FINANCIAL SECTOR DEVELOPMENT, INCOME INEQUALITY AND HUMAN WELFARE IN SUB SAHARAN AFRICA

A Thesis submitted to the University of Huddersfield in partial fulfilment of the requirements for the Degree of Doctor of Philosophy in Finance

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ABSTRACT

This thesis contains the findings of an examination of the joint and endogenous evolution of financial development, income inequality and human welfare using data for a sample of 29 Sub-Sahara African countries from 1990 to 2010. Specifically, the study purposed to investigate whether the relationship between human welfare measured by the aggregate Human Development Index and financial sector measured by broad money (M2) is influenced by the level of income inequality in SSA. Unlike previous studies, this study uses the Vector Error Correction Model (VECM) methodology to correct for biases arising from the presence of unit roots, serial correlation and endogeneity.

The results suggest that financial sector development measured by its size or broad money as a percentage of GDP (M2/GDP) yields a disproportionately higher and significant robust effect on living standards in SSA when national incomes are highly unequally distributed (GINI > 0.45) both in the long and short run. This finding is strongly causal and irrespective of whether a multidimensional measure of welfare such as the human development index (HDI) or a one-dimensional measure such as the infant mortality rate is employed. Also, the finding that high income inequality is not a fatality in SSA could be taken as evidence in support of the Kuznets (1955) hypothesis.

In addition, the results suggest that the disproportionate impact of financial sector deepening (credit to the private sector) on human welfare in the highly unequal countries only occurs in the long run. Contrary to Beck *et al.* (2007), the liquidity, savings and transactions functions offered by a more developed financial sector in terms of broad money (M2) provides a higher economic wellbeing for the residents of our highly unequal SSA sub-sample than credit issued to private individuals and businesses. Again, this study found that the disproportionate impact of financial sector development in the highly unequal countries is related to an average ratio to GDP of broad money (M2) of 25 percent and credit to the private sector of 18 percent calculated independently of the VECM model. The implication is that these average ratios could be important thresholds for which the impact of financial development on human welfare becomes vital. This is consistent with theories that suggest that there is increasing returns to scale as the financial sector develops from a lower level.

Consequently, and because of the finding that there is strong causality between M2 and human welfare in the highly unequal SSA countries in our sample, any policy designs to combat poverty and enhance living standards in such countries must have a strong financial sector development component. Then too, the findings suggest that low income SSA countries must enact adequate policies to increase the size and depth of their financial sectors to reach at least, a long term average ratio to GDP of 25 percent for M2 and 18 percent for credit to the private sector.

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To my beloved wife *Becky Elvira*

For love, patience and encouragement

My daughters,

Jordin Nannerl & Grace Eliada

My son,

Joseph Junior

For love, patience and inspiration

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LIST OF ABBREVIATIONS

2SLS	Two Stage Least Squares
CEMAC	Economic Community of Central African States
COMESA	Common Market for Eastern and Southern Africa
ECM	Error Correction Model
ECOWAS	Economic Community of West African States
FDI	Foreign Direct Investment
GMM	Generalized method of Moments
HDI	Human Development Index
HDR	Human Development Report
LAC	Latin America and Caribbean
LMIC	Low and Middle Income Countries
M2	Money and quasi money (liquid liabilities)
MDGs	Millennium Development Goals
ODA	Overseas Development Assistance
OLS	Ordinary Least Squares
SSA	Sub-Sahara Africa
UN	United Nations
UNDP	United Nations Development Programme
VECM	Vector Error Correction Model
WDI	World Development Indicators
WLS	Weighted Least Squares

CHAPTER ONE

INTRODUCTION

Introduction

The overriding purpose of this thesis is to study the joint and endogenous evolution of financial development, income inequality and human welfare using a sample of 29 SSA countries with continuous data on the Human Development Index (HDI) from 1990 to 2010. In this light, it *first* of all would assess whether all SSA countries are the same as a contribution to the debate on the African dummy. *Secondly*, it would explore the nature of the relationship between human welfare and financial sector development in SSA. *Thirdly*, and most importantly, it would investigate whether the relationship between human welfare and financial sector development is likely to depend on the level of income inequality in SSA. Fourthly, using cointegration and vector error correction modelling (VECM) it shall explore whether any relationship between human welfare and financial sector development conditional on income inequality is likely to be different for the short and long run. *Finally*, it seeks to know whether there is strong causality in the latter relationship and the direction of that causality.

In what follows, the background of the study, motivation, research questions and contribution, research strategy and organization of the study are presented in turn.

1.1. Background

The preponderance of economic growth over human welfare in the development process is analogous to the corporate governance issue of prioritizing shareholder value over stakeholder value in optimal corporate management. The reasoning in corporate governance is that managers should seek to maximize shareholder value because shareholders have only one objective - to maximize their profits whereas stakeholders include multiple groups with diffuse and competing objectives driven by special interests (Jensen, 2001, p.8). Thus, even though human welfare should be the ultimate goal of the development process, economists rather focus on income growth as the finality of it (Solow, 1956; Lucas, 1988). This is so because while human welfare could mean so many things including for example, level of educational attainment, standards of living, life expectancy, infant mortality rates and even quality of shelter, economic growth, a single and seemingly easily achievable objective, is thought to have the power to drive the

improvement or not, of these competing human welfare objectives (UN HDR, 2004; Pinkovskiy and Sala-i-Martin, 2010).

However, some researchers tend to disagree with the view that economic growth should be the ultimate pursuit by those involved in promoting and measuring the development process. For example, Easterly (2006, p. 158) points out that, 'the link from efforts and inputs – medicines, vaccination, food, construction of classrooms and water infrastructure, power generation, regulation simplification, etc – to results is simpler and clearer in health, education, nutrition, water, electrification, piecemeal policy reform than with other more general goals, such as how to achieve overall economic growth.' Nonetheless, we remark that since Denison (1962), economists have been in search of the sources of economic growth rather than piecemeal policy reforms that work on a case by case basis in their quest to provide answers on how to enhance the living conditions of countries. This is so because it is generally believed that economic growth is what would solve all social and economic problems of countries. Thirlwall, 2006, p. 47) remarks that until the advent of the Human Development Index in 1990 by the United Nations, the common practice amongst economists comparing living standards amongst countries has been to compare their income per capita.

Hence, over five decades since Denison (1962), economists have focused their energies almost entirely on how to achieve economic growth, and opinions on the sources of growth have remained muddled. For example, Honohan (2004a) remarks that while suggested determinants of economic growth have not always been robust in different empirical growth model specifications, economists have recently been overwhelmed by the high degree of significance of financial development variables in growth regressions especially since the cross-country study by King and Levine (1993a). Also, and prior to Honohan (*op. cit.*), the seminal contributions of Schumpeter (1912), Goldsmith (1969) as well as Shaw (1973) and Mckinnon (1973) had suggested the existence of an important relationship between financial intermediary development and economic growth. This further reinforces the belief that economic growth should be the finality of the development process and that researchers should focus on its sources.

In effect, with regards to financial development as a source of economic growth, there have been a large number of studies either verifying the conclusions of King and Levine (1993a) using the same datasets and methods or different datasets and methods. Levine (2005) provides a summary of such studies investigating the relationship between financial development and economic growth and concludes that financial development is vital for economic progress.

Broadly speaking, by the close of the 20th century, most studies on the finance-growth nexus strongly supported the view that financial sector development was crucial in the process of economic expansion of countries. This is so because in theory, the development of financial intermediation enhances capital accumulation and productivity which are growth enabling (King and Levine, 1993a, b; Rousseau, 2003; Levine, 1997, 2005).

Nonetheless, there are some contentions to this view. Rousseau and Wachtel (2011) cast some doubts regarding the important positive relationship between economic growth and financial deepening, which had become more of an empirical regularity. They hold that this relationship is rather dynamic, that is, tends to change sign with the passing of time. Also, the findings of some recent authors suggest that financial development is only good for economic expansion up to a certain threshold. For example, Cecchetti and Kharoubi (2012) have found that credit to the private sector as a share of GDP is only good for economic growth up to 90 percent whereas Arcand, *et al.* (2015) found that the goodness of credit threshold is 100 percent. Moreover, Aizenman et *al.* (2015) have equally suggested a diminishing role for credit in advanced economies. In addition, the vital role of credit expansion in economic prosperity has been challenged by recent studies looking at the impact of the boom-bust credit cycle on the real economy. Hence, Schularick and Taylor (2009) and Oscar *et al.* (2011) who study a host of financial crises, find that periods of rapid credit intensive expansions are followed by very severe economic recessions and slow recoveries.

However, despite these recent controversies on the finance–growth nexus, some researchers have found some exciting virtues in developing the formal financial sector especially in developing countries as illustrated in the following assertion by Ross Levine (2007):

> *The operation of the formal financial system is profoundly important for the poor. It influences how many people are hungry, homeless, and in pain. It shapes the gap between the rich and the poor. It arbitrates who can start a business and who cannot, who can pay for education and who cannot, who can attempt to realize one's dreams and who cannot. Finance affects the degree to which economic opportunities are defined by talent and initiative or by parental wealth and social connections. (Levine, 2007, p. 1)*

This statement, drawn from Ross Levine's paper presented during the 2007 Maxwell Fry Global Finance Conference in Birmingham Business School suggests two things. First, it downplays the importance that prior authors had placed on economic growth as a sole barometer

of assessing the impact of financial development. Secondly, it gives a clear suggestion of how the formal financial system can influence many dimensions of welfare including poverty and income inequality apart from its contribution to economic growth. If anything, financial development promotes equity through human capital formation and asset accumulation, when it relaxes credit constraints especially for the poor, a view espoused by Banerjee and Newman (1993). Then too, Easterly (2006, p. 67) finely coins the virtue of finance by asserting that 'financial markets (1) are a great source of free-market efficiency, and (2) create opportunities for anyone to get rich by borrowing and investing.'

Even though the simple relationship between financial sector development and economic growth has caused much ink to be laid on paper, researchers have often times failed to realize that unlike in developed countries, financial development or deepening of financial markets in developing countries usually happens amidst large disparities in income distribution. Hence, despite the suggestion that it is an interesting source of free-market efficiency and crucial for economic growth, economists searching for the sources of growth must deal with the challenges of uneven distribution of income in countries. In fact, Simon Kuznets had suggested in 1955 that there is an inverted U-shaped relationship between income inequality and economic growth, such that income inequality increases with increase in incomes in the early stages of the development process of countries. Bringing this literature into perspective is essential for understanding the role of financial intermediaries and markets in the development process when incomes are expected to be highly unequally distributed. This is important because such financial sector development could be happening in developing countries in Latin America or in Sub-Sahara Africa (SSA) where persistent income inequality has frequently been associated with murky growth. In effect, Deininger and Squire (1996, 1998), Perotti (1996), Barro (2000), and Sukiassyan (2007) have found some evidence that income inequality is bad for economic growth and consequently for human welfare in developing countries.

To buttress the above point, we take the example of the human development index (HDI) of the United Nations which is some kind of an aggregate measure of human welfare. The Human development report (2010) team calculated inequality-adjusted human development indexes and found that while the simple HDI has an average value of 0.704 for the group of Latin American and Caribbean (LAC) countries and 0.389 for Sub-Saharan Africa region, the inequality-adjusted HDI has a value of 0.527 and 0.261 respectively for LAC and SSA countries on a scale of 1 for high human development and 0 for low human development. This implies that persistent income inequality depressed human welfare, on average, by 25.1 and 32.8 percentage

points respectively for LAC and SSA regions in that year. One view to this adjusted measure is that, whereas economic growth restarted in SSA in 1995 after about a decade of stagnation, income inequality might be limiting the impact of that growth on human welfare. Yet another view could be to ask whether the UN is justified in calculating an inequality adjusted measure when other socio-economic parameters such as financial sector liberalization which started in the 1990s in SSA tend to matter both for growth and income inequality. For instance and according to theories by Demirguc-Kunt and Levine (2009), policies which improve the development of the financial sector are beneficial to human welfare because finance tends to concurrently reduce income inequality and enhance economic growth.

As such, if the above assertion by Demirguc-Kunt and Levine (2009) were verifiable, then one would empirically find that finance invariably either enhances economic growth or reduces the level of income inequality or both, with a positive consequence on human welfare. For example, Claessens and Feijen (2006, 2007) have found that financial sector development improves on living standards measured by various one-dimensional measures of welfare such as infant mortality, undernourishment and consumption in a sample of developed and developing countries, even though Sen (1999) argues that one-dimensional measures do not adequately capture the sufferings of the poor. Moreover, studies by Beck *et al.* (2007) and Canavire-Baccareza and Rioja (2008) using respectively a global sample and a Latin American sample suggest that financial development enhances welfare by promoting growth and reducing income inequality. These findings, taken together, suggest that finance either directly enhances human welfare or does so through promoting income growth and tightening the distribution of incomes. This somehow, downplays an income inequality adjusted HDI and could suggest that income inequality and growth are not telling the whole story about what matters for human welfare in SSA.

Surprisingly though, Go *et al.* (2007) have found that financial sector and income inequality variables are insignificant when measures such as the level of schooling and infant mortality are used as dependent variables in the case of SSA. Also, Singh and Huang (2015) have found that private credit reduces poverty in SSA only when it is interacted with a measure of property rights. Then too, some theories tend to suggest that financial development might rather widen income inequality if financial regulation or the political system is dominated by entrenched insiders who benefit from any enlargement of the financial sector while risks are socialized (Greenwood and Jovanovic, 1990; Acemoglu and Johnson, 2004; Claessens and Perotti, 2007; Lu and Wallis, 2015). Furthermore and as suggested by Oscar *et al.* (2011), credit

expansion cycles tend to lead to recessions which may have a more negative effect on the poor. Given the foregoing, it may not be unwise to investigate the contribution of financial sector deepening to overall human welfare in SSA countries since economic and financial reforms in the 1990s and the quest of SSA countries to meet the Millennium Development Goals (MDGs) of the United Nations declared in year 2000.

1.2. Aim and Objectives of this thesis

The overriding aim of this thesis is to critically assess the joint and endogenous evolution of financial sector development, income inequality and human welfare in Sub Saharan Africa in order to inform the choices of policy makers who seek to employ the development of the financial sector as a means to improving human wellbeing both in the short and long run.

As such, this thesis has *five competing objectives*. The *first* is to elicit an understanding of SSA economies by evaluating the evolution of socioeconomic data from 1990-2010 for the main trading blocs which consist of 48 SSA economies and contrasting the averages amongst these blocs and with the group of low and middle-income countries (LMIC) in order to establish the existence or not of a pan-African malaise. *Secondly,* it also seeks to bring out a clear understanding of the literature linking the concepts of financial sector development, income inequality and human welfare by discussing them in pairs following the current practice and extending the literature by suggesting how all three variables can be expected to move together.

Thirdly, this work intends to assess the nature and characteristics of the data for a group of 29 SSA countries to be used for empirical analyses and to explore the evolution from 1990 to 2010 of the core variables whose interrelationships we estimate. *Fourthly,* this study shall seek to substantiate the potential of cointegration and error correction modeling in deal with systems where variables are likely to have unit roots, minimize the impact of endogeneity and enable the estimation of long and short run relationships amongst our main variables.

Finally, this thesis shall make recommendations towards enhancing human welfare in SSA using financial sector development as a policy based on the level of income inequality. It shall also elicit future studies to explore the joint movement of these three variables as a means of informing financial sector policy choices towards improving social wellbeing in countries and regions across the world.

1.3. Motivation of study and problem statement

This study on financial sector development, income inequality and human welfare in Sub-Sahara Africa has three main motivations. *Firstly*, it stands out, from the background to this study that previous researchers have over-emphasized the importance of economic growth over human welfare as the finality of the development process. Therefore rather than focus on the relationship between financial sector development and economic growth, a closer look at this relationship by substituting economic growth with human welfare might reveal some new insights and ignite a new debate in this area. Moreover, knowledge on whether financial development directly enhances an aggregate human welfare measure like the Human Development Index (HDI) or just a component of it remains scant and especially for SSA countries as a group.

However, some studies as indicated above have used one-dimensional welfare measures such as income growth, the percentage of population below the income poverty line of $1.25 dollar-a-day or the infant mortality rate criterion offset by the World Bank as dependent variables, to test the impact of financial intermediary development on human welfare in samples of developed and developing countries. As such, it would be interesting to investigate the validity of such findings using the HDI and an exclusive sample of SSA countries with data from 1990. This is important because most SSA countries have been through economic and financial reforms since 1990 to boost the development of their financial sectors towards achieving the Millennium Development Goals (MDGs) of the United Nations declared in year 2000 even though income distributions remain very wide.

Secondly, the nature of the relationship between financial deepening and human welfare remains unclear in a context of persistent income inequality, especially given the fact that income inequality tends to relate ambiguously to financial development and economic growth. Thus, even though some researchers (Clarke, Xu and Zou, 2006; Beck *et al.*, 2007; Canavire-Baccareza and Rioja, 2008) have been interested in knowing whether financial development reduces income inequality and hence poverty in mixed samples of developed and developing countries, we are not aware of any study which has taken a particular interest in knowing how the evolution of finance directly impacts on human welfare in a context of high income inequality either generally or in the specific context of Sub-Sahara African (SSA) countries.

Moreover, this conjecture is supported by two facts. *First*, our observation of sample SSA data shows that more unequal countries have a higher propensity to have higher financial sector development and better living standards, on average, than more equal ones as shall be illustrated in chapter Four. *Second*, Demirguc-Kunt and Levine (2009) asserted that the joint and endogenous evolution of finance, income poverty and income inequality have not yet been studied in a coherent framework. Such that any studies which can attempt to bring these variables together in one framework will significantly contribute to knowledge in this area.

Thirdly, studies in this area have largely not considered how financial sector variables impact measures of human welfare both in the short and long run. Consequently, we think that using data from a sample of 29 SSA economies for which we have continuous data on a selected welfare indicator, the human development index (HDI) published by the United Nations, on the basis that human welfare is not only about economic growth, *the long-run and short run relationships between financial sector development and living standards conditional on the extent of average long term income inequality can be studied in one framework*.

1.4. Research Questions and Contribution of Study

Given the paucity of empirical studies which consider the joint and endogenous evolution of finance, income inequality and human welfare and especially using SSA countries as a sample for empirical testing, we wish to empirically test the following five questions. *Firstly*, will SSA data provide sufficient variability amongst countries to warrant modelling of these countries as an exclusive group in a time-series panel study? This is important because the usual rhetoric as we shall see in Chapter two is that SSA countries are similar which is why they are usually grouped and analyzed as the 'so called' African-dummy in global cross country studies. *Secondly*, will the HDI capture the impact of financial sector development on human welfare better than a one dimensional measure such as the under-five infant mortality rate? Sen (1999) suggest that it is a better measure of human welfare whereas Go *et al.* (2007) say that it is not suitable for empirical testing. *Thirdly*, would the average long run level of income inequality affect the relationship between financial sector development and income inequality? *Fourthly*, will the impact of financial sector deepening on human welfare depend on whether one considers the long or the short run? *Finally*, will modelling the impact of the level of income inequality on the relationship between financial sector development and human welfare suggest new ways of designing financial sector policies for SSA countries?

