. New York: United Nations.

Uthman, O. (2009a). Patterns, distribution, and determinants of under- and overnutrition among women in Nigeria: a population-based analysis. *Journal of Public Health,* 17(5)**,** 289-299.

Uthman, O. (2009b). Using extended concentration and achievement indices to study socioeconomic inequality in chronic childhood malnutrition: the case of Nigeria. *International Journal for Equity in Health,* 8(1)**,** 22.

Valladares, E., Ellsberg, M., Pena, R., Hogberg, U. & Persson, L. A. (2002). Physical partner abuse during pregnancy: a risk factor for low birth weight in Nicaragua. *Obstet Gynecol,* 100(4)**,** 700-5.

Van de Poel, E., Hosseinpoor, A., Jehu-Appiah, C., Vega, J. & Speybroeck, N. (2007). Malnutrition and the disproportional burden on the poor: the case of Ghana. *International Journal for Equity in Health,* 6(1)**,** 21.

van Doorslaer, E. & Koolman, X. (2004). Explaining the differences in income-related health inequalities across European countries. *Health Economics,* 13(7)**,** 609-628.

van Doorslaer, E., Koolman, X. & Jones, A. M. (2004). Explaining income related inequalities in doctor utilisation in Europe. *Health Economics,* 13(7)**,** 629-647.

van Doorslaer, E., Masseria, C. & Koolman, X. (2006). Inequalities in access to medical care by income in developed countries. *Canadian medical association journal,* 174(2)**,** 177-183.

Vella, F. (1994). Gender Roles and Human Capital Investment: The Relationship between Traditional Attitudes and Female Labour Market Performance. *Economica,* 61(242)**,** 191-211.

Verick, S. (2008). The Impact of Globalization on the Informal Sector in Africa. Addis Ababa: Economic and SocialPolicy Division, UNECA.

Wagner, D. R. & Heyward, V. H. (2000). Measures of body composition in blacks and whites: a comparative review. *The American Journal of Clinical Nutrition,* 71(6)**,** 1392-1402.

Wagstaff, A. (2002). Inequality aversion, health inequalities and health achievement. *Journal of Health Economics,* 21(4)**,** 627-641.

Wagstaff, A. (2005). The bounds of the concentration index when the variable of interest is binary, with an application to immunization inequality. *Health Economics,* 14(4)**,** 429-432.

Wagstaff, A. (2009). Correcting the concentration index: a comment. *Journal of Health Economics,* 28(2)**,** 516-520.

Wagstaff, A., Paci, P. & Van Doorslaer, E. (1991). On the measurement of inequalities in health. *Social Science & Medicine,* 33(5)**,** 545-557.

Wagstaff, A. & van Doorslaer, E. (2000). Measuring and testing for inequity in the delivery of health care. *Journal of Human Resources***,** 716-733.

Wagstaff, A., Van Doorslaer, E. & Watanabe, N. (2003). On decomposing the causes of health sector inequalities with an application to malnutrition inequalities in Vietnam. *Journal of Econometrics,* 112(1)**,** 207-223.

Wagstaff, A. & Watanabe, N. (2000). Socioeconomic inequalities in Child Malnutrition in the Developing World *World Bank Policy Research Working Paper 2434.* Washington: World Bank.

Wagstaff, A. & Watanabe, N. (2003). What difference does the choice of SES make in health inequality measurement? *Health Economics,* 12(10)**,** 885-890.

Wahhaj, Z. & Kanzianga, H. (2010). Gender, Social Norms and Household Production in Burkina Faso. *CASE Working Paper Series No. WPS/2010-33. 2010.*

Wang, Y., Moreno, L. A., Caballero, B. & Cole, T. J. (2006). Limitations of the current World Health Organization growth references for children and adolescents. *Food and Nutrition Bulletin,* 27(4)**,** 175 -188.

Wannamethee, S. G. & Shaper, A. G. (2002). Physical Activity and Cardiovascular Disease. *Seminars in Vascular Medicine,* 02(03)**,** 257,266.

WEIGO. (2012). *Informal economy statistical picture. www.http://wiego.org/informal-economy/statistical-picture* [Online]. [Accessed 6th February 2013].

Wells, J. C. K. (2001). A critique of the expression of paediatric body composition data. *Archives of Disease in Childhood,* 85(1)**,** 67-72.