By answering the above research questions, this study hopes to make five new contributions to the existing literature on financial sector development, income inequality and human welfare. *Firstly*, this study shall show that the 48 SSA countries excluding South Africa are markedly different socio-economically and that an exclusive SSA dataset can be used for time-series panel data modelling. In so doing, this study will contribute to the debate on the African-dummy by exploring over sixty socio-economic variables which compare economic and social development amongst regional trading blocs in SSA. *Secondly*, this thesis shall show for the first time that the long and short run impacts of financial sector development on an aggregate measure of human welfare are consistent. This shall be achieved using a sample of 29 SSA countries with continuous HDI data from 1990. As will be explained in Chapter four, this is the largest SSA sample that has been used in an empirical study on financial sector development and human welfare in SSA.

Thirdly, this study will add some new evidence to the literature on the nature of the relationship between financial sector deepening and economic development based on the level of income inequality using an SSA sample. Prior studies such as Beck *et al.* (2007) and Canavire-Baccareza and Rioja (2008) rather study the effects of financial development on growth, income poverty and income inequality in separate frameworks. *Fourthly*, we shall provide new evidence which challenges the view that the HDI is not an adequate measure of human welfare for empirical analysis by checking the consistency of our results for the HDI with the under-five infant mortality measure which has been used as an indicator of living standards in earlier and similar studies. This is quite important because as suggested by Go *et al.* (2007) the aggregation methodology of the HDI measure has largely been criticized and sparingly used in empirical work.

Finally, this thesis introduces co-integration and vector error correction modelling for the first time into research that uses panel data to study the effects of financial development on human welfare. The beauty of this approach is that, this study shall show, using this single method, the long and short run relationships among these variables while at the same time controlling for potential endogeneity problems. It will also enable us to directly establish the direction of strong causality between financial sector development and human welfare.

Based on these contributions, the outcome of this study shall suggest new ways of designing financial sector policies necessary for enhancing living standards in SSA amidst

persistent income inequality as well as serve as a useful point of departure for more specific country studies.

1.5. Research Strategy

For the purposes of this work, we have used the Human Development Index (HDI) produced by the United Nations – a comprehensive measure of human welfare - as our measure of welfare from 1990 to 2010. The choice of data start date is related to the consistent availability of HDI data for the selected SSA countries since 1990 while the end date 2010 is the latest available data by the time of writing. Haber (2008) remarks that even using data from 1990 to 2004 does not seem to make a difference regarding the economic performance of SSA States. What is more, the period 1990 to 2010 captures the years when the majority of SSA countries received significant inflows of overseas development assistances allied to adjustment programmes in order to meet the set of Millennium Development Goals by 2015[1]. The resulting dataset is the largest sample of SSA States that have hitherto been empirically analysed where welfare determinants are concerned.

To empirically analyze the data for this study, two approaches were adopted. The first tactic was to dissect and analyze SSA socioeconomic data in order to establish whether SSA countries are all similar or different and whether they can be pooled into a panel for subsequent analysis. For this, we use the entire group of 48 SSA countries excluding South Africa to calculate averages of all selected socioeconomic parameters for three non-overlapping periods: 1990-2010, 1990-1999 and 2000-2010. We then use the analysis of variance (ANOVA) method to establish whether the means of the sub-regional trading blocs are the same for these parameters. The second approach uses advanced co-integration and vector error correction modelling to analyze the relationship between our key variables for the period 1990-2010 for a selected group of 29 SSA countries. This approach generates in one framework, both short and long run outputs for the relationships being analyzed.

[1] The Millennium development Goals (MDGs) is a set of 8 international development goals set by the United Nations following the Millennium Summit of year 2000 to be achieved by 2015. These goals range from halving extreme poverty to halting the spread of HIV/AIDs and providing universal primary education amongst others. These goals have galvanized unprecedented efforts from countries and leading global development institutions to meet the needs of the world's poorest nations and peoples by 2015 (UNDP, *Human Development Report (2002)* (New York: Oxford University Press))

1.6. Organization of Study

The rest of our work will be organized under the following chapters:

Chapter two analyzes the pattern of movement in selected indicators of aggregate macroeconomic performance and social welfare in all the 48 countries in the SSA region (excluding South Africa) over the period 1990 to 2010.This period has been chosen because of data availability for the selected human welfare indicator. The chosen dimensions of the aggregate level of development in SSA are then compared with those of (i) Economic Community of West African States (ECOWAS), (ii) Common Market for Eastern and Southern Africa (COMESA), (iii) Economic Community of Central African States (CEMAC) and (iv) the group of low-middle income countries. The categories are adopted from United Nations and World Bank publications so as to highlight those aspects of African economic policies and outcomes which are markedly different. We also expect this analysis to guide the selection of variables for our empirical models which will be tested using a reduced set of 29 countries with available and consistent data on the HDI from 1990.

Chapter three reviews the theoretical and empirical literature on the links between financial development, income inequality and human welfare in both developed and developing countries. The literature survey will be considered for separate pairs of variables since no clear framework has emerged in previous studies on how to deal with these three variables jointly. Also, the paucity of empirical studies for SSA countries implies that our survey will be based largely on studies relating to developing countries in general but we will endeavour to summarize those few papers which deal specifically with African economies.

Chapter four summarizes the underlying trend for our chosen core variables and provides the descriptive statistics for our datasets using five-year averaged panel data for a sample of twenty-nine SSA economies during the years from 1990 to 2010. The choice of countries in this section is largely dictated by the availability of continuous HDI data from 1990. It also shows how some variables like the bilateral real exchange rate and the institutional quality variables were constructed. The latter was constructed using principal component analysis. Furthermore, it illustrates that in SSA, where income inequality is higher, financial development and human welfare are also higher consistent with Kuznets (1955).

Chapter five specifies our regression model with the theoretical hypotheses on the relationships between human welfare, financial sector development, income inequality and the

other explanatory variables that will be included in our conditioning set. Additionally, it discusses the major problems which are commonly encountered in econometric modelling especially endogeneity with their related solutions. It finally outlines the key features of the Johansen co-integration method, the vector error correction model (ECM) used in the estimation of our empirical equations as well as the model for causality analysis.

Chapter six achieves two objectives. First, it reports the basic empirical results with explanations for the estimated relationships. The results here are likely to show that financial development has a disproportionate impact on human welfare in the highly unequal countries of SSA both in the short and long run. It is also likely to show that the relationship is strongly causal. Also, it is likely to show that the relationship between higher income inequality and human welfare in SSA is positive based on the left arm of the Kuznets (1955) hypothesis. Secondly, it checks the robustness of the basic regression outcomes to an alternative definition of human welfare. We use the under-five infant mortality rate which has been found to be a good proxy for human welfare in previous studies pitting human welfare against financial development (Go *et al.*, 2007; Claessens and Feijen, 2006). The results here are likely to show that our findings are robust to a change of dependent variable and that the HDI is a better measure of human welfare.

The *final chapter* summarizes the major findings of our work, provides policy implications of the findings, limitations of the thesis, research contribution and suggests areas for further research.

1.7. Main Findings of the study

This study has reached four key findings. *Firstly*, it has found that SSA trading blocs are not similar (using data from 1990 to 2010) as per their socio-economic development levels and as such the overarching idea of the 'African dummy' common in the African growth literature might be a fallacy. *Secondly,* financial sector development disproportionately enhances human welfare in the long and short runs in the highly unequal group of countries in SSA (GINI>45), consistent with our hypothesis that finance works better for living standards where income inequality is higher, especially in early stage countries where the Kuznets effect is likely in operation. *Thirdly,* this study also finds that broad money (M2) is the more apposite measure of financial sector development in SSA because the effect of its interaction with income inequality is stronger, showing both a positive and significant relationship with human welfare both in the

short and long runs as opposed to private credit whose relationship with human welfare is only feasible in the long run. *Finally*, strong causality in SSA runs uniquely from financial sector development (M2Y), the real bilateral exchange rate and openness to trade to human welfare. Therefore, policy-wise, these are the most crucial variables which policy makers can use to accelerate social welfare in SSA.

CHAPTER TWO

IS THERE A PAN AFRICAN MALAISE?

Introduction

Many researchers including Collier and Gunning (1999a), Artadi and Sala-i-Martin (2003), Sachs *et al.* (2004), Easterly (2003, 2006), Collier (2007) and Chen and Ravallion (2010) say that Sub-Saharan Africa (SSA) has performed relatively poorly compared to other developing countries in Asia and Latin America on various measures of economic and social development. This conclusion stems from the analytical perspective of the 'growth regression literature' of the early 1990s which introduced the idea of the 'African dummy'. In fact, in a global cross country growth regression analysis of which average GDP per capita growth was the dependent variable, Barro (1991) found that a large percentage of Africa's growth compared to growth in the other continents could not be explained by the selected variables of his model. This unexplained fraction was captured by a 'dummy' which was significantly negatively correlated with growth.

Hence, it was concluded that there was something typically wrong with being an African country when it comes to historical growth performance – suggesting why SSA has been growing slowly. Several authors in trying to solve the Barro (1991) conundrum have added other variables to try to capture the effect of the 'dummy' in what has recently been termed the 'regression growth industry' (Durlauf *et al.*, 2005, p. 639). For example, Mauro (1995) added 'corruption', Sachs and Warner (1995) added 'openness to trade', Easterly and Levine (1997) added 'ethnic fractionalization', Temple and Johnson (1998) added 'social capital' whereas Burnside and Dollar (2000) added 'Aid' as additional explanatory variables to the Barro (1991) baseline model and all except Sachs and Warner (1995) still found a significant African dummy.

This means that there is something in SSA that makes SSA countries different from countries in other continents when it comes to economic growth performance. However, one must remark that these cross-country growth regressions involved lumping up African countries as if there were no differences amongst them. Again, the history of growth in Africa shows some contrasts with what we get from the regression story. Jerven (2011) has shown that SSA grew from independence in 1960 until about 1977 with rates comparable to those of other continents before retrogression in growth rates owing to various shocks including the 1981 oil shock.

Furthermore, few authors have questioned whether the poor performance attributed to SSA economic growth by these studies has been uniform both across the continent and over time, especially after the economic crises of the mid-1980s to the early 1990s, a view also espoused by Englebert (2000) and Jerven (2011).

This chapter therefore contributes to the debate on Africa's growth tragedy by checking the robustness of the foregoing assertions across the different regional and trading blocs in the SSA sub-continent. Such will help establish the degree to which the results from the previous papers provide a reliable guide to the fundamental determinants of living standards in SSA and the rest of the developing world. More specifically, the data from the World Bank African Development Indicators online (World Bank, 2011) allows us to examine the statistical power of the claims relating to changes in social and macroeconomic performance indicators across the largely different climatic and topographic West versus East and Southern Africa using simple unweighted averages from 1990 to 2010. Our starting year corresponds to the reference year for setting the millennium development goals (MDGs) while 2010 is the last year with available data for the selected parameters at the time of writing.

From the World Bank (2011) database, one can effectively separate the Sub-Saharan African region into countries that constitute the Common Market for Eastern and Southern Africa (COMESA) and the Economic Community of West African States (ECOWAS). COMESA covers the twenty-two countries listed in Appendix I Table 2.1, Column 1 and ECOWAS sixteen more in Column 2. The performance comparisons between the two trading blocs as well as with the group of forty-eight Sub-Saharan African countries, *excluding* South Africa, as a whole (hereafter referred to as SSA) are presented in subsequent tables and figures inserted in the text, numbered in accordance with the section in which they appear. We have excluded South Africa because it is atypical; it has a much higher level of infrastructure development including higher levels of financial institutions development. The tables are divided between two sub-periods, 1990 to 1999 and 2000 to 2009, plus for the whole period 1990 to 2010.

The statistics for the entire period 1990 to 2010 shown in the third column of these tables are generally the ones considered however, and the two component sub-periods largely serve to show how persistent the similarity in unfavourable data for the two trading blocs has been during the periods of study. In addition, we use evidence from a group of six oil and mineral producing states which form the Economic and Monetary Community for Central Africa (CEMAC) given in Columns 3 and 4 of Appendix I Table 2.1 to highlight those aspects of African economic

policies which are markedly unique to this oil-rich monetary bloc. Furthermore, we compare SSA's performances with those of the group of Low-Middle Income Countries (LMIC) where comparable data on selected indicators is available to demonstrate the disastrous consequences of African unfulfilled growth potential.

For simplicity, much of our arguments here are based on the results of a standard non-parametric t-test for the differences between the means for the overall SSA sample and our three regional sub-samples for the selected performance indicators over the entire period 1990 to 2010. We have identified those variables whose corresponding t-test statistics obtained using a single factor Analysis of Variance (ANOVA) method are statistically significant under the null hypothesis that the sub-groups have the same mean and variance as the group of forty-eight SSA states. Comprehensive surveys of existing regression analyses of factors affecting African development which inform our choice of performance indicators and explanations here can be found in Collier and Gunning (1999a), Janine Aron (2000), the World Bank's report, "Can Africa Claim the 21st Century" (World Bank, 2000), Go et *al.* (2007), IMF (2011), Bruckner and Lederman (2012), Ghazanchyan and Stotsky (2013).

This chapter is subdivided into two sections. The first section deals with human welfare and income inequality whereas the second explores some key determinants of living standards in SSA commonly cited in the literature, with particular emphasis on the measures of financial sector development. We may deal with each in turn.

2.1. Human welfare

Earlier researchers including Sen (1999), Kakwani and Pernia (2000), Thirlwall (2006), and UN HDR (2013) have remarked that the use of GDP to measure living standards is an inadequate way of measuring overall human welfare. This is so because it is possible to have income growth without the enhancement of the situation of the poor, especially when such growth does not tighten the distribution of incomes between the rich and the poor. Also, it is possible to find situations where living standards improve more than the growth rates experienced. For example, Ferreira *et al.* (2009) have found that taming hyperinflation in 1994, and substantially improving social security and social assistance transfers, led to an increase in overall social welfare in Brazil during the period 1985 to 2004, when in fact the country experienced very slow growth. Furthermore, the use of other one-dimensional measures of welfare such as income share of the poor, educational attainment, life expectancy at birth and the under-five infant mortality rate

have all been deemed to be inadequate in themselves as measures of the overall plight of the poor (Sen, 1999; Kakwani and Pernia, 2000; Akire, 2002;). This is the reason why there has been in recent years the search for a global multidimensional poverty index promoted since 2010 by the Oxford Poverty and Human development Initiative and the United Nations Development Programme.

Owing to the foregoing, a multidimensional measure of social welfare like the human development index (HDI) which is a composite of income, educational attainment and life expectancy is usually deemed to be a better measure of overall living standards (Thirlwall, 2006; UN HDR, 2010; Akire and Foster, 2011). This is because in addition to income, it accounts for changes in health and education which are vital components for future wealth creation. It also compares favourably with the other measures of human welfare cited above and in addition data is available for the HDI continuously from 1990 for most countries, unlike the multidimensional poverty index available only since 2010. However, as Kakwani and Pernia (2000) have also suggested, if growth is equitable, that is, accompanied by an appropriate redistribution of wealth, it could be considered as an adequate measure of changes in overall social welfare.

As such, human welfare in this study is chiefly measured by the UN human Development Index (HDI). This Index is an equally weighted measure of health (life expectancy), education (schooling) and income (GDP per capita). Data for this Index is drawn from various HDR reports from 1990 to 2010 and especially from the online database of the UNDP *Human development Report 2010* which has consistent data calculated using the same formula for the years 1990-2010. However, averages discussed here have been calculated by us. We compare the averages for SSA from 1990-2010 with those of the three sub-regional groupings in SSA; COMESA, ECOWAS and CEMAC sub-regions, as well as with those countries that fall in the HDI categorisation as Medium and Low Human Development (MLHD). In the last two decades spanning the years 1990 to 2010, human development has been at best dismal in SSA. On a scale of 0 to 1, SSA scored an average of 0.38. However, over this period there were contrasting outcomes amongst the selected trading blocks in SSA.

For instance, average HDI for the COMESA bloc was the same as the SSA average whereas it was statistically at the 5 percent level of significance lower in the ECOWAS bloc whose average HDI was 0.34. On the contrary, the CEMAC region enjoyed significantly higher HDI at 0.44 and which was similar to the average HDI for the group of countries classified as having medium and low human development. Thus, it is not quite true that SSA as a whole has

experienced the same level of deprivation according to the HDI. If anything, we remark that human deprivation in SSA is more abundantly dominated by living conditions in West Africa to which most of the ECOWAS countries belong. Nonetheless, this study finds that the average HDI for SSA improved from an average of 0.36 in the period 1990-1999 to an average of 0.39 in the period 2000-2010 suggesting that SSA is progressing as a group just as there has been progress in other continents of the world (UN Human Development Report, 2013). However, only a breakdown of the components of the HDI should be able to help us gain better understanding as to why human welfare in SSA has been uneven across the region and why SSA as a group has failed to catch up with the rest of the developing world.

In this vein, we review the causes of movements of the components of the HDI Index rather than the aggregate Index values in order to gain an overall understanding of the facets that might have been relevant in influencing living standards in SSA. These different facets of the Index are the quality of health measured by life expectancy or under-five infant mortality, education attainment of populations measured by school enrolment ratios and adult literacy, and income per person measured using income per capita of countries in SSA. Furthermore, we relate the underlying trend in income to the extent of inequality in the distribution of income across the selected regions since the quality of welfare does not only depend on income growth but also on how that wealth is distributed across society (Deaton, 2013). Our arguments here will therefore be organised under (i) health, (ii) education, (iii) income per capita and (iv) income distribution.

2.1.1. Health

Here, we evaluate the status of healthcare provision in SSA by looking in turn at the level and evolution of *life expectancy* and the *under-five mortality rate* in SSA region as a whole, between our various SSA sub-groupings and compared to the group of LMICs.

Life expectancy at birth: As Appendix I Table 2.2 shows, average life expectancy at birth for children born during the 21 year period 1990-2010 is circa 53 years for SSA. This is significantly below the number of years to be lived by children born in the group of LMICs - 65 years for the same period. Within SSA, our data shows that life expectancy in COMESA was not significantly different from the aforementioned African average of 53 years. However,

ECOWAS and CEMAC averages were about 52 years and appear to be statistically significantly different from the SSA average.

With knowledge from UN AIDS (2010) report that COMESA countries have a higher rate of prevalence of HIV-AIDS, this finding becomes quite intriguing. A potential explanation is that the use of more innovative education campaigns to combat HIV AIDS spread and the higher use of anti-retroviral drugs are slowing down spread and deaths at a faster rate in the group of COMESA countries. According to UNAIDS (2010), by the end of 2009, 41 percent of HIV patients in Eastern and Southern Africa (chiefly COMESA) countries were receiving antiretroviral drugs as compared to 25 percent for West and Central African countries which comprise ECOWAS and CEMAC states. Furthermore, these latter trading blocs are plagued with high incidence of malaria which Carstensen and Gundlach (2006) find in a regression analysis pitting growth against malaria prevalence that the latter has a negative impact on income growth even after controlling for institutional quality.

Also, Gallup and Sachs (2001) have found that wiping out malaria from SSA could potentially increase economic growth by 2.6 percent per year. This is thought to be so because healthier people are said to be more efficient and provide more labour and can work for longer hours. Also, health status can improve economic outcome owing to its effect on education. Improvements in health status tends to increase the motivation for individuals to attain higher levels of schooling, since the returns on investments in schooling are only valuable over a longer working life. It has also been found that healthier children and students have more attendance and higher cognitive functioning, and thus receive a better education for a given level of schooling. Furthermore, lower mortality rates and higher life expectancy encourage savings for retirement, and thus raise investment levels and capital per worker (Audibert, 2010).

In general, there was no tremendous improvement in life expectancy of children born in the final decade of the 20th Century and those born in the first ten years of the 21st Century across our selected SSA regions despite considerable enhancement in medical technology and health facilities around the world (51.6 years in the period 1990-1999 and 53.8 years in the decade 2000-2010). This, as has been suggested by some authors is likely due to the spread of the HIV-AIDS epidemic in many of the SSA States during the periods in question (Go *et al.*, 2007; UNAIDS, 2010; Acemoglu, 2012). In fact, according to UNAIDS annual reports from 1998 to 2010, SSA still continues to bare an inordinate share of the HIV burden. Although the rate of new HIV infections has declined, the total number of people living with HIV continues to

increase. In 2009, that number reached 22.5 million, 68 percent of the global total, from 21 million in 1997 (UNAIDS, 1998, 2010).

Ironically, prevalence is higher amongst women and in the more educated class. It has been found that the relationship between education and HIV was positive for SSA while globally it was negative (UNAIDS, 1998). One suggested reason is that the educated class in SSA with more discretionary income tends to indulge in more inappropriate sexual behaviours. The relatively high rate of infection amongst African Females may be the consequences of migrant mining workers especially in the Southern African countries who leave home for months at time without their wives and so are prone to indulge in casual sex with prostitutes. These men, who may well be in polygamous marriages, have been known to infect their wives when they return home. SSA recorded 1.3 million AIDS related deaths in 2009, showing only a marginal decrease from the 1.4 million deaths registered in 2001 (UNAIDS, 2010).

However, the 2 years gain in life expectancy between the two decades (51.6 years for the period 1990-1999 and 53.8 years for the period 2000-2010 for the entire SSA sample) seems to be quite important as has been demonstrated by some scholars working in the area of full income (per capita income adjusted for life expectancy). In fact, it is estimated that a one year increase in life expectancy can increase per capita GDP by 4 percentage points (Bloom *et al.* 2004). Also, Becker *et al.* (2003), Jamison *et al.* (2001, 2003) and Crafts and Hacker (2003) report that full income has been converging rather than diverging as suggested between SSA and the LMICs when considering GDP per capita. This is so because lower mortality rates and higher life expectancy encourage savings for retirement, and thus raise investment levels and capital per worker.

Under-five infant mortality: Another indicator of the quality of healthcare, the under-five infant mortality rate also confirms the poor situation of healthcare in SSA relative to the group of LMICs during that period. In fact, on aggregate, SSA lost 134 children aged under-five for every 1000 live births each year during that time. This was far higher than the 81 deaths recorded for every 1000 live births on average in the group of LMICs during the period 1990-2010. Within SSA, COMESA had the lowest aggregate under-five mortality rate with 118 deaths per 1000 live births. This was significantly lower than the SSA aggregate rate of 134 deaths per 1000 live births over the entire period 1990-2010; compared with the significantly higher infant death rates of 155 in ECOWAS and 141 in the CEMAC bloc. UNICEF (2009) statistics suggest

that these differences are due to poverty and higher prevalence of conflicts in West and Central Africa as well as the fact that more females are living in rural areas with poor road networks in a continent where 75% of doctors and 65% of Nurses work in the urban areas.

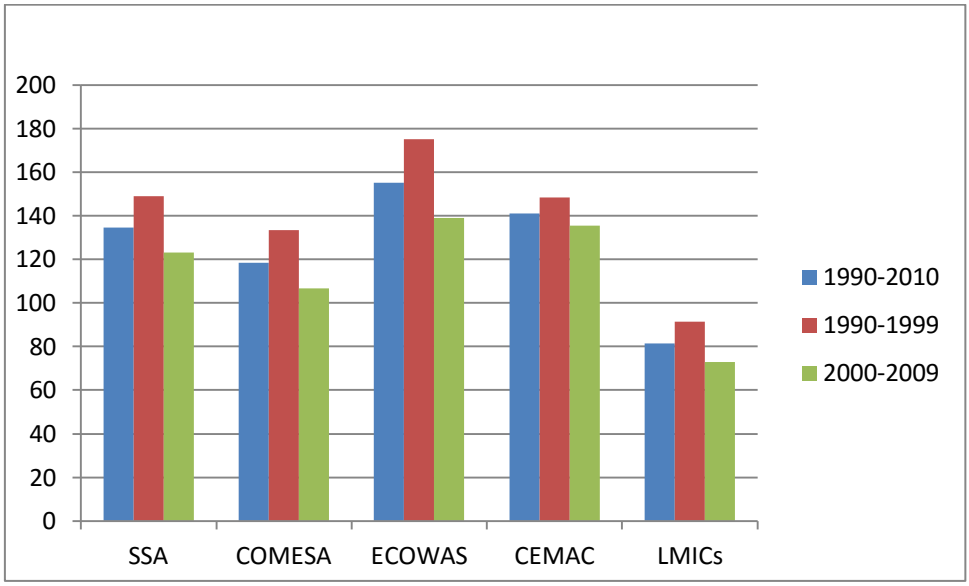
Then too it appears that immunisation programmes by organisations such as the Gates foundation are overwhelming concentrated in the COMESA states. Whereas life expectancy rose marginally over the two decades, infant mortality also experienced a more significant reduction of about 18 percent across SSA (from 149 per 1000 live births in the 1990s to 123 in the decade 2000-2009) except in the oil-rich CEMAC bloc where it dropped by only 8.6 percent (from 148 per 1000 live births to 135 between the two decades. This higher rate of death of infants in these oil-rich countries is likely associated with the fact that they have been more prone to civil unrest, corruption and other incidences which are damaging to the welfare of children and their mothers.

This slight progress notwithstanding, the overall reduction in under-five mortality in SSA was rather disappointing given that the region is required to reduce under-five mortality by two-thirds – from about 154 per 1000 live births in 1990 to about 51 per 1000 live births by 2015 – to meet the fourth goal of the MDGs. Easterly (2009) has argued that the setting of this goal was unfair to SSA since the region started from a higher level of infant mortality and performance evaluation depends on whether the assessor is looking at the absolute or relative achievements. Nonetheless, SSA's poor performance in this regard has been attributed as in the case of life expectancy to HIV/AIDS, malaria, lack of basic health services and continuing conflict (Verdier-Choucane, 2008). Overall, the group of SSA countries under-underperformed by comparison with the group of LMICs where aggregate under-five mortality dropped by one-fifth; from 91 in the 1990s to about 73 per 1000 live births in the decade 2000-2009.

Health and human welfare: The consequence of poor healthcare in SSA is that it has had an adverse effect on economic growth and human welfare in comparison to the rest of the developing world. For example, it is reasonable to surmise that HIV related deaths reduced skilled manpower for productive activities while public expenditures that could have been directed towards investments in infrastructure and other relevant services are being drained to fund the purchase of anti-retroviral drugs and to fight endemic diseases such as malaria. Economic intuition linking health to economic growth cited in Aghion *et al.* (2010) holds that health should matter for economic growth for four main reasons.

First, they noted that Zhang *et al.* (2003) found that individuals with higher life expectancy can be expected to save more through pension schemes to cater for their needs after retirement and these savings should feed into capital accumulation and investments which drives GDP growth. *Second*, Miguel and Kremer (2004), and Jayachandran and Lleyas-Muney (2009) provided microeconomic evidence that better health encourages human capital investments in education which is likely to be growth-enhancing. This is so because improvements in health status would increase the motivation for individuals to attain higher levels of schooling, since the returns on investments in schooling are only valuable over a longer working life. *Third*, where there is low infant mortality, parents are likely to choose low fertility which should limit population growth thereby enhancing GDP per capita growth (Murtin, 2009; Aghion *et al.* (2010). *Finally*, healthy individuals are generally more productive and better able to cope with new and changing production technologies which enhance growth (Howitt, 2005).

Figure 2.1: Average under-five infant mortality in SSA per 1000 live births



Source: Author with data from World Bank, World Development Indicators (2011)

In general, the marginal improvement in life expectancy in SSA between the two decades considered for this study tends to support the position of economists like Bloom *et al.* (2004) and Jeffrey Sachs (2005). They pointed out that lags in healthcare and the high prevalence of the HIV infection might be affecting SSA's economic growth and living standards negatively, even though Acemoglu and Johnson (2007) did not find any improvements in economic growth as a result of improvements in healthcare since the 1950s in a sample of developed and developing

countries. However, Lerentzen *et al.* (2008) have found that increases in adult mortality rates can account for Africa's entire growth shortfall between 1960 and 2000.

Subsequently, Aghion et *al.* (2010) have reported that the only reason why the Acemoglu and Johnson (2007) study did not find a positive and significant effect of health status on economic development is that they failed to consider the effect of the initial level of health (measured by life expectancy), but only used the growth of this latter welfare indicator. In fact, they found that an initial level and accumulation of life expectancy are both important for economic growth, bringing together the Lucas (1988) and Nelson and Phelps (1966) approaches to the question. This latter finding is consistent with the conclusions of the full income theorists who have found that improvements in life expectancy over the last 50 years have largely accounted for the growth in full income (income adjusted for life expectancy) across countries (Jamison *et al.*, 2003).

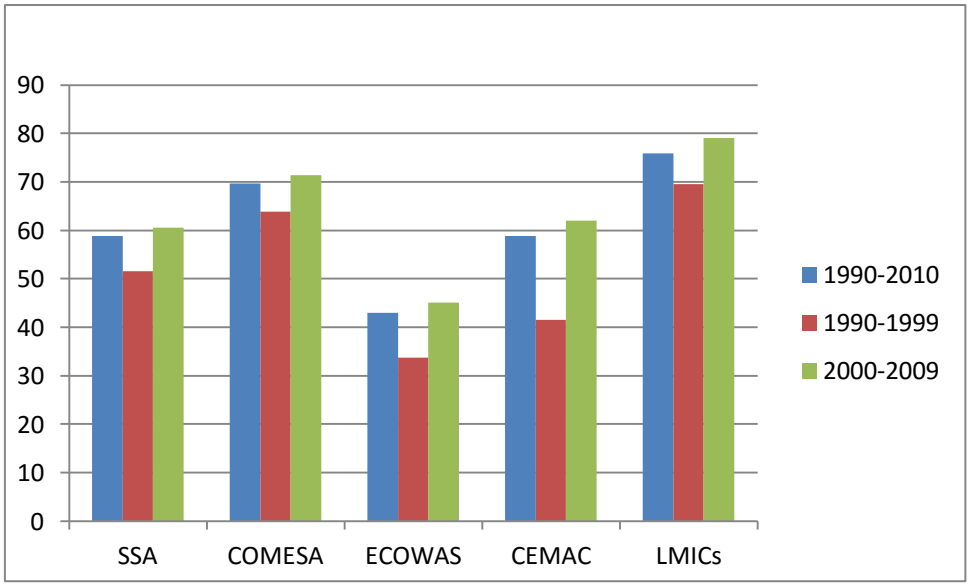
Based on the foregoing, we may suggest that researchers who use an African dummy to represent the health conditions in SSA have been wrong in assuming that health conditions across SSA are similar. Our statistics have uncovered that: (i) Life expectancy was largely comparable in the 1990s across all the regions, presumably due to the spread of HIV-AIDS across the continent. However, since 2000, the richer COMESA region has managed to reduce the rate of infection and prolonged the lives of those infected through the use of anti-retroviral drugs, trained more nurses, doctors and public health workers and leading more public awareness campaigns; (ii) infant mortality rate is lower in COMESA compared to the other trading blocs in SSA, possibly because of its higher income (as we shall see later) with related better road and health infrastructure, better immunisation programmes, less civil unrest and more people living in cities.

2.1.2: Educational attainment

The literature frequently cites *adult literacy* and *gross school enrolment ratios* as measurements for the level of education or human capital (Barro, 1991, 2000; Vandenbussche, Aghion and Meghir, 2006; Go *et al.*, 2007; UNESCO UIS, 2010; Hanushek and Woessmann, 2012). We thus follow their selection and deal with adult literacy and *gross school enrolment ratios* in turn.

***Adult literacy*:** With respect to the adult literacy rate, Appendix I Table 2.2 shows that only 59 percent of the relevant age group (15 years and above) of people living in SSA during our reference period were literate. Within SSA, illiteracy appears to be an ECOWAS phenomenon with only 43 percent of its adult population able to read and write. This was significantly lower than the 59 percent recorded for the CEMAC bloc and 70 percent for COMESA. Lower adult literacy in ECOWAS may be due to the higher Muslim populations in this region in countries such as Nigeria, Niger, Senegal, and Mauritania. It is reasonable to surmise that the poor performance of the ECOWAS bloc is responsible for the correspondingly low literacy rate reported for the SSA region as a whole, and vis-a-vis the rest of the developing world. Indeed, our statistics reveal that on average from 1990 to 2010, just 59 percent of adults aged above 15 years were able to read and write compared to 76 percent literacy rate for the group of LMICs. This implies that the malaise where adult literacy rate is concerned is actually a West African issue.

Figure 2.2: Average level of adult literary as share of population aged 15+



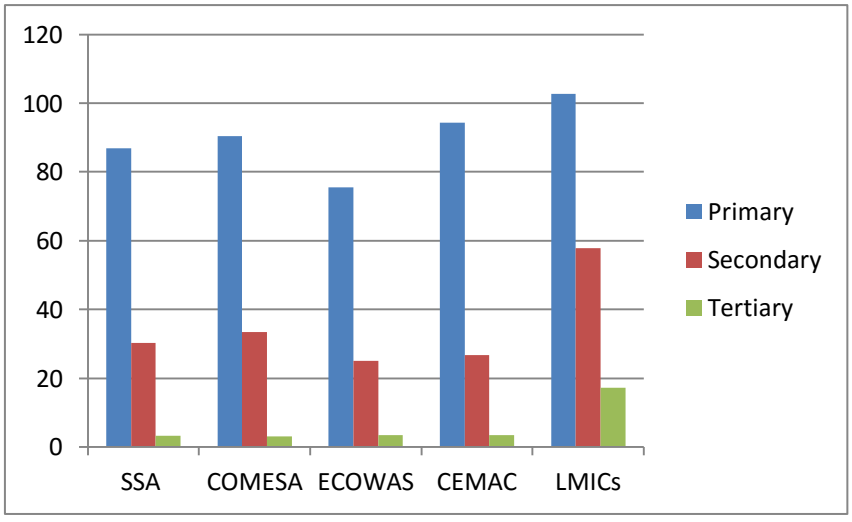
Source: Author with data from World Bank, World Development Indicators (2011)

Gross School enrolment ratios: Similarly, gross enrolment ratios for primary, secondary and tertiary education are also very informative of SSA's economic and social problems. Primary, secondary and tertiary gross enrolments were on average 87 percent, 30 percent and about 3 percent respectively for SSA during the period 1990 – 2010. Within SSA, the CEMAC bloc performed better in terms of primary enrolment for all age groups (94 percent) compared to

COMESA (90 percent) and ECOWAS (75 percent) whereas the COMESA bloc performed better in terms of secondary enrolment (33 percent) than ECOWAS (25 percent) and CEMAC (27 percent). However, there is a common malaise in terms of tertiary enrolment in SSA. All three trading blocs have similar tertiary enrolment ratios of about 3 percent each and this figure is very significantly lower than the 17 percent aggregate attained by the LMICs.

It has been suggested by UNESCO institute for statistics (2010) that tertiary education remains very expensive to provide in SSA. In fact, this UNESCO study reports that of the 16 out of 19 SSA countries that reported data for its study, public expenditure on a tertiary student amounts to 1 to 10 times that of a secondary student. For example, in Burkina Faso, the cost of secondary education per student is up to 30% of GDP per capita, whereas the cost for tertiary education is 10 times higher at 307% of GDP per capita. These higher costs are mainly attributed to economies of scale but could also be related to the findings that the social returns rate to education is highest for primary then secondary and lowest for tertiary education in developing countries (Psacharopoulos, 1994; World Bank, 1995; Gupta *et al.* 2002, Aghion and Howitt, 2009).

Figure 2.3: Average gross school enrolment ratios % of relevant age in SSA 1990-2010



Source: Author with data from World Bank, World Development Indicators (2011)

In light of these higher costs for providing tertiary education, international organisations like the World Bank, UNICEF, UNESCO and donor countries have directed most of their education funding into SSA towards primary education and very little into tertiary education as they strived to attain their promise of universal primary education by year 2010. In fact, in a 2011 UNESCO report, the UNESCO Institute for Statistics (UIS) found that, on average,

governments in SSA spend 10 times more to train a student in tertiary education than in primary education. They illustrated their argument using countries like Madagascar where only 9 percent of school-age population progresses to tertiary education but consumes around 27 percent of resources. In addition, Psacharopoulos and Patrinos (2002) found that the average public rate of return for primary education is 18.9 percent while the corresponding return on tertiary education is 10.8 percent. Thus, international donors to SSA are justified in redirecting more spending into primary education. However, Bloom *et al.* (2006) have argued that this difference in rate of return is likely because the authors did not take into consideration externalities and spill over effects of higher education in estimating the rate of return.

There are arguments that the lower level of tertiary education is a serious hurdle to advancing economic development in SSA because skills for the knowledge economy are built at the tertiary level and African workers need to acquire skills to compete, innovate and respond to complex socio-economic and environmental problems. However, one might also be of the opinion that 3 percent of population attaining higher education versus 94 percent gaining primary education in SSA is money well spent in the light of the marked differences in the social returns for the different levels of education. On this note, Africans may be judged to be spending their money in the right manner for their level of development. In effect, Asiedu (2014) has found that whereas there is a positive and significant relationship between foreign Aid financed primary education and economic growth, the relationship is either negative or inexistent between post-primary education and growth.

2.1.3: Income per capita

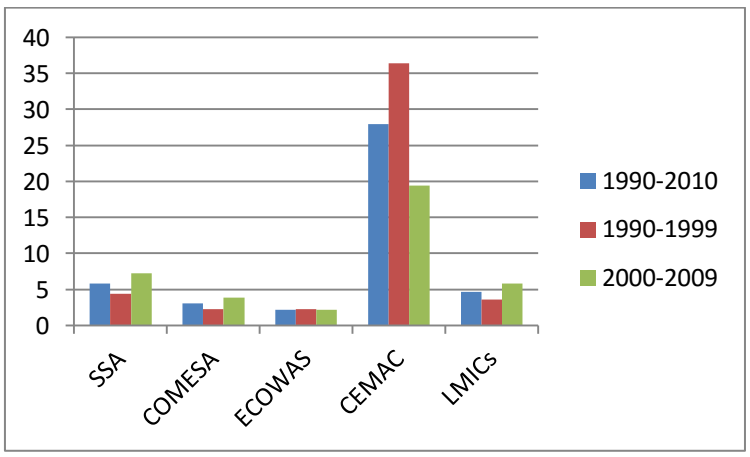
In this section, income per capita growth and the level of income per capita for the selected SSA trading blocs will be explored in turn.

***Income per capita growth*:** As can be seen in column 2 of Table 2.3 in Appendix I, SSA without South Africa achieved an aggregate growth of 3.87 percent over the period 1990-2010. Within SSA, average growth rates in two of the three selected trading blocs - COMESA (3.39 percent) and ECOWAS (3.6 percent) - were statistically similar to the SSA average. These figures were however significantly lower than the 5.41 percent recorded for the oil-rich CEMAC trading bloc at the conventional 5 percent significance level. These growth rates, simply taken, are quite flattering about SSA's performance. However, the picture is rather bleak when we factor in the influence of population over the selected period for this study. Per capita income in

SSA grew, on average, by only 1.34 percent per year over the 21 years period 1990-2010. Amongst the trading blocs, per capita income growth stalled in the ECOWAS and COMESA where average per capita GDP growth rates were barely 0.99 percent and 0.88 percent respectively. However, in the CEMAC trading bloc, average per capita income grew by 2.66 percent which was significantly higher than the SSA average. This is principally due to above average growth rates of about 27% achieved in Equatorial Guinea since the beginning of oil production in the mid 1990s. Such contributed to the significantly higher average per capita income of $1715 (at constant 2000 USD) reported for the CEMAC trading bloc versus the $995 in COMESA and $369 in ECOWAS for the period 1990-2010.