Weyerer, S. (1992). Physical Inactivity and Depression in the Community. *Int J Sports Med,* 13(06)**,** 492,496.

WHO (1994a). Antenatal Care: Report of a Technical Working Group, . Geneva, 31 October-4 November: World Health Organization.

WHO (1994b). Mother Baby-Pakage: Implementing Safe Motherhood in Counries - Practical Guide. Geneva: Maternal Health and Safe Motherhood Programme Division of Family Health World Health Organisation.

WHO (1995). Physical Status: The Use and Interpretation of Anthropometry, Report of a WHO Expert Committee. *World Health Organ Tech Rep Ser 854:1–452.* World Health Organisation.

WHO (2004). Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. *Lancet,* 363(9403)**,** 157–163.

WHO (2010). Trends in Maternal Mortality: 1990 to 2008 Estimates developed by WHO, UNICEF, UNFPA and The World Bank. 20 Avenue Appia, 1211 Geneva 27, Switzerland: World Health Organization.

WHO Multicentre Growth Reference Study Group & de Onis, M. (2006). WHO Child Growth Standards based on length/height, weight and age. *Acta Pædiatrica,* 95**,** 76-85.

William G, A. & Scott T, Y. (2001). Social Change, the Social Organization of Families, and Fertility Limitation. *American Journal of Sociology,* 106(5)**,** 1219-1261.

Williams, J. (2005). Measuring gender and women's empowerment using confirmatory factor analysis. *Working paper POP2005-01.* Population Program, Institute of Behavioural Science. University of Colorado, Boulder.

Williamson, O. E. (1998). The institutions of governance. *The American Economic Review,* 88(2)**,** 75-79.

Williamson, O. E. (2000). The new institutional economics: taking stock, looking ahead. *Journal of economic literature***,** 595-613.

Wolfe, B. L. & Behrman, J. R. (1987). Women's schooling and children's health : Are the effects robust with adult sibling control for the women's childhood background? *Journal of Health Economics,* 6(3)**,** 239-254.

Wong, E. L., Popkin, B. M., Guilkey, D. K. & Akin, J. S. (1987). Accessibility, quality of care and prenatal care use in the Philippines. *Social Science & Medicine,* 24(11)**,** 927-944.

World Bank (2006). Repositioning Nutrition as Central to Development: A strategy for Large-Scale Action. *Directions in Development.* Washington DC: The World Bank.

World Bank (2007). The 2007 Global Monitoring Report. Confronting the Challenges of gender Inequality and Fragile States. Washington DC: The World Bank.

World Bank (2010). World Development Indicators. (ISBN 978-0-8213-8232-5).

World Bank (2012). World Development Indicators.

World Economic Forum (2010). The Global gender Gap Report for 2010.

Xu, F., Yin, X. M., Zhang, M., Leslie, E., Ware, R. & Owen, N. (2005). Family average income and body mass index above the healthy weight range among urban and rural residents in regional Mainland China. *Public Health Nutrition,* 8(1)**,** 47-51.

Yoong, J., Rabinovich, L. & Diepeveen, S. (2012). The impact of economic resource transfers to women versus men: A systematic review. *Technical Report.* London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.

Zere, E., Kirigia, J., Duale, S. & Akazili, J. (2012). Inequities in maternal and child health outcomes and interventions in Ghana. *BMC public health,* 12(1)**,** 252.

Zere, E. & McIntyre, D. (2003). Inequities in under-five child malnutrition in South Africa. *International Journal for Equity in Health,* 2(1)**,** 7.

Zere, E., Oluwole, D., Kirigia, J., Mwikisa, C. & Mbeeli, T. (2011). Inequities in skilled attendance at birth in Namibia: A decomposition analysis. *BMC Pregnancy and Childbirth,* 11(1)**,** 34.

Zere, E., Tumusiime, P., Walker, O., Kirigia, J., Mwikisa, C. & Mbeeli, T. (2010). Inequities in utilization of maternal health interventions in Namibia: implications for progress towards MDG 5 targets. *International Journal for Equity in Health,* 9(1)**,** 16.

Zhan, M. & Sherraden, M. (2003). Assets, Expectations, and Children's Educational Achievement in Female-Headed Households. *Social Service Review,* 77(2)**,** 191-211.