Indeed, Figure 2.4 below shows that the CEMAC bloc has the largest proportion of oil rents in gross domestic output. We may therefore infer that the considerable rise in oil prices, particularly in the first half of the 21st Century has played a major part in the larger comparative increase in output per capita there. But Collier and Goderis (2007) argue that this kind of gain observed in countries like Equatorial Guinea are only in the short run as stagnation is the long run order. This usually occurs because when such resources are depleted, oil rich countries fail to develop innovative production techniques and to offer sufficient economic and civic liberties to their citizens. A case in point being the oil rich countries in the Middle East which have failed to grow in recent history. However, as Brunnschweiler (2008) and Brunnschweiler and Bulte (2008) have found, natural resources do not always spell doom for development when properly managed as these resources can provide the necessary foreign reserves that can be ploughed into productive industries and for improving education, healthcare and infrastructures that contribute to future income growth.

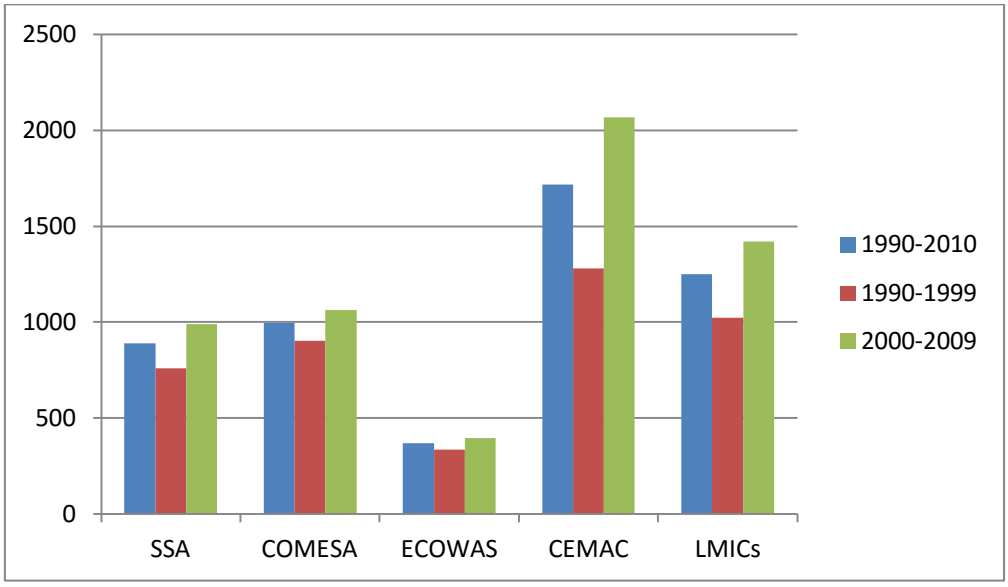
Figure 2.4: Oil rents percentage GDP 1990-2010



Source: Author with data from World Bank, World Development Indicators (2011)

Nonetheless, in recognition of the bleak picture which previous authors, most notably Easterly (2003) and Collier and Gunning (1999) painted of SSA's per capita growth performance, we looked at the pattern of movement in our data for income per capita between the sub-periods 1990-1999 and 2000-2009. Columns 3 and 4 of Table 2.3 in Appendix I reveal significant improvement in aggregate per capita growth over the two sub-periods. For instance, between 1990 and 1999, average per capita GDP growth for the SSA region was barely 0.42 percent, rising to 2.11 percent in the second sub-period 2000-2009. Likewise, COMESA and ECOWAS which failed to grow in the 1990s achieved average per capita growth rates of 1.76 percent and 1.56 percent respectively in the final decade 2000-2009. In like manner, GDP per capita growth also more than doubled in the CEMAC bloc from an average of 1.64 percent to 3.76 percent between the two sub-periods considered.

Figure 2.5: Average GDP per capita 1990-2010 (constant 2000 $US)



Source: Author with data from World Bank, World Development Indicators (2011)

Comparing the per capita growth performance in our overall sample of forty-seven SSA countries with that achieved in the group of low-middle income countries (LMICs), we note that LMICs grew, on average, by 4.76 percent vis-à-vis the 3.87 percent reported for the SSA sub-continent during the period1990-2010. However, the result of a simple t-test analysis suggests that the estimated difference of 0.89 percent is not statistically significant at the conventional 5

percent level. In contrast, our analysis shows that in per capita income terms, the inferiority of our SSA sample becomes exaggerated. The region's average per capita GDP growth of 1.34 percent is less than half the 3.26 percent achieved by the group of LMICs. In fact, population growth in SSA (2.45 percent on average) was about twice that which occurred in the group of LMICs (1.46 percent) between the decades of the 1990s and 2000-2009 (Table 2.6, Appendix I).

Level of income per capita: In dollar terms, Table 2.3 also reveal that the average GDP per capita at constant 2000 US dollar increased markedly from $761 to $989 in SSA between the two decades; $903 to $1063 in COMESA; $1279 to $2068 in CEMAC and $337 to $394 in the ECOWAS region. However, the relatively low increase in the per capita GDP observed for ECOWAS is contrary to the predictions of the convergence growth literature (Solow, 1956; Barro and Sala-i-Martin, 1992; Sachs and Warner, 1995; Aghion and Howitt, 2009). According to these authors, ECOWAS which started at the lowest level of income per capita of $337 in the first sub-period should have grown the fastest and so would have converged to the SSA aggregate. Instead, the data tends to support the finding by Pritchett (1997) that incomes between rich and poor countries around the world have been diverging since 1870.

This absence of convergence in SSA is presumably related to the discrepancies in the stocks of public goods including infrastructure. Lall and Yilmaz (2000), Aschauer (1989), Holz-Eakin (1988) and Munnel (1990a) have found that the impact of public capital on private output and productivity is very large. In line with the supposition of a relatively low level of infrastructure in ECOWAS , Table 2.5 in Appendix I reveals that electric power consumption per person, the share of all existing roads that are paved and internet usage are far lower in the ECOWAS bloc than in the COMESA trading bloc. For example, electric power consumption per head of population in ECOWAS was circa 139.6 KWh, less than half the 502.7 KWh in COMESA averaged from 1990 to 2010. Likewise, the proportion of roads paved was 21.6 percent in ECOWAS compared to 37 percent in COMESA. In the CEMAC bloc with the worst road network, only 7.23% of existing roads were tarred.

Another possible reason for the absence of growth in per capita income in ECOWAS is linked to the importance of human capital as an engine for economic growth (Barro and Sala-i-Martin, 1992; Galor, 2011). The low level of human capital in ECOWAS measured both by the literacy rate and school enrolment over the period 1990-2010 is likely to have contributed to the divergence in incomes and welfare observed between ECOWAS and COMESA countries and also the difference in per capita growth rates between SSA and the group of LMICs. Indeed,

figures 2.4 and 2.5 above revealed that adult literacy rate in ECOWAS was far lower than in COMESA whereas infant mortality was also higher there during the 21 years period for this study.

Besides, as remarked by Galor (2011) and Engermann and Sokoloff (2000), one consequence of the low literacy rate is that the structure of output in the economy concerned is heavily dominated by subsistence agriculture. They found evidence that incomes tend to rise faster as labour and capital shift from agriculture into industrial manufacturing and services exports. Indeed, our data (Table 2.4 in Appendix I) shows that the poorer ECOWAS economies had a higher dependency on agriculture which contributed on aggregate 35 percent to its GDP compared to 27 percent to GDP in COMESA for the period 1990-2010. On the grounds of more rapid growth in population and slower growth in income, SSA's average per capita income at constant 2000 US dollars was only $888 compared to $1250 for the group of LMICs from 1990-2010. Divergence in income per capita between SSA and the LMICs is also supported by data in Table 2.6 of Appendix I. It shows that a larger share (28 percent) of SSA's GDP compared to just 12 percent for LMICs depended on agriculture whereas value added per worker was similar in both cases; $555 for SSA and $569 for the LMICs. Also and as suggested by Duarte and Restuccia (2010), the industrial sector has higher productivity and greater impact on per capita growth and economic transformation. In the case of SSA, our analysis revealed that the industrial sector contributed on average only 27 percent to SSA's GDP and this was significantly lower than the 35 percent reported for the group of LMICs, at the conventional 5 percent level.

Worst still, within the industry share of output, manufacturing represented only 10 percent of GDP in SSA whereas it accounted for a considerable 21 percent in the LMICs. McMillan and Rodrik (2012) have found that since 1990, structural change has been growth-reducing in Africa. That is, whereas labour has moved from low productivity activities like agriculture into high-productivity activities in industry in Asia, it has been moving in the opposite direction in Africa, and most notably into informal markets and traditional farming in rural areas. Furthermore, as Table 2.4 of Appendix I shows, oil and mineral resource rents as a share of GDP are significantly higher in SSA than for the LMICs. Such higher dependence on natural resources has been found to be one of the causes of slow growth in SSA due to (i) its deleterious impact on institutional quality as it promoted waste, corruption, civil strife and even Dutch disease (Sachs and Warner, 1997; Sala-i-Martin and Subramanian, 2003; Collier and Hoeffler, 2004; Isham *et al.*, 2005; Collier, 2006; Busse, 2010), and (ii) crowding out physical and human capital as much capital investments and human resources are attracted to the natural

resource sectors with little spill over effects, and (iii) slowing down the development of the local financial system by distorting savings and investments since most savings and investments in this sector are foreign (Gylfason and Zoega, 2002).

One could surmise from the foregoing that previous authors who suggested that SSA countries are similar and thus could be treated as a dummy have not been correct based on the 1990-2010 data. In fact, we have found that adult literacy and income have been fairly lower in the ECOWAS region than in the other trading blocs whereas health outcomes have been more unfavourable for the CEMAC area. However, whereas there are large differences amongst the different trading blocs with respect to primary and secondary education rates, there is a pan-African malaise as far as tertiary education is concerned; the average rate is about 3 percent for the different trading blocs in SSA compared to 17 percent for the LMICs during the period 1990-2010.

Despite weak growth in income per capita in SSA, it is its distribution that matters most for the poor, to which we turn in the next sub-section.

2.1.4. Income distribution

In recognition of the impact of income inequality on welfare the United Nations started publishing in its 2010 Human Development Report an HDI adjusted for income inequality. Hence, following Beck *et al.* (2007), Go *et al.* (2007), Chen and Ravallion (2010), Pinkovskiy and Sala-i-Martin (2010) and Singh and Huang (2015), we use two indicators of income distribution (i) the GINI coefficient and (ii) the poverty gap index to measure the degree of inequality in the distribution of income in SSA relative to the developing world. We may deal with each in turn.

The GINI coefficient: The GINI coefficient measures the degree of income inequality on a scale of zero percent for perfect equality to one for perfect inequality. An average of about 0.45 was recorded for SSA over the period of study. When income is divided into quintiles, the highest 20 percent in SSA held an aggregate of 51.5 percent of all income earned during the 21years of analysis. Whereas inequality in the COMESA bloc was similar to the 45 percent

recorded for SSA, it was lowest and significantly different in the ECOWAS bloc (42.5 percent) and highest in the CEMAC group of countries (46.7 percent). Average income held by the top 20 percent was also highest in the CEMAC (52.6 percent) and lowest in ECOWAS (49.5 percent). This higher income inequality in the CEMAC compared to ECOWAS is not unrelated to corruption and cronyism especially in the redistribution of oil and mineral rents abundant in the CEMAC sub-region.

Comparing the two decades 1990-1999 and 2000-2009, we found that there was a significant improvement in aggregate income inequality in SSA, from a GINI coefficient of 46.5 percent to 43.8 percent likely due to improvements in economic growth and better redistribution of the fall-out from growth since 1995 as suggested by Pinkovskiy and Sala-i-Martin (2010), who calculated an improving welfare Sen index for SSA since 1995. However, average income inequality in SSA is only lower than the mean for Latin American countries for all LMICs (HDR, 2010). These high levels of income inequality are likely contributing to lower GDP per capita growth recorded in SSA over the 21 years period of this study. Barro (2000) has found a negative relationship between income inequality and economic growth for developing countries and suggested that this is because income inequality creates political instability which hampers investment in unequal societies. However, as Kuznets (1955) had suggested, higher income inequality may also be associated with higher economic development at the early stages as countries grow and expand.

In general, Table 2.2 of Appendix I shows that income inequality was lowest in the ECOWAS bloc (41 percent) in the decade 2000-2009 compared to 44 percent in the 1990s; but the greatest improvement in income equality was observed in the CEMAC bloc where the GINI coefficient dropped by 17.6 percent from an average of 54 percent in the 1990s to about 44.6 percent in the period 2000-2009. The latter value put income inequality in the CEMAC bloc lower than the aggregate value for COMESA countries in the decade 2000-2009, which was 45.2 percent. This disproportionate reduction in income inequality in the CEMAC bloc compared to COMESA and ECOWAS is correlated with higher growth that has been observed in this trading bloc since 1995. It could also be because as stated above, the CEMAC bloc started with higher income inequality in the 1990s. Then too, it could be an indication that there is a better redistribution of incomes from the more buoyant growth as countries such as Equatorial Guinea enact new social and redistributive policies such as universal low cost housing, better road infrastructure and improved access to education and availability of medical services with

windfall oil rents. But income inequality remains higher in the CEMAC area which may also suggest that there are concentrated oil rents in the hands of government and its cronies.

The Poverty gap index: Another indicator of income inequality, the poverty gap index measures the proportion of a population that falls below the poverty line which the World Bank has now set at US$1.25 in PPP terms per day (Chen and Ravallion, 2010). This indicator measures down-side income inequality; that is, income inequality amongst the poor. During the period 1990-2010, average poverty gap for SSA was 23.3 percent, 21.4 percent in ECOWAS, 21.8 percent in CEMAC and 25.4 percent in COMESA. The differences between these rates were not significantly different from zero at the 5 percent confidence level, suggesting similarity in the percentage of very poor people across the SSA region. However, compared to the group of LMICs, it becomes clear that extreme poverty is chiefly an SSA phenomenon. In the LMICs, the extent to which people fell below the poverty line was on average 11 percent. In terms of the evolution of the poverty rate in SSA we note that there was a narrowing in the poverty gap by over 26 percent, from an average of 27.2 percent to 19.9 percent between the two sub-periods of study.

The greatest gain in the reduction of the poverty gap was in the CEMAC trading bloc where the gap was reduced by more than one-half from 38.1 percent to 17.2 percent. The poverty gap also fell from 28.1 percent to 23.2 percent in COMESA, from 25.5 percent to 17.1 percent in ECOWAS compared with a thirty percent drop from 12.2 percent to 8.5 percent in the group of LMICs. This faster drop in the poverty gap across SSA is not only an indication that inequality on the down-side has reduced but is also a sign that overall hardship has fallen. Our data is supported by recent studies by Chen and Ravallion (2010) and Pinkovskiy and Sala-i-Martin (2010) who have found that poverty in Africa is falling faster than many would imagine since the growth episode that started around 1995.

Indeed, Pinkovskiy and Sala-i-Martin (ibid: p. 3) affirm that:

"*Not only has poverty fallen in Africa as a whole, but this decline has been remarkably general across types of countries that the literature suggests should have different growth performances. In particular, poverty fell for both landlocked as well as coastal countries; for mineral-rich as well as mineral-poor countries; for countries with favorable or with unfavorable agriculture; for countries regardless of colonial origin; and for countries with below- or above median slave exports per capita during the African slave trade. Hence, the substantial decline in poverty is not*

driven by any particular country or set of countries,". This is contrary to the suppositions of Collier (2006), Easterly (2006) and Njikam (2008) who tend to believe that geography and natural resources have mattered more in poverty reduction in SSA.

Thus, according to Pinkovskiy and Sala-i-Martin (ibid.), only growth matters for poverty reduction however it is achieved. But IMF (2011) has found that the correlation between growth and poverty in SSA for countries with data on headcount index was just -0.14. Nonetheless, this correlation was negative and significant for the fast growing countries and insignificant for the slow growing ones. Several reasons have been advanced for the faster reduction in extreme poverty including growth enhancing policies enshrined in poverty reduction strategy papers (PRSP). These countries identified for themselves areas into which poverty reducing investments needed to be done. Then too, with the end of violent conflicts in Rwanda, Burundi, Uganda, Angola, and other countries in SSA by the beginning of the last decade, it had become possible to implement pro-poor growth enhancing policies like micro-credit and increased flow of international aid into priority sectors such as healthcare, education and infrastructure development to alleviate extreme poverty (Shimeles, 2010).

. In conclusion, this analysis has revealed that income inequality was higher in COMESA and CEMAC than in ECOWAS countries but that the level of extreme poverty was the same across the continent. Therefore, this finding does not support authors who assume that such outcomes have been similar and as such SSA could be treated as a dummy in cross country studies.

Our discussions so far have been based on variables used in the construction of the human development index and the distribution of incomes. Though they measure the overall standard of living, they do not tell the entire story about the existence of a pan-African malaise. There are other measures of performance which have been frequently cited in the literature and which also tend to determine growth and living standards in SSA to which we now turn in the next section.

2.2. Other measures of performance in SSA

Other factors which impact economic development with associated living standards in SSA could be grouped into four; (i) macroeconomic policy,(ii) financial sector development, (iii) net foreign capital inflow (iv) quality of institutions and governance.

2.2.1. Macroeconomic Policy

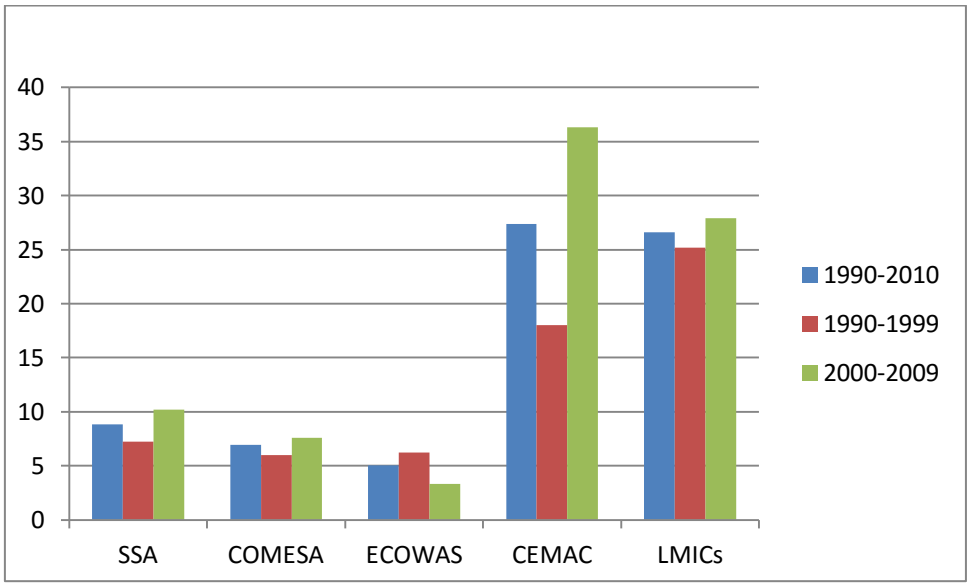
Three macroeconomic variables frequently used as determinants in growth and living standards studies include (i) savings and (ii) openness to international trade. Appendix I Table 2.7 provides the summary statistics for these indicators of the performance of the macroeconomy which we discuss in turn in the following paragraphs.

Savings: In conformity with Prasad *et al.* (2006), the *ratio to GDP of gross domestic savings* and *gross domestic savings as a share of gross capital formation* were used as measures of the size of savings in analysing the macroeconomic performance of SSA economies during the period 1990-2010. The average rate of savings in SSA as seen in Table 2.7 of Appendix I is a depressing 8.8 percent of GDP compared to a savings rate of 26.6 percent of GDP for the group of LMICs. This finding is in support of the prediction by Sachs *et al*. (2004) that the existence of a savings trap is hampering development in SSA. Within SSA however, the worst level of savings was recorded in the ECOWAS bloc where we have reported a savings rate of 5 percent of GDP. This was two percentage points lower than the 7 percent reported for COMESA over the period 1990-2010. Thus, low savings in SSA uncovered by the data is chiefly an ECOWAS issue. It is suggested that this may be because the ECOWAS region is much poorer as we saw above and so should save lesser as expected. Also, banks in ECOWAS bloc may be very limited in their capacity to offer savings accounts and products. As a result, customers tend to save their cash in non-liquid assets such as buildings, land and livestock. Abu *et al.* (2014) find that the determinants of low savings in ECOWAS include low income per capita, high inflation rate and low real interest rate and higher agricultural share in GDP.

The corresponding average savings rate for the SSA region was 8.8 percent of GDP and was chiefly supported by the CEMAC bloc with a recorded average gross domestic savings of 27.4 percent of GDP likely associated with increased oil revenues in Equatorial Guinea and Chad which started production in the 1990s and 2000s respectively. Also, average gross domestic savings ratio in SSA increased by over 40 percent between the periods 1990-1999 and 2000-2009. This was due principally to the CEMAC bloc where total savings more than doubled from about 18 percent of GDP in the 1990s to about 36.3 percent in the last decade. Nonetheless, average gross savings in SSA remained very low at 8.8 percent of GDP over the period 1990-2010.

This low level of average gross domestic savings in SSA could also be associated with a number of factors apart from those cited above for the ECOWAS bloc, and which were raised in a recent study by Horioka and Terada-Hagiwara (2012). These researchers found that the determinants of savings in 12 developing Asian economies have been the age-structure (especially age dependency ratio), income levels, and the level of financial sector development. On the backdrop of this finding, we suggest that the high age dependency ratio of ECOWAS countries (89.2 percent), together with their relatively low level of income may have equally contributed to their excessively low rate of domestic savings. In fact, the age-dependency ratio was about one dependant for every person in the working-age group in ECOWAS and SSA (87.9 %) in general, whereas it was about one dependant for two persons in the working-age group in the group of LMICs (see Table 2.7 of Appendix I). However, the age dependency ratio of the CEMAC countries during the period 1990-2010 was 85.2 percent which was significantly lower at the 5 percent level than that for the other SSA trading blocs. This lower age-dependency ratio might have contributed to higher average gross savings recorded in the CEMAC bloc especially in the petroleum economies of Gabon and Equatorial Guinea where average saving rates have been about 50 percent of GDP in the last decade.

Figure 2.6: Average gross domestic savings percentage GDP 1990-2010 in SSA



Source: Author with data from World Bank, World Development Indicators (2011)

This higher average savings rate might have contributed to the faster per capita growth recorded for the CEMAC trading bloc during our reference period consistent with Aizenman *et*

al. (2004) who found that countries with higher self-financing grew faster in the 1990s. In fact, Aghion, Comin and Howitt (2006) have empirically shown that a higher savings rate is associated with higher productivity growth in poorer but not in richer countries. This finding is supported by their theoretical argument that growth results from innovations which allow local sectors in poor countries to catch-up with frontier technologies. In this model, an external investor familiar with frontier technologies associates with a local entrepreneur accustomed with local conditions but unfamiliar with frontier technologies to undertake a venture. Hence, domestic savings tend to matter for innovation and growth because it allows the local entrepreneur to put their own savings into the venture, which mitigates an agency problem which would otherwise dissuade the foreign investor from participating. However, in the richer countries, entrepreneurs are already familiar with frontier technologies, have access to finance in international capital markets and do not necessarily need to attract foreign investments in order to innovate. Hence, domestic savings does not matter here for growth.

International Trade: As in Morrissey and Mold (2006) and Africa Competitiveness Report (2011), we analyse international trade in terms of the following measures: exports of goods and services as a share of GDP and import of goods and services as a percentage of GDP (Appendix I Table 2.7).

Exports of goods and services: According to Table 2.7 of Appendix I, on average, exports of goods and services represented 32.4 percent of GDP in SSA over the period 1990-2010. Within SSA, export as a share of GDP was 27.8 percent in ECOWAS, 31.9 percent in COMESA and 44 percent in the CEMAC bloc. It is notable that the CEMAC average was significantly higher than the other SSA averages at the conventional 5 percent level. Higher exports as a share of GDP in the CEMAC bloc were not unrelated to the rising exports of petroleum products from Equatorial Guinea since the early years of the 1990s. Surprisingly, SSA exported on average more in goods and services as a percentage of GDP than the group of LMICs during the period 1990-2010. Indeed, SSA's 32.4 percent of GDP in exports on average was significantly higher at the conventional 5 percent level than the 25.8 percent of GDP recorded as exports for the group of LMICs.

Although the export as a share of GDP figures are higher in SSA than for the group of LMICs on average, some researchers including Gupta *et al.* (2007) and Sachs *et al.* (2004) have reported that these exports were mostly composed of primary commodities and natural resources like cocoa, coffee, rubber, bananas, oil, wood, and minerals. In fact, Gupta *et al.* (2007, p. 6.) report that "*of the total increase in export values between 2000 and 2005, fuels accounted for 65 percent, manufactures 24 percent and food and raw materials about 5 percent each. Because manufactures include processed natural resources, the extent to which Sub-Saharan Africa's exports are resource-driven is obvious."*

Thus, in spite of substantial efforts to trade liberalisation in the last two decades, SSA might have failed to diversify its export variety to include high value-added products offering enough gains through specialisation which is exactly what 'buys' growth and enhances human welfare. As Imbs and Wacziarg (2003) have found, successful developing countries that have achieved emergence all went through a process of diversification before crossing into concentration after attaining a level of development equated to the GDP per capita of Ireland in that year.

Based on the foregoing, it would appear that SSA has remained concentrated over time in its much touted comparative advantage sectors which tend to suffer from the vagaries of international prices. Indeed, according to a report by the World Bank in 2000, SSA has not diversified its export base. Also, even though exports as a share of GDP are comparatively higher in SSA, these have largely come from inefficient agricultural sectors which offer little productivity gains over time. Also, Gupta *et al* (2007, p. 38) remarked that the manufacturing taking place in SSA is linked to natural resources and that even though there has been some improvement in exports, there has been less product diversification, with landlocked SSA countries depending exclusively on agricultural exports.

Moreover, Rajan (2010) has sounded a warning call that an export-led growth strategy could backfire because efficiency gains achieved in the exporting industries may soon be wiped out when international demand slumps. This is the case during global crises especially when policy makers focus on specific export sectors whereas the inefficient domestic sector which receives no attention fails to bring growth. Japan in the 1990s is an excellent case in point. Thus, diversification of the domestic sector and improvements in efficiency are paramount in sustaining growth even when an export oriented strategy is adopted.

Import of goods and services: With regards to imports, Table 2.7 of Appendix I reveals that import of goods and services as a percentage of GDP to SSA excluding South Africa was about 43.8 percent during the period 1990-2010. Within SSA, COMESA's 43.3 percent average imports as a share of GDP over the period was similar to the SSA average; whereas imports to ECOWAS (40.5 percent) and CEMAC (41.9 percent) were significantly lower than the SSA average for the period at the conventional 5 percent level. While SSA led the group of LMICs in aggregate exports as a share of GDP during the period 1990-2010 as we saw above, it also imported more in goods and services as a percentage of GDP.

Indeed, SSA's average import of goods as a share of GDP was 43.8 percent whereas it was only about 25.3 percent of GDP for the group of LMICs for the same period. This is presumably because of SSA's relatively higher ratio of exports and consequent higher foreign exchange earnings. Then too, foreign exchange from grants in Aid on a per capita basis is higher in SSA than elsewhere in the developing World. It is therefore fair to say that such Aid flows have been spent on the importation of machinery and other equipment needed for economic activities. But also, since the quality of goods and services provided by domestic producers in the SSA region is relatively poor, much of the commodities consumed by the middle –higher income classes are imported from overseas. However, the change in overall imports as a share of GDP between the two decades 1990-1999 and 2000-2009 was higher for the group of LMICs than for SSA albeit from a lower value as Table 2.7 of Appendix I shows.

In general, whereas SSA countries tended to export more as a share of GDP than the group of LMICs thanks chiefly to the CEMAC bloc, they also imported far more than they exported. Thus, they experienced a deficit primary balance over the reference period on average, even though this balance was positive for the CEMAC countries likely due to higher oil exports and prices. As we have argued above, imports into SSA have not contributed much to industrial manufacturing development (manufacturing was barely 10 percent of GDP) and therefore the likely externalities or spill-overs which are said to occur during international trade might have been limited in driving growth rates in SSA during the period of our study compared to that which was observed for the group of low-middle income countries. These latter countries exported more than they imported during the period 1990-2010 and most importantly had a stronger manufacturing sector (21 percent of GDP during 1990-2010).

Interestingly, Prasad *et al.* (2006) have found that there is a negative correlation between current account deficits and economic growth in developing countries while the relationship is

positive for countries that recorded current account surpluses contrary to neoclassical growth theory. Maybe this is the reason why some authors like Rodrik (1997) have failed to see a positive effect of trade on growth and welfare in SSA and why the group of LMICs have been growing faster than SSA countries and enjoying higher welfare gains.

Nonetheless, because SSA countries had an overall trade openness (imports plus exports) ratio of over 75 percent of GDP between 1990 and 2010, a figure substantially higher than that for the group of LMICs, it may be unfair to say that SSA countries are not open to trade as suggested by Sachs and Warner (1997). These writers suggest that this lack of openness explains why trade has not been favourable for growth in SSA, a position also espoused by the Commission for Africa (2005, p. 263). Contrastingly, the Africa Competitiveness report (2011, p.3) suggest that even though SSA's share in World trade did not increase, it is rather because the other regions like South East Asia have been growing their exports at a greater speed.

Also, Morrissey and Mold (2006) report that between 1990 and 2002, export volumes for non-oil exporters actually increased by 130 percent in SSA. Thus, notwithstanding this seeming controversy between the Commission for Africa on the one-hand and the Competitiveness report and Morrissey and Mold (2006.) on the other hand, Rodrik (1997) explains that trade is not a crucial ingredient for long term growth but rather an auxiliary of an enabling nature. Thus, the much talk about trade liberalisation since the mid-1980s in SSA might have drained economic and political resources away from much needed human capital and infrastructural development into trade policies and reforms with little consequence on economic growth.

However, because Rodrik (1997)'s finding was controversial sincetrade is theoretically said to be an engine of economic growth, it sparked a number of empirical investigations. In these debates, Alesina *et al.* (2005) have suggested that openness to trade and the size of countries must be taken together to evaluate the impact of trade on growth. Hence, the effect of trade on growth might be significant if small-size economies like those of SSA countries are interacted with trade openness to evaluate the effect of trade on growth. More recently, Bruckner and Lederman (2012) have found using cross-country regressions of 30 SSA countries that trade actually contributes to long-run growth in SSA, consistent with the idea promulgated by Bhagwati and Srinivasan (2003) that trade increases the 'size of the pie' and should be welfare enhancing.

In general, we find that the CEMAC trading bloc was more open to trade measured by the sum of exports and imports of goods and services, than the other trading blocs. Therefore, based on these measures of trade openness, we think that there is no pan African malaise. As such,

SSA countries should not be treated as similar with regards to their openness to international trade.

2.2.2. Financial Markets development

Financial markets development is measured for the purposes of this study using both banking sector and stock market development indicators. With respect to the former, we employ the following measurements: (i) the ratio to GDP of money and quasi money (M2) and (ii) the ratio to GDP of credit to the private sector. In the case of stock market development, the ratio of stock market capitalisation to GDP and the stocks turnover ratio are used. These measures have previously been used by authors such as Rajan and Zingales (1998), Levine (2005), Demirgüç-Kunt and Levine (2009) and Greenwood *et al.* (2010), Rousseau and Wachtel (2011) amongst others. We discuss the evolution of these indicators in turn using Table 2.8 of Appendix I. We compare the SSA average with those for the different trading blocs within SSA and the group of LMICs to establish the presence or not of a pan-African malaise in this dimension of development in SSA.

Financial institutions development by size and depth: Over the period 1990-2010, SSA was financially underdeveloped when measured by size (broad money or M2/GDP) and by depth (credit to the private sector percentage GDP) as seen in Table 2.8 of Appendix I.

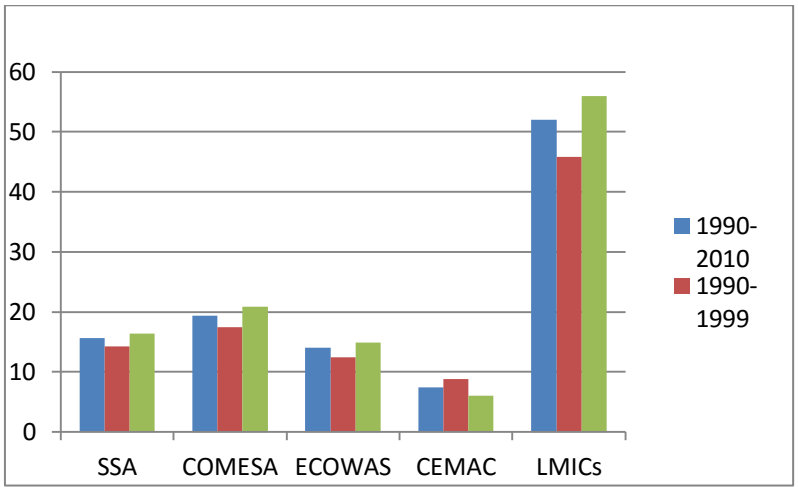
On average, M2/GDP for the SSA region was less than 28 percent whereas credit to the private sector on GDP was barely 15.6 percent. Within SSA, the CEMAC trading bloc was the most underdeveloped with an M2/GDP ratio of only 14.3 percent followed by the ECOWAS with 24.5 percent and about 34.4 percent in the COMESA bloc which was significantly more developed at the conventional 5 percent level. Also within SSA, we note that M2/GDP increased from an average of about 28.6 percent to about 39.4 percent of GDP in COMESA, from about 21 percent to about 27 percent of GDP in ECOWAS likely due to the liberalization of the financial sector in these countries from around 1990, but it regressed by about 6.3 percent in the CEMAC bloc from an average of about 14.6 percent in the 1990s to about 13.7 percent of GDP in the period 2000-2009. In effect, M2/GDP's decrease in the CEMAC bloc is not unconnected to tighter monetary policies applied in countries using the franc CFA as currency. That is, countries

in this monetary zone are expected to adhere to strict monetary expansion rules including depositing 65 percent from 1973 and since 2009, 50 percent of their foreign exchange earnings with the French treasury. This ensures that they meet an inflation convergence criterion of 3 percent to maintain convertibility to the Euro since the franc CFA is pegged to the Euro at the rate of 1 Euro to 655.957 CFA francs.

There was also significant variability amongst the three trading blocs in SSA with regards to the domestic credit issued to the private sector as a share of GDP ratio. It was significantly higher at the conventional 5 percent level in COMESA (19.4 percent) than the SSA average of 15.6 percent. Like for the M2/GDP ratio, the CEMAC area was the poorest performer in terms of the ratio of domestic credit to the private sector, recording a dismal average of 7.4 percent over the 21 year period followed by ECOWAS which recorded about 14 percent. This low level of financial development in the CEMAC area despite its higher average gross domestic savings during this period is not unrelated to the finding that banks in this area are over-liquid and less competitive (Saxegaard, 2006; Saab and Vacher, 2007). Also, about 70 percent of bank deposits in this trading bloc are short term time deposits. In the absence of competitive banking services and a vibrant stock market, CEMAC banks lack instruments to transform short term deposits into long term loans.

By trading blocs, the COMESA bloc was the most financially developed as per these measures of financial sector development during the period 1990-2010. The significant difference of financial institutions development in COMESA relative to these latter trading blocs could be explained in part by the literature on colonial origins chiefly promoted by Acemoglu, Johnson and Robinson (2001, 2007). According to these authors, when colonisers settled in a country owing to favourable climate, they enacted better institutions that promoted property and political rights while where they could not settle because of unfavourable climate and disease, they set-up extractive institutions. It is no longer a debate that better institutions that protect property rights and the rule of law are good for financial development (La Porta *et al.,* 1998; Beck *et al.,* 2003). In effect, there are more countries with sizeable white populations in the COMESA bloc than in either ECOWAS or CEMAC. This high level of financial development in the COMESA could have favourably influenced its better performance compared to ECOWAS and CEMAC in terms of human welfare measured by education and healthcare. This is so because access to finance has been found to unambiguously improve some welfare indicators (Claessens and Feijen, 2006, 2007; Beck *et al.*, 2007, Singh and Huang, 2015).

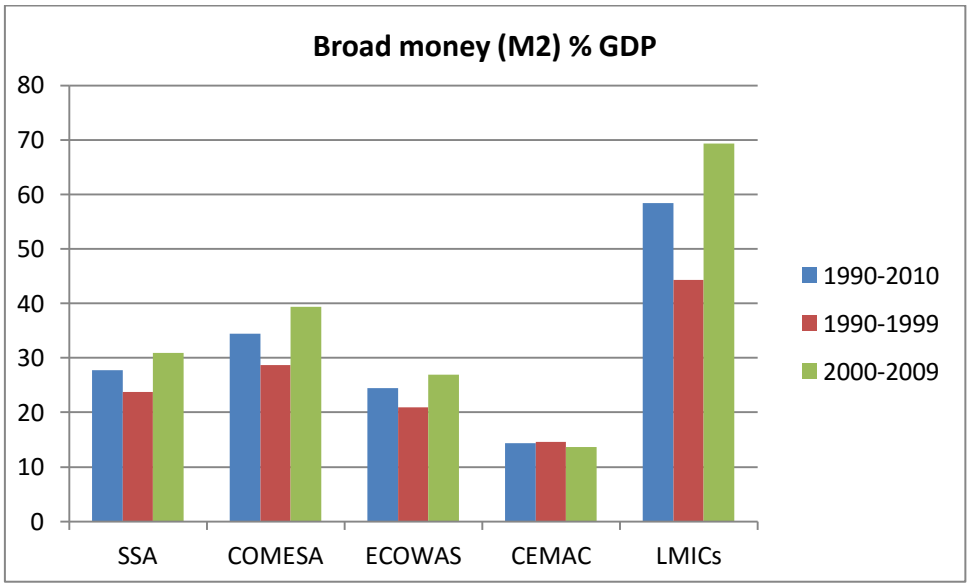
Figure 2.7: Average Domestic credit to the private sector Percentage GDP 1990-2010



Source: Author with data from World Bank, World Development Indicators (2011)

Moreover, significant growth in the ratio to GDP of domestic credit to the private sector was recorded in COMESA and ECOWAS where it increased from about 17.5 percent to 21 percent and from 12.4 percent to 15 percent respectively. By contrast, there was a decrease of 31.6 percent in the CEMAC bloc, falling from 8.8 percent to 6 percent between the two decades. This finding is not unrelated to a decrease in the corresponding ratios in the early 2000s for the Central African Republic and the Republic of Congo which experienced civil wars and political unrests during those years. Low credit to GDP and high savings to GDP ratios in the CEMAC tend to tie with the findings of some IMF authors like Saab and Vacher (2007) who found that the CEMAC banking sector is less competitive and that legal institutions are weak to support better credit development. Nonetheless, as figure 2.7 above shows, performance measured by domestic credit as a share of GDP issued to the private sector in SSA was less than 25 percent, a threshold which Aghion *et al.* (2005) suggest financial development must reach in order to favour growth convergence to that of their frontier nation (per capita income growth in the United States).

Figure 2.8: Average broad money (M2) percentage GDP 1990-2010



Source: Author with data from World Bank, World Development Indicators (2011)

In addition, over the period 1990-2010, SSA was significantly underdeveloped compared to the group of LMICs when measured using the M2/GDP ratio as seen in Table 2.8 of Appendix I. On average, M2/GDP for the SSA region was less than 28 percent compared to about 58 percent in the group of LMICs. Also, the ratio to GDP of domestic credit to the private sector was significantly lower at the conventional 5 percent level in SSA compared to the group of LMICs. In effect, the average private credit to GDP ratio was less than 16 percent in SSA which was significantly lower than the 52 percent recorded for the group of LMICs during the same period.

In terms of evolution between the two decades 1990-1999 and 2000-2010, the data in Table 2.8 of Appendix I and figures 2.7 and 2.8 above show that M2 was growing faster in the group of LMICs than in SSA; from an average of about 44 percent of GDP in the 1990s, M2 reached an average of about 69 percent of GDP in the LMICs in the period 2000-2009 whereas it marginally increased from an average of about 23.8 percent of GDP in the 1990s to about 31percent in the decade 2000-2009 in SSA despite financial liberalisation. In the same vein, domestic credit to the private sector as a share of GDP grew faster in the group of LMICs than in SSA; from an average of 46 percent in the 1990s, it reached about 56 percent in the last decade in the LMICs but only dismally increased from 14.3 percent to about 16.4 percent in SSA.

Stock market development: Stock market development here is measured by size (market capitalisation as percentage of GDP) and market liquidity (the turnover ratio or value traded divided by market capitalisation).

Table 2.8 of Appendix I also reveals that SSA stock markets were significantly underdeveloped when compared to markets in the group of LMICs. For example, the ratio of market capitalisation to GDP (MCAP) for SSA was just under 22 percent on average compared to the 43.5 percent recorded for the group of LMICs over the period 1990-2010. Even this value of 22 percent of GDP of market capitalisation in SSA was only possible because of the substantial ratio recorded in Zimbabwe where GDP has shrunk to levels lower than market capitalisation since the 2002 political violence facing the Mugabe regime. Furthermore, stock markets are only reasonably developed in the COMESA and ECOWAS trading blocs with ratios of market capitalisation to GDP of 26.2 percent and 14.4 percent respectively. By comparison, the CEMAC bloc has the lowest ratio at less than 1 percent of GDP due largely to the fact that it has two shallow markets - the Douala Stock Exchange in Cameroon and the Central African market in Gabon.

Also, stock market development measured in terms of the market turnover ratio (total value traded divided by market capitalisation), is a more appropriate measure of the level of development of markets because it is free of GDP volatility and gives an indication of the degree of liquidity of these markets. For example, during the period under consideration, market liquidity measured by the turnover ratio was barely 5.1 percent on average in SSA whereas it reached 66.2 percent in the group of LMICs. Market liquidity is similar amongst the selected trading blocs and the SSA average. It was 5.2 percent in COMESA and about 4.7 percent in ECOWAS and these were statistically similar at the conventional 5 percent level. SSA stock markets were inherently characterised by illiquidity reflecting their high underdevelopment compared to the group of LMICs. Allen *et al.* (2011) have also reached this conclusion and suggested that this finding is due to the lack of depth in African capital markets owing to poor corporate governance in local corporations and overdependence on the banking sector. Thus, these markets were likely incapable of providing the functions of allocational efficiency, risk management and liquidity enhancement which are exactly what buys growth (Levine, 1997).

With regards to evolution of the measures of stock market development, average SSA market capitalisation as a share of GDP almost doubled between the two decades, from an aggregate of about 14 percent in the 1990s to 27 percent of GDP in the decade 2000-2009. This

increase was mainly influenced by MCAP in COMESA which increased on aggregate from about 17.4 percent to 31 percent between the two decades owing strongly to skyrocketing MCAP/GDP values in Zimbabwe where GDP has been shrinking in the last decade. In the LMICs, MCAP/GDP attained an average of 53 percent in the decade 2000-2009 from 30 percent in the 1990s. The low level of MCAP/GDP in the LMICs in the 1990s is presumably due to the 1994-1995 financial crises in Latin America and the 1997-1998 Asian financial crises.

Also, we note that the turnover ratio measure of stock market liquidity in SSA recorded an average increase of about 29 percent from an average of 4.4 percent in the 1990s to about 5.7 percent in the decade 2000-2009 owing to strong performance in ECOWAS in the last decade as governments and corporations turn to the markets to raise money. In fact, liquidity increased by about 152 percent in ECOWAS from an average of 2.6 percent in the 1990s to about 6.6 percent in the decade 2000-2009. COMESA also recorded a 19 percent increase in market liquidity from an aggregate of 4.7 percent in the 1990s to about 5.6 percent in the decade 2000-2009. Concurrently, market liquidity also increased at a faster rate in the group of LMICs from 49 percent in the 1990s to 80 percent in the decade 2000-2009. This rise in liquidity tends to suggest that these markets are getting better at allocating resources and could subsequently serve as significant contributors to economic growth.

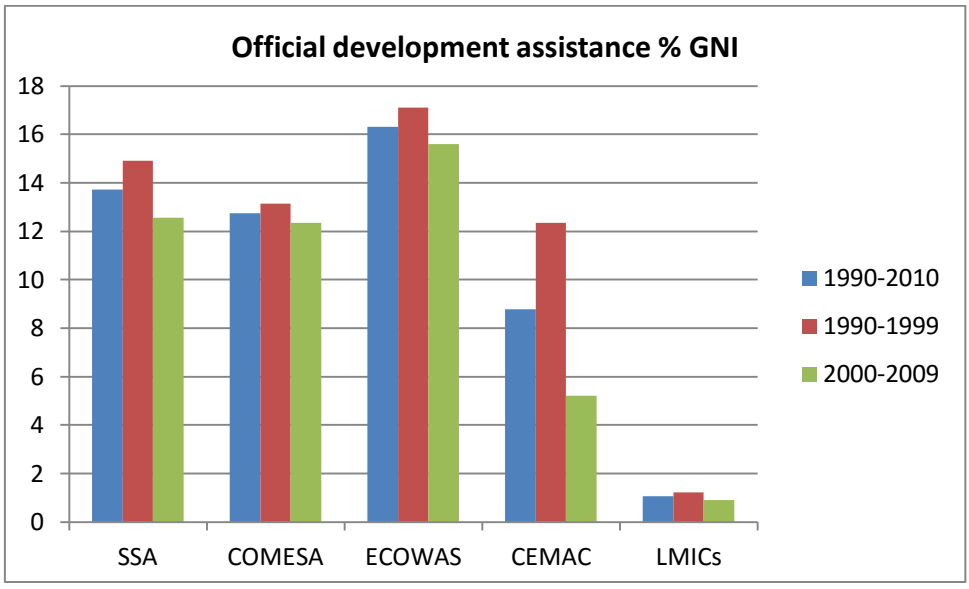
In conclusion, we find that in terms of stock market development, there is a pan African malaise especially regarding liquidity in stock markets across the continent. Therefore, studies that assume that SSA countries are similar as per this indicator may not be far from the truth. However, in terms of broad money and credit development, they are essentially different. Nonetheless, SSA countries also tend to depend on foreign savings apart from local financial markets to finance growth and welfare. Hence we turn to foreign capital flows in the next sub-section.

2.2.3. Foreign Capital Inflows

In this sub-section, we discuss in turn SSA's performances relating to (i) overseas development assistance (ODA), (ii) foreign debt and (iii) foreign private investment. As in the previous sections, we compare these performances to those of our selected trading blocs within SSA and the group of LMICs.

Overseas development assistance (ODA): As presented in Table 2.9 of Appendix I and figure 2.9 below, SSA received on average 14 percent of its gross national income in overseas development assistance (ODA) during the period 1990-2010. However, ODA to COMESA of 12.7 percent and to CEMAC of 8.8 percent were significantly lower than the SSA average and the ECOWAS average which stood at about 16.3 percent of gross national income (GNI). Then too, within SSA, ECOWAS recorded the highest average amount of ODA per person of about 67.8 USD followed by COMESA with 57.5 USD and then CEMAC with 54.5 USD. This implies that a significant proportion of ODA to SSA during the twenty-one years timeframe of this study went to ECOWAS which as we have seen above, recorded the lowest per capita income and educational attainment in SSA during the period 1990-2010. However, a disproportionate amount of foreign Aid was directed to Sierra Leone and Liberia which had been in conflict for most of the years considered for this study.

Figure 2.9: Official development assistance percentage GNI 1990-2010



Source: Author with data from World Bank, World Development Indicators (2011)

Furthermore, we observe that despite international bickering since the Gleneagles G8 summit of 2005 about increasing aid to SSA towards achieving the millennium development goal of halving poverty by 2015, ODA/GNI to SSA has been on the decline between the two decades of the 1990s and 2000-2009. In fact, it decreased by more than one-half from about 12.3 percent of GNI to about 5.2 percent of GNI between these two periods in the CEMAC bloc; from 14.9 percent of GNI to about 12.6 percent in the COMESA bloc; and from about 17.1 percent of GNI to about 15.6 percent in the ECOWAS trading bloc. The large decline in the CEMAC area

is not unconnected to its higher income per capita, higher growth rates and higher domestic savings. By contrast, in the group of LMICs the net inflow of ODA was very low at 1.2 percent of GNI in the 1990s, and it decreased to less than 1 percent of GNI between the two decades.

With falling Aid dollars to SSA, there is a suggestion that the global financial crises facing Western countries since 2007 may be having spill-over effects, of which Aid reduction to SSA is one (Fosu, 2010b; Quattri and Fosu, 2012). But this view is ambiguous as ODA/GNI ratios for some SSA countries increased even during the global financial crises. Other suggestions are that much of the ODA may be flowing into South Asia where poverty remains a serious problem in countries like Bangladesh. Nonetheless, it may also be that sustained growth in gross national income in many SSA countries during the last decade is stunting the per GNI relevance of ODA or simply that 'Aid fatigue' is returning to donor nations as far as SSA is concerned.

Looking also from the data in Table 2.9 of Appendix I, we find that ODA represented on aggregate 628 percent of central government expenditures in SSA and that this high figure was principally influenced by the 1828 percent recorded in ECOWAS over the period 1990-2010. In fact, the high figure recorded in ECOWAS was chiefly a consequence of the fact that central governments in Liberia and Sierra Leone were entirely funded by ODA since year 2000. For example, the contribution of ODA to central government expense in SSA increased by over 2000 percent between the decade of the 1990s and the decade 2000-2009 signalling increased foreign intervention to support governments in countries like Liberia, Rwanda, Uganda and Sierra Leone after the civil wars in the 1990s. Nonetheless, ODA's contribution to central government expense was about 51 percent in COMESA and about 37 percent in CEMAC over the period 1990-2010 and recorded only marginal improvements between the two decades 1990-1999 and 2000-2009.

The higher inflow of ODA into ECOWAS amongst the SSA trading blocs may suggest that aid flows mostly to regions with low income per capita and deplorable welfare conditions, and not necessarily to close one of the dual gaps suggested by neoclassical theory (Chenery and Strout, 1966). Thus, it should not be expected that Aid would promote growth but it could promote welfare that does not depend on whether the economies are growing. For example, as we mentioned earlier, despite dismal growth in the ECOWAS bloc during the 1990-2010 period, educational attainment in ECOWAS almost doubled between the two decades and infant

mortality reduced significantly. In fact, these are the key sectors into which Aid money has been directed during the last several years.

Again, maybe the role of Aid is not for growth as has also been suggested by Bhagwati and Srinivasan (2003). For example, Easterly (1997, 2003, 2006) continues to argue that Aid cannot 'buy' growth in Africa despite the Burnside and Dollar (2000) claim that Aid works well in countries with good policies because foreign Aid as he suggests, promotes currency overvaluation and civil unrests amongst other ills. In this connection, other reasons have been advanced as to why Aid may not cause growth in SSA. For example, Rajan and Subramanian (2006) find that Aid leads to an appreciation of real exchange rates which hampers growth in the manufacturing sector (the so called Dutch disease problem) and suggest that this could be why it is hard to find robust evidence that Aid helps countries grow. However, Elbadawi *et al.* (2011) have found that foreign Aid is not a significant contributor to exchange rate overvaluation in SSA and that Aid spurs growth but not in countries with exchange rate overvaluation.

Another argument as to why Aid may not be beneficial for growth in SSA is that Aid promotes capital flight. For example, Collier, Hoeffler and Patillo (2001) have found that compared to other developing countries, SSA has a larger share of private assets held abroad while Boyce and Ndikumana (2001) found that SSA is a 'net creditor' as its stock of private wealth held abroad is higher than its stock of debts. Thus, it appears that foreign Aid either displaces domestic savings or is siphoned and directed back to foreign bank accounts by corrupt officials hence dampening any beneficial effects to economic growth; a support to Boyce (1992) thesis of a 'revolving door' in the foreign Aid business in the Philippines. Serieux (2011) reinforces the argument that foreign Aid to SSA finances 'reverse flows' by pointing to debt service, capital flight and reserve accumulation and suggesting that reverse flows account for 50 percent of all Aid to SSA for the period 1980-2006.

Foreign debt: The available data in Table 2.9 of Appendix I also suggests that, total external debt stocks as a percentage of gross national income (GNI) over the period 1990-2010 had reached an average of 108 percent in SSA excluding South Africa. This level of debt was significantly different from the 34 percent that was recorded in the group of LMICs. Over this period, high external debt was truly an SSA problem but its level of prevalence was different amongst the three trading blocs considered for this analysis.

In effect, the average stock of debt as a percentage of GNI in the CEMAC bloc was 102 percent and this was similar to the SSA average. ECOWAS had the highest level of debt stock of about 137 percent of GNI and this was significantly higher at the conventional 5 percent level than that recorded for COMESA which had the lowest level at about 89 percent of GNI. One can conjecture that the higher level of indebtedness in ECOWAS was not unrelated to its low level of income per capita and weak institutions caused by wars in some member countries. Fofack (2009) found in a co-integration analysis that external debt leads to capital flight in SSA though there is some bi-directional causality. Also, Cerra *et al.* (2008) found that countries with weak institutions have a greater propensity to accumulate debt because weak institutions promote capital flight which creates financing need. Also, they remarked that capital flight undermines growth and the effectiveness of debt relief and foreign Aid and sometimes drains more resources from poor countries than debt service.

Furthermore, the data shows a drop in the debt stock as a share of GNI of 19 percent in SSA; from 120 percent to about 97 percent between the two decades 1990-1999 and 2000-2009. This reduction in the percentage debt stock between the two decades in SSA was influenced chiefly by large debt cancellations for post-HIPC completion point countries in all the trading blocs (World Bank, 2006; Nwachukwu, 2011). For example, in the CEMAC bloc, countries like Cameroon which attained the completion point of the Heavily Indebted Poor Countries Initiative (HIPC) in 2004 benefitted from significant debt cancellations; from 109 percent of GNI in 2000, external debt was only 12.2 percent of GNI in 2009 (IMF Cameroon Country Report, 2009).

In spite of debt reductions in ECOWAS countries that attained HIPC completion point after 2005, average debt stock levels still remained significantly dangerously high in Liberia, Guinea Bissau and Gambia throughout most of the last decade. Comparing the evolution of ODA and the debt stock as a share of GNI between the two periods, we realized that the Developed World (G20) was replacing its promise to double ODA in the 2005 Gleneagles summit with its promise for debt relief earlier in the decade. This assertion is confirmed by Serieux (2011) who remarked that this substitution is part of an international convention.

Foreign private investment: A new summary measure by the World Bank called private capital flows as a percentage of GDP (Table 2.9 of Appendix I) captures all private capital (foreign direct investment, portfolio investment, foreign bank loans, and remittances) flows into countries. However, only components like *FDI*, *portfolio capital and remittances* shall be discussed subsequently.

In effect, when private capital flow is measured by the *ratio of foreign direct investment (FDI) to GDP*, we found contrary to anecdotal evidence that SSA received, on average more FDI as a percentage of GDP than the group of LMICs. Total FDI as a share of GDP to SSA during the period 1990-2010 was about 4.2 percent and it was significantly higher than the 2.4 percent recorded for the group of LMICs. While the aggregates for the COMESA and ECOWAS trading blocs were not significantly different from the SSA figure, FDI inflows to the CEMAC trading bloc were significantly higher than the SSA average; about 7.3 percent of GDP. As we have remarked elsewhere, a huge portion of the FDI flows into the CEMAC bloc has been resource seeking FDI directed towards the petroleum sector especially in Equatorial Guinea. As with private capital flows, the ECOWAS trading bloc also experienced the greatest change in FDI inflows as a percentage of GDP between the two decades 1990-1999 and 2000-2009.

Whereas FDI flows as a share of GDP to SSA and the group of LMICs increased respectively by about 60 percent and 51 percent, that into the ECOWAS trading bloc more than doubled, from 2.2 percent in the 1990s to 5.1 percent in the decade 2000-2009. It also increased by about 80 percent into the COMESA bloc and by a marginal 3.3 percent into the CEMAC bloc between the two decades. Owing to this rising trend of FDI into SSA, it may not be unwise to ask how beneficial this FDI flows have been to SSA. Existing literature such as Ndikumana and Verick (2008) suggest that FDI crowds in domestic investment in SSA and that private domestic investment is a driver of FDI in SSA.

More crucially, Gohou and Soumaré (2011) have found contrasting effects of FDI in the different sub-groupings of SSA. For example, they found that FDI enhances welfare (measured using HDI) in East and Central Africa, has no impact on welfare in Southern and Northern Africa and has an ambiguous effect on welfare in West Africa (ECOWAS). FDI is expected to impact growth and welfare through its contribution to capital accumulation and its supposed externalities including technology transfer, skills and knowledge spill-over (Tanna, 2009). However, knowing that much of the FDI into SSA in the last decades has been in search of natural resources, it remains unclear that it has contributed to growth and welfare through these suggested externalities.

Elsewhere, even though SSA failed to attract portfolio investment over the period under consideration as Table 2.9 of Appendix I indicate, this same table reveals that SSA received on average more in *remittances* as a share of GDP than the group of LMICs. In effect, remittances as a share of GDP to SSA was more than double that to the group of LMICs as it was

respectively about 4 percent and 1.5 percent of GDP for the two groups. Within SSA, we found that remittances inflows went chiefly into ECOWAS which received on average 4 percent of GDP in remittances while the trading blocs of COMESA and CEMAC received respectively 2 percent and 0.2 percent of GDP as remittances. These latter were significantly lower than the ECOWAS figure at the conventional 5 percent level.

Also, remittances as a share of GDP increased across the board between the 1990s and the decade 2000-2009 in SSA. It was 3.7 percent of GDP in the 1990s and 4.4 percent in the decade 2000-2009 in SSA whereas it increased from about 3.1 percent to 4.7 percent in the ECOWAS trading bloc. These increases in remittances are likely to have had significant social and economic consequences. In fact, Lartey (2010) found that remittances are not only directly positively associated with growth but also that their interaction with financial development is positively associated with growth in SSA. This effect on growth, this researcher found, works through capital accumulation and macroeconomic stability through consumption smoothing. This is consistent also with Gupta, Patillo and Wagh (2009) who found that remittances alleviate poverty and promote financial development in SSA.

In all, we have found that SSA trading blocs have been very different in terms of their capacity to attract foreign capital. For example, the ECOWAS region attracted a higher level of foreign Aid and also the highest level of remittances but had the largest debt burden of the trading blocs in comparison. This suggest that SSA countries are different as per this performance indicator and cast doubts on studies that have treated SSA as similar with regards to their attractiveness to foreign capital. However, it is usually suggested that countries in SSA fail to attract foreign investment like their counterparts in Asia because they have bad institutions and poor governance mechanisms. We therefore examine the quality of institutions and governance in SSA in the next sub-section.

2.2.4. Institutions and governance

The quality of institutions and governance have been measured using various indicators which in reality all tend to measure the degree to which formally or informally devised constraints affect our human interactions (North, 1990). Herrera et *al.* (2005) provides a comprehensive list of the most frequently used indicators which measure these variables. They

include amongst others the Country Policy and Institutional Assessment (CPIA) Index of the World Bank, Governance Matters I-VII of Kaufmann et *al.* (1999, 2008) and World Bank, ethnic fractionalization index, the Index of Economic freedom of the *Heritage Foundation* and Political rights and Civil liberties status of *Freedom House*. We can also add the POLITY IV variable which is frequently used in studies where institutions are equated to democratic participation. While these different indicators measure various dimensions of the same problem, we have chosen to use for this study, the *Freedom House* indicators *'Political rights'* and *'Civil liberties'* which have consistent values from 1990 to 2010 and have equally been used in some economic papers like Levy-Yeyati and Stuzenegger (2003) and Mulligan *et al.* (2004) to test the effect of institutional quality on economic growth, and in studies on leadership and underdevelopment in SSA such as Petithomme (2010).

The indices of *political rights* and *civil liberties* measure the quality of institutions for countries on a scale of 1 to 7; 1 to 2.5 representing countries which enjoy the most political rights and liberties, whereas 7 represents the value for countries with the worst institutional or political arrangements. According to *Freedom House*, countries whose combined average ratings fall between 1.0 and 2.5 are characterized as "free", those between 3.0 and 5.0 are considered as "partly free", whereas those with a rating between 5.5 and 7.0 are designated "not free". In the analysis that follows, this study uses just the changes in political rights (PR) in SSA and its sub-regions to discuss the evolution of the quality of governance and institutions within SSA and compared to the group of 204 countries for which *Freedom House* has provided values.

Political rights: With regards to political rights, SSA's average score for the period 1990-2010 was 4.64 on a scale of 7 suggesting that SSA has been 'partly free' over this period. However, broken down by regional trading blocs, we find that SSA's average performance as a group by this metric was significantly higher at the 5 percent test level than the average for ECOWAS (4.34) and significantly lower than the average for the CEMAC sub-region which scored 5.73 ("not free"). The average for COMESA of 4.57 is statistically equivalent to that of SSA. This suggests that political rights have been better in the ECOWAS sub-region over the period of this study than in the rest of SSA, in spite of the civil wars that have marred the region in the recent past in countries like Cote d'Ivoire, Liberia and Sierra Leone, following the wake of political democracy in the early 1990s (Kwame, 2008).

In fact, the ECOWAS sub-region has experienced far more democratic elections and power transfers than in any of the other sub-regions of SSA since 1990. This perhaps explains why the measure of political liberties tends to be more favourable there (Kwame, 2008). Nonetheless, all countries in the PR database as a group scored 3.48 on the scale of 7 which suggest that they were 'partly free' as a group. Yet, the fact that this rating is significantly lower than the average rating for SSA suggests that non-SSA countries tend to enjoy better political rights than their SSA counterparts.

Between the two decades of the 1990s and 2000s, governance and institutional quality improved in SSA as the average PR value went from 4.86 in the decade 1990-1999 to 4.41 in the period 2000-2010. Then again, there was a 20% improvement in the quality of institutions in SSA from the initial PR value of 5.63 in 1990 ("not free") to 4.51 in 2010 ("partly free"). However, and as the data reveals, the greater part of these gains (19%) was achieved in the period 1990-1999 and which can be attributed to enhancements in freedoms, voters' rights and democratic processes in the 1990s (Lindberg, 2006a, b; Petithomme, 2010; Masaki and van de Walle, 2014). Only a 1% improvement in political rights has occurred since 2000 with regards to the PR index and this weak performance has also been confirmed by Petithomme (2010) and may suggest that SSA is falling back into chaos.

However, going by the sub-groupings to understand why there has been some sort of stagnation in governance and institutional quality using the PR index, we find that the index improved from an average of 4.73 in the decade 1990-1999 to 4.40 in the decade 2000-2010 in COMESA and from about 4.81 to 3.87 in the ECOWAS trading bloc although it is possible that things might have worsen a bit in ECOWAS. This may be so because of the recent and ongoing *Boko Haram* crisis in Nigeria and neighbouring Niger, Cameroon and Chad where freedoms of people in an entire region have been greatly impeded by Islamic fighters trying to create an Islamic caliphate in the North East of Nigeria. In fact, cohorts of girls have been impeded from going to school and others kidnapped and married off to fighters in an insurgency that has claimed thousands in about six years. Also, some schools have been burnt and women forced into marriages while young girls, men and male children have been transformed into guerrilla fighters and suicide bombers. Aside from these recent developments in the ECOWAS sub-region, what the data has revealed with regards to stagnation in the quality of governance and institutions in SSA is that the oil rich CEMAC sub-region is the underlying challenge.

In fact, the PR index for the CEMAC region has deteriorated from an average value of 5.55 in the period 1990-1999 to an average of 5.92 ("not free") in the 2000-2010 sub-period, an occurrence which tends to support a 'resource curse paradigm'. In effect, elites in the CEMAC bloc have erected and are perpetuating blocking institutions in order to expropriate the masses from natural resource rents and this has often led to frequent conflicts in places like Chad, Congo and the Central African Republic. Moreover, in countries like Cameroon, Gabon and Equatorial Guinea, the same persons or families have been in power for over 30 years, gripping the political system and effacing any political gains of the 1990s such as political liberties and freedom of the political system to organize free and fair elections. Inadvertently, democracy is gradually becoming a discourse rather than a practice. In effect, high corruption and rigging mechanisms set-up with the advent of democracy in the sub-region are guaranteeing that the incumbents are likely always to be winners of any elections, even though most are above 80 years of age.

In contrast however, we find that the other countries in the PR index as a group have seen their political liberties continue to improve as the average index value went from 3.59 in the period 1990-1999 to 3.37 in the 2000-2010 sub-period. Authors like Collier (2007), Easterly (2003, 2006) find that the advent of democracy has been murky for institutional development as it usually led to conflicts that have destroyed both institutional and physical capital and plunged SSA into more poverty. However, Masaki and van de Walle (2014) using the POLITY IV variable have found that the gains in democratic political processes have been beneficial to economic growth and enhancement of welfare in SSA since the advent of multiparty democracy in the 1990s.

In conclusion, there is no pan-African malaise as far as political rights are concerned. The ECOWAS sub-region tends to enjoy better governance and quality of institutions which promote political rights and civil liberties than the rest of SSA (Petithomme, 2010). Surprisingly, it remains the poorest sub-region in SSA, casting doubts on the unconditional proposition that better institutions promote economic development. Again, the very poor performance of SSA taken as a group with regards to its quality of institutions is most likely greatly influenced by the gridlock that has stalled democratic processes, accountability and freedom of association in the oil and mineral-rich countries of the CEMAC sub-region and elsewhere in the continent in countries like Zimbabwe where incumbent Heads of States have remained in power for over three decades. Surprisingly though, oil rich States in SSA have enjoyed higher economic growth during the same period than those that had better institutions.

2.3. Chapter summary

We have thus far grappled with some socio-economic aggregate data in trying to establish whether there is a pan-African malaise in social and economic development in SSA. The approach adopted included comparing SSA averages with those for three trading blocs (COMESA, ECOWAS and CEMAC) within SSA and against those for the group of low-middle-income countries (LMICs) from 1990 to 2010 and using literature in the different areas to substantiate our findings. *Five major* issues have emerged from our analysis.

First, in terms of human welfare, SSA fell far behind the group of LMICs but we did not find an overall pan-African malaise. In effect, within SSA, COMESA enjoyed the highest level of welfare in terms of health (measured by life expectancy and under-five infant mortality) and education measured by adult literacy rate and gross enrolments in primary and secondary schools. Nonetheless, there was a pan-African malaise in terms of tertiary enrolment as all three trading blocs only recorded an average of 3 percent as gross tertiary enrolment compared to 17 percent in the group of LMICs for the period 1990-2010. Also, whereas SSA as a whole tended to underperform the group of LMICs in average per capita income and income growth for the period 1990 to 2010, there were significant differences between trading blocs in SSA. In effect, average income and income growth were higher in CEMAC than in the COMESA and ECOWAS trading blocs though this difference appears to have come largely from the petroleum boom in Equatorial Guinea that pushed growth rates higher in the CEMAC. Furthermore, within SSA, income inequality was highest on average in the CEMAC bloc followed by COMESA during the period 1990-2010. Nonetheless, overall income inequality has been declining albeit slowly across the sub-continent and downside inequality measured by the poverty gap has also largely declined across SSA with greatest gains recorded in the CEMAC bloc which started with the largest gap in 1990.

Second, with regards to macroeconomic policy, we found that savings as a share of GDP was very low in SSA compared to the group of LMICs. Indeed, a differential of about 17 percent separated the two groups over the period 1990-2010 and may be suggestive of a savings trap à la Sachs *et al.* (2004). However, savings like investments was highest in the CEMAC area than in all the other trading blocs including the group of LMICs mainly because savings in countries like Gabon and Equatorial Guinea have been about 50 percent of GDP since year 2000. International trade-wise, SSA countries exported on average more than the group of LMICs during the period

1990-2010, but they also imported more than they exported over the same period. Apart from the CEMAC bloc, COMESA and ECOWAS experienced a negative trade balance over the selected period. Thus, there is no pan-African malaise as per this measure of economic development.

Third, with respect to financial sector development, SSA was underdeveloped financially whether measured by institutional or market development compared to the group of LMICs during the period 1990 – 2010. However, whereas there was a common malaise in stock market development measured by stock market liquidity, the COMESA bloc was the most developed when financial development is measured by institutional development in terms of size (M2/GDP) and depth (domestic credit to the private sector on GDP) most likely due to its colonial origins with higher white settler populations and better property rights.

Fourth, in terms of international capital inflows, whereas SSA received more ODA as a share of GDP than the group of LMICs during the period 1990 – 2010, it was also more indebted than the group of LMICs. However, ECOWAS which received the most Aid over the period was also the most indebted trading bloc of the three selected for this study. Thus, while SSA is viewed as too over-dependent on Aid, it is precisely the ECOWAS bloc that is the chief culprit. Furthermore and consistent with neoclassical theory on international capital flows, SSA outpaced the group of LMICs by attracting more FDI as a share of GDP with the CEMAC bloc being the most attractive due to the discovery and exploitation of new oil fields in Equatorial Guinea in the 1990s and Chad more recently. In addition, whereas SSA and its sub-groups were laggards compared to the group of LMICs in attracting portfolio equity and bonds, they received more remittances as a share of GDP than the LMICs. However, the inflow of remittances was mainly to the ECOWAS trading bloc which happens to be the poorest amongst the selected SSA trading blocs. Therefore, we could not find a pan-African malaise with respect to international capital inflows to SSA.

Finally, we did not find that SSA countries have the same quality of institutions. In fact, we found that even though the ECOWAS sub-region is the poorest in SSA, it tends to have better institutions which promote political rights and civil liberties than the rest of SSA, casting doubts on the unconditional proposition that better institutions promote better economic development. Again, the very poor performance of SSA taken as a group with regards to its quality of institutions is most likely greatly influenced by the gridlock that has stalled democratic processes, accountability and freedom of association in the oil and mineral-rich countries of the CEMAC sub-region and elsewhere where incumbent heads of States have remained in power for

over three decades. Surprisingly though, these oil rich states have enjoyed higher economic growth during the same period than those that had better institutions.

In general therefore, any study on SSA must treat countries as different and model them as such rather than using SSA countries in global datasets and treating them as similar through the use of a dummy variable. Thus, we are justified to proceed after analyzing the socio-economic state of affairs in the different sub-groups making up SSA to review the literature linking in particular, human welfare, income inequality and financial sector development knowing that these countries are different and will be treated as such empirically.

The following Chapter shall discuss those policies that have been found to theoretically and empirically affect human welfare in developing countries and SSA in particular in order to anchor our subsequent empirical analyses on strong theoretical and empirical tenets.

CHAPTER THREE

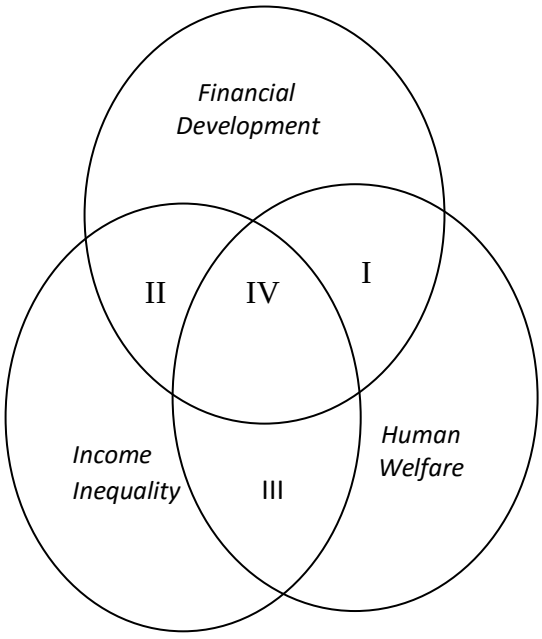
FINANCIAL DEVELOPMENT, INCOME INEQUALITY AND HUMAN WELFARE: A SURVEY OF THE LITERATURE

Introduction

The purpose of this present chapter is to review and discuss existing theoretical and empirical literature linking the dependent and independent variables - human welfare, financial sector development and income inequality - that will be used in subsequent empirical analysis.

The Venn diagram below depicts all possible logical relationships between these variables – human welfare, financial sector development and income inequality – and should help in situating our discussions on their theoretical and empirical interrelationships. Therefore, this chapter comprises four main sections; the first defines and suggests ways of measuring the selected dependent and independent variables, the second examines the relevant theoretical and empirical literatures and hypothesis development of the variables in pairs and the third summarizes the related evidence of joint relationship of the three variables as depicted by the Venn diagram below. We discuss them in turn.

*Figure 3**.1**: Vein Diagram Depicting the Interrelationships amongst Finance, Income Inequality and Human Welfare*



Source: Author

3.1. Definitions: human welfare, financial sector development and income inequality

We discuss in turn the conceptual definitions of the dependent variable of this study, human welfare and the independent variables in section 3.1.1, financial sector development in section 3.1.2. and income inequality in section 3.1.3 as shown in the Venn diagram above.

3.1.1. The dependent variable: Human welfare

Human welfare relates to the concept of well-being or poverty. A common approach has been to look at well-being as the command that individuals or households have over commodities in general, so that individuals or households are seen to be better off the greater the command they have over resources (Haughton and Khandker, 2009, p.2). The focus in this conceptual approach is to determine whether households or individuals have enough resources to meet their needs (Ravallion and Chen, 2003; Chen and Ravallion, 2010). Another approach to well-being (or poverty) is to ask whether people have access to certain kinds of consumption goods. Here, researchers ask questions such as whether a person can obtain enough food, whether they have access to education, health and shelter.

Perhaps the broadest approach to well-being has been that propounded by Sen (1987) in which well-being is defined as the 'capability of individuals to function in society'. The capability approach goes beyond basic needs like food, education, health and shelter to include in the analysis of living standards concerns relating to whether people feel secure, have low or high self-esteem, are powerful or powerless and whether there exist freedom of speech in society. Sen's approach recognizes that human welfare is a multidimensional phenomenon and therefore no simple measure or solution may be used to capture its overall progress or bring about its eradication in case one thinks of it in the sense of poverty.

When the unit of analysis is a country, researchers look at the aggregate level or per capita well-being (poverty) of a country based on a preconceived benchmark level of welfare deemed as adequate. For example, standards of living (a measure of welfare) are compared

amongst countries by comparing per capita income or consumption in these countries against a threshold income/consumption per capita level. Also, human capital is usually measured by the number of years of schooling that the average individual in a country has attained. These measures are usually used to classify countries and to begin to find out why some economies are poorer (lagging behind) than others and what macroeconomic policies could be used to reduce (enhance) the average level of country poverty (welfare) (Thirlwall, 2006).

In general, two approaches have been used to measure poverty (human welfare); the *welfarist* and the *non-welfarist* approaches. The *welfarist* approach to measuring poverty was first introduced by Sen (1980) and measures household *utility*; usually approximated by household consumption expenditure or income which can be regarded as inputs into a utility function. However, household income and expenditure are far from perfect measures of utility since they do not take into consideration the benefits from publicly provided goods and even leisure. The *non-welfarist* approach focuses on whether households have attained certain minimal levels of indicators of well-being; say nutrition, education, health, infant mortality, level of schooling, life expectancy and calories consumed per person per day (Haughton and Khandker, 2009, Deaton, 2013). These indicators are usually thought of as output measures of utility.

Most of the above mentioned indicators of wellbeing are one-dimensional measures which fail to capture the different facets of wellbeing as researchers such as Akire (2002), Akire and Foster (2011) and the first Human Development Report in 1990 have argued. Thus, there have been attempts to find a multidimensional measure to capture the different aspects of well-being and one of the earliest proposed measures was the Human Development Index (HDI) of the United Nations published in the Human Development Reports since 1990. The HDI measures human welfare along three dimensions: a long and healthy life, access to knowledge and a decent standard of living. It uses three indicators to construct three indices which embody the aforementioned three key dimensions of human development.

They comprise: (i) life expectancy at birth used in the construction of the life expectancy index, (ii) mean years of schooling and expected years of schooling used to construct an education index, and (iii) Gross National Income (GNI) per capita (PPP $US) used to construct the GNI index. Researchers including McGillivray (1991) and Cahill (2005) have found that the HDI is highly correlated with the GNI Index and so could quite well be used as a substitute for GDP per capita in empirical studies. Further discussions on the HDI and its

limitations as used in this study are presented in Chapter Four where we discuss the construction of our dependent and independent variables – human welfare, financial sector development and income inequality. We now turn to a discussion of the concept of financial sector development.

3.1.2. Independent variable: Financial sector development

The idea of financial development remains murky even decades after McKinnon-Shaw (1973). And this is for a simple reason. There is no direct meaning of financial development which usually tends to be defined by the functions or role of finance in economic development. It is common for financial development to be defined as policies, factors and institutions that lead to efficient intermediation and effective financial markets and which offer deep and broad access to capital and financial services (Levine, 1997, 2005; World Economic Forum, 2010). From this definition, it is difficult to imagine how financial development should be measured. For example, some researchers argue that a developed financial system is one that offers higher savings mobilization, allocational efficiency and effective risk diversification (Bencivenga *et al.*, 1991, King and Levine, 1993a, b; Capasso, 2006). Yet others like Antzoulatos (2008) assert that a developed financial system curbs the potential for adverse selection as it reduces information asymmetry while Levine (2007) and Demirguc-kunt and Levine (2009) suggest that a developed financial sector is one that offers investment opportunities and improves access to finance with consequent alleviation in poverty.

Generally speaking, four key dimensions are used to measure the extent of development of a country's financial system either in relative or absolute terms. They comprise: (i) depth and size, (ii) access, (iii) efficiency and (iv) soundness of the financial system (stability). These measurements are based on the activities and performance of equity markets, bond markets and financial institutions, including banks. For example, Rajan and Zingales (1998), Levine (2002, 2005), Arcand *et al*. (2015) and Becerra *et al.* (2012) used the relative amount of private credit to GDP and the size of broad money (M2) relative to GDP to capture financial intermediary development (depth and size). They also used stock market capitalization and stock market liquidity (turnover) to measure financial markets development. Recently also, measures of access such as number of bank accounts per 100.000 population and number of ATMs have also been suggested even though their application in empirical works remain limited (Beck *et al.*, 2010a).

Then too, efficiency of institutions is measured using the *net interest margin, bank overhead costs* and *bank cost-income ratio*. The *net interest margin* is the accounting value of a bank's net interest income as a share of its total earning assets, whereas *overhead costs* is the accounting value of a bank's overhead costs as a share of its total assets. Lower levels of *net interest margins* and *overhead costs* indicate higher levels of banking efficiency, as banks incur lower costs and there is a lower wedge between lending and deposit interest rates. The other indicator of banking efficiency, *cost–income ratio*, measures overhead costs relative to gross incomes, with higher ratios indicating lower levels of cost efficiency. According to Beck et *al.* (*op. cit.*), banks in richer countries typically have lower *cost–income ratios*. Also, Beck et *al.* (*op.cit.*) use the z-score (a ratio of return on assets plus the capital–asset ratio divided by the standard deviation of return on assets) as an indicator of banking stability. Assuming profits follow a normal distribution, the z-score is the inverse of the probability of insolvency. The higher the z-score, the more stable the bank. The z-score varies over time and across countries.

Nonetheless, since Rajan and Zingales (1998) some researchers have used a combination of both banking sector variables, equity market measures, policy and institutional governance variables to create indices of financial development. Again, since 2008, the World Economic Forum (WEF) has created a yearly index of financial development for developed and emerging market economies based on seven pillars: institutional environment, business environment, financial stability, banking financial services, non-banking financial services, financial markets and financial access. It is not clear what one should make of this composite measure but the World Economic Forum report writers believe that all these dimensions capture the development of financial systems.

More recently again, World Bank (2012) has created the Global Financial Development Database which is an updated version of the Financial structure dataset started by Beck *et al.* (2000). Cihak *et al.* (2013) are optimistic about the contribution of this latter database which highlights the multidimensional nature of financial systems. The indicators used in its construction are grouped into four categories: size of financial institutions and markets (depth), degree to which individuals can and do use financial services (access), efficiency of intermediaries and markets in facilitating transactions (efficiency) and stability of financial institutions and markets (stability).

However, because the purpose of this work is not to create new measures of financial intermediary development, our choice of indicators of financial institutions development is based

on the measures that offer the longest time series for most countries in SSA and have been frequently used in comparable empirical studies. That is, broad money(M2) as a percentage of GDP and credit to the private sector as a percentage of GDP. It is difficult to rely on some of those recent indices which have not been conclusively tested in empirical work. We shall discuss these chosen indicators further in Chapter Four where we look at trends in our dependent and independent variables – human welfare, financial sector development and income inequality.

3.1.3. Independent variable: Income inequality

According to Haughton and Khandker (2009) inequality is a broader concept than poverty in that it is defined over the entire population and not just for the segment of the population below a given deficiency line. Most inequality measures exhibit mean independence which is thought to be a desirable property. This means that these measures do not depend on the average of any given distribution and inequality measures are usually calculated for indicators of human welfare such as consumption, income and land ownership amongst others. To measure inequality, we need a unit of analysis such as individuals (adults or labourers) or households (either the total household income or income per person, with the household as unit of observation).

For the purposes of this thesis, we focus mainly on income inequality which is one of the independent variables for this study. Income inequality pertains to the differences in income accruing to the different segments of population ordered from those with lowest income to those with highest income. Commonly used measures of income inequality include the decile or quintile dispersion ratio, the GINI coefficient, Generalized Entropy measures and Atkinson inequality measures (Dollar and Glewwe, 1998; Gottschalk and Smeeding, 2000; Haughton and Khandker, 2009).

Specifically, we use the GINI coefficient measure of income inequality which is the most commonly used indicator of income inequality and is simple and straight forward in interpretation. In effect, it measures income inequality on a scale from zero to one or zero to 100 percent based on the area under the Lorenz curve. A GINI coefficient of zero represents the absence of income inequality and one (100 percent), total income inequality. It has been used in various empirical studies especially those verifying the consistency of the Kuznets hypothesis

that income inequality increases with economic development before declining (Deininger and Squire, 1996, 1998; Barro, 2000). The format in which the GINI income inequality coefficient will be used as a measure of income inequality in this study is further discussed in Chapter Four.

In sum, this sub-section has presented the conceptual definitions of the dependent and independent variables – human welfare, financial sector development and income inequality - highlighting some of the complexities around providing a concise definition for each of them. Broadly speaking, researchers have been more interested in finding variables that can measure effectively what they think these concepts should represent. Single and multidimensional measures have been suggested and their use in empirical work usually depends on the availability of consistent data over a long time period. Nonetheless, these concepts individually do not tell any particular story about how they affect each other as the economies of countries evolve. It is rather their interrelationships as depicted in the Venn diagram above that should give us a better understanding of why or how they evolve together over time.

3.2. Theoretical and empirical literature review

There are competing theories linking finance and human welfare (area I of the Venn diagram), finance and income inequality (area II of the Venn diagram) as well as income inequality and human welfare (area III of the Venn diagram) but a joint endogenous evolution of finance, income inequality and human welfare (area IV of the Venn diagram) is yet to be studied in a coherent conceptual framework as has also been recognized by Demirguc-Kunt and Levine (2009). Consequently, our review of studies on the impact of the development of financial systems on human welfare in a context of persistent income inequality is organized within the framework of these competing theories.

Consequently, the arguments of this study are organized under the following headings (1) Theories and empirical evidence on finance and human welfare (area I of Venn Diagram), (2) Theories and empirical evidence on finance and income inequality (area II of Venn diagram) (3) Theories and empirical evidence on income inequality and human welfare (area III of Venn diagram). The rest of the chapter is organized as follows. In sections 3.2.1 and 3.2.2 the theoretical and empirical evidence between financial development and human welfare shall be

discussed. In Section 3.2.3 and 3.2.4 the theoretical and empirical evidence between financial development and income inequality and in sections 3.2.5 and 3.2.6 the theoretical and empirical evidence between human welfare and income inequality shall be explored.

3.2.1. Theories linking financial development and human welfare

The direct relationship between finance and measures of human welfare (area I of the Venn diagram) has not received much attention in the theoretical literature. By contrast, there is an abundance of literature linking finance and economic growth which is generally thought to be crucial for human welfare (King and Levine, 1993a, b; Honohan, 2004a, b; Levine, 2005). According to these authors, the role of finance in the development process and welfare enhancement is through its contribution to economic growth. The contribution of finance in the growth process was only formally established following the seminal papers on endogenous growth theory by Romer (1986) and Lucas (1988) albeit based on the pioneering works of scholars like Schumpeter (1912), Goldsmith (1969), McKinnon (1973) and Shaw (1973) who alleged that the financial sector impacts the economy by enhancing savings mobilization and selecting the best projects and entrepreneurs.

Theoretically, five functions have been attributed to the development of the financial sector for the economic development process. They are resource mobilization, allocational efficiency, managerial monitoring and corporate control, risk management, and transactions costs minimization. We discuss them in turn.

Resource mobilization channel: The first function of financial development pertains to the mobilization of resources to spur economic expansion. In effect, financial markets and intermediaries such as banks that are more effective at mobilizing savings of disparate individuals can profoundly affect economic development and human welfare. This is so because beyond the benefits of savings mobilization on capital accumulation, better savings mobilization can improve resource allocation and technological innovation which are crucial for long-run economic growth (Bagehot, 1873, cited by Levine, 1997, p. 699). According to these authors, it would be impossible to implement certain technologies if one did not have adequate resources to cause those technologies to be converted into usable products. For example, during the 1800s when railways were implemented, if there were no financial intermediaries to mobilize the

necessary external resources to constitute the huge capital requirements to build and operate railways, it would have been impossible to build and operate these kinds of infrastructure that contributed to economic transformation during the industrial revolution.

Another example drawn from McKinnon (1973) would be to consider a farmer who needs to improve on their production by the adoption of better production techniques like the use of a commercial fertilizer. Since the farmer's savings alone cannot be sufficient for the development of new and better fertilizers, such commercial fertilizers would not be produced and that would limit the production capacity of the farmer. However, one can imagine that the savings of individual farmers and other non-farmers in society mobilized by financial intermediaries could provide the resources needed to fire the production of commercial fertilizers by a separate entity. Hence, the farmer can acquire the needed fertilizer at a lower cost once that fertilizer has been developed. In this way, savings mobilization promotes technological innovation whose adoption enhances productivity and economic growth (McKinnon, 1973, p. 13).

Allocational efficiency channel: The second function of financial development in economic progress pertains to allocational efficiency. In this vein, it is a stylized fact that financial markets and intermediaries are more effective than individuals at acquiring and processing information about firms, managers and production processes which lowers information acquisition cost for society as a whole (Schumpeter, 1912). Furthermore, since financial intermediaries are better at selecting entrepreneurs and the most promising firms and technologies, they will induce a more efficient allocation of capital and faster economic growth (Mckinnon, 1973, Greenwood and Jovanovic, 1990; Levine, 1997; Demirguc-Kunt and Levine, 2004). In effect, allocational efficiency in which banks can more efficiently mobilize and allocate resources by selecting the most promising projects which are likely to provide the best risk-adjusted returns is a crucial function of the development of the financial sector in the growth process. Then too, banks continue to provide the necessary liquidity to short term savers. These short term savings are transformed into long term financing of huge industrial and infrastructural projects with large positive benefits to the economy such as job creation and other welfare enhancing services.

Managerial monitoring and corporate control: The *third* function of financial intermediary development pertains to the ability of these intermediaries to enhance productivity

by lowering the cost of monitoring of managers and controlling corporations. In effect, financial contracts, markets and intermediaries alleviate the information acquisition and enforcement costs of monitoring managers and exerting corporate control after financing the activity (Jensen and Meckling, 1976). This is so because it will be extremely costly for each individual to monitor separately the activity of the firm into which they have all invested. Thus, in the absence of mechanisms to control managers, it may be difficult to mobilize savings from disparate agents thereby stopping capital from flowing to profitable projects (Stiglitz and Weiss, 1981, 1983).

Also, financial contracts which assure outsiders that, insiders will manage a firm in their best interest will tend therefore to promote faster capital accumulation and growth by improving the allocation of capital (Bencivenga and Smith, 1991, Pagano, 1993). In this case, financial intermediaries effectively play the role of delegated monitoring by using debt contracts and diversifying the risks of individual investors. This has the effect of enhancing the volume of investment capital and consequently living standards. This is so because such investment projects yield additional tax revenues for social redistribution and employment. However, the link from stock markets to corporate control and long-run growth remains ambiguous. The argument is that liquid equity markets that facilitate corporate takeovers may hurt resource allocation even though the fear of takeovers in liquid equity markets should align managerial incentives with those of investors (Shleifer and Summers, 1998). It is however not clear if this would enhance national income and living standards.

Risk management channel: The *fourth* function of financial intermediary development is its role in facilitating risk management through trading, hedging and pooling of risks. Two main kinds of risks, liquidity and idiosyncratic risks are ameliorated by the development of financial intermediaries and markets. Financial development enables greater risk sharing by pooling and diversifying idiosyncratic risks associated with individual projects, industries or countries. Such risk diversification function enhances capital accumulation and promotes technological innovation which can potentially accelerate economic growth and human welfare (King and Levine, 1993b). Also, by enhancing liquidity (the ease with which investors can buy and sell their assets and/or savers deposit and get their money out of financial intermediaries), financial intermediaries and markets offer allocational efficiency whereby financial resources can be allocated to higher-return long-term illiquid projects because those who invest in such illiquid projects have the opportunity to move out of them by trading their investments to other investors. Thus, if such long-term projects provide higher externalities in comparison to other short-term investments, then one would find that higher liquidity in stock markets will enhance

steady-state growth rates (Levine, 1997). However, in less developed countries with illiquid stock markets such as in SSA, as we saw in Chapter Two, this fluidity function may hardly be accomplished, thus limiting the importance of stock markets in the growth process in those countries.

Transactions cost minimization: The *fifth* function of financial development is associated with its capacity to minimize transactions costs. In effect, financial arrangements that lower transaction costs can promote greater specialization and technological innovation (Bencivenga and Smith, 1991). Thus, financial markets that facilitate exchange will enhance productivity gains. Such gains foster economic expansion in that the reduction of transactions costs tends to enhance economy wide efficiency. In effect, more specialization requires more transactions but more transactions are costly. Therefore, financial dealings that arise to reduce the cost of transactions will facilitate more specialization (Levine, 1997). In this way, financial markets that promote exchange will increase productivity gains which are crucial for growth and enhancement of human welfare. However, if there are fixed costs in establishing markets, then higher income per capita will imply less burdensome fixed costs as a share of per capita income (Levine, 1997). In this case financial development may follow economic development as was suggested by Robinson (1952, p. 86).

Some controversies on the role of financial development in economic expansion: Controversies on the role of financial development in economic progress span from issues relating to reverse causality, macroeconomic volatility and returns to scale. The following paragraphs consider them in turn.

In the view of Robinson (1952), economic development creates demand for particular kinds of financial services and the financial system tends to respond to these requirements automatically. Thus, it is not the development of the financial institutions and markets that spur economic growth and human welfare but rather higher welfare that drives the demand for more sophisticated financial services. This controversy is behind the famous chicken-and-egg construct or the problem of 'reverse causality' that has dominated much of the work on the finance-growth nexus since King and Levine (1993a, b).

Apart from the Robinson contradiction, and despite the afore mentioned functions by which finance tends to be beneficial for economic development, dissenting views on the

beneficial effects of financial development on economic expansion can also be traced back to Minsky (1974), Kindleberger (1978, 2000) and Tobin (1984). They have argued that financial deepening could cause macroeconomic volatility and that private returns of financial development tend to be higher than its social returns. In fact, financial development could lead to large financial sectors 'stealing' talents from the productive economy which is inefficient from society's point of view (Tobin, 1984).

Also, Saint-Paul (1992) and Bencivenga and Smith (1991) had argued that at the early stages of financial development, the financial sector may be too small to provide effective savings mobilization to undertake higher returns projects with higher average risks. According to these researchers, size of financial intermediaries matters to set in increasing returns to scale and providing efficiency gains. Therefore, according to this tenet, financial intermediaries may not generate effective risk diversification and allocational efficiency at lower levels of financial development and this should explain why finance does not spur income growth in early stage economies.

Taken together, there seem to be in the existing theories, some support for a feed-back mechanism. That is, financial development drives welfare enhancements and the latter in turn pulls financial expansion. However, recent financial crisis literature especially Oscar *et al.* (2011) points to the fact that financial expansions pulled by rising living standards have been at the centre of recent economic recessions which have been welfare damaging. Thus, financial development may promote human welfare through its various functions in the economy only to the extent that it has not gone beyond an imaginary threshold that spurs macroeconomic volatility and crises. Then too, because finance exhibits increasing returns to scale, it may be less relevant for improving living standards, on average, at low levels of financial and economic development.

To this controversy in theoretical literature, there have also been plenty of empirical studies to verify the various claims.

3.2.2: Financial development and human welfare: empirical evidence and hypothesis development

In the following paragraphs, we discuss first, empirical studies on the finance - income growth nexus based on the functions of finance highlighted in section 3.2.1 and then those on the

relationship between financial development and some other direct measures of human welfare before formulating our hypotheses.

Financial development and economic growth - empirical evidence: Apart from the earlier work by Goldsmith (1969), empirical studies on the relationship between financial development and social welfare dates back to the early 1990s. The majority of these studies used economic growth as a proxy for human development. This is so because it was generally believed that economic advancement is the most important component of well-being, even though the UN human development index assumes that the importance of income in human welfare is comparable to education and health.

Nonetheless, one of the pioneering econometric studies on the relationship between financial development and economic growth was by King and Levine (1993a). They used data averaged over the period 1960-1989 for 77 industrial and developing countries and analysed the importance of financial development in explaining differences in cross-country growth rates and employed four indicators of financial sector development in doing so. These indicators included: (i) broad money as a share of GDP, (ii) credit to the private sector relative to GDP, (iii) commercial bank credit plus central bank assets to GDP, and (iv) the ratio of claims to non-financial private sector to aggregate domestic credit.

These researchers found that all four measures of financial development were positively and significantly correlated with economic growth even after controlling for a number of other growth determinants. Also, because financial institutions may increase lending and expand credit in periods of rapid growth, King and Levine used initial values of the financial development measures to study the issues of causality in a sub-set of 57 countries with available data for the early sixties. They also found evidence that initial levels of financial development can explain about 60% of subsequent growth and concluded that financial development was a crucial predictor of economic growth and associated human welfare as it enhances capital accumulation and productivity.

However, the conclusions of King and Levine (1993a) have been criticized by several authors on the following grounds: (i) the dataset used included countries at different levels of development pooled into a cross-section rather than a panel which could have controlled for country fixed effects. Thus their findings could have been influenced by the specificities of some countries in the dataset, especially the newly industrialized countries of South East Asia

(Driffill, 2003), (ii) initial levels of variables are weak instruments when controlling for endogeneity and the bi-directional causality which usually dominate the finance – growth relationship (Khan and Senhadji, 2000); (iii) the choice of dataset to study causality could have been biased by the reduction in the dataset from 77 to 57 countries.

Equipped with better analytical tools and more data, Levine and Zervos (1998) investigated the independent contributions of stock market development and financial intermediary development to long-run growth employing cross-section panel data with OLS and instrumental variable (IV) estimation techniques. They employed a dataset of 49 developed and developing countries covering the period 1976 to 1993 and controlled for many suggested determinants of long-run growth like initial output, inflation, political instability (measured by the number of revolutions and coups), size of government and the black market exchange rate premium. They found that stock market liquidity measured both by the value of stock traded relative to the size of the market and by the value of stocks traded relative to GDP, is positively and significantly correlated with current and future rates of growth, capital accumulation, and productivity growth.

Also, this study found that financial intermediary development measured by the share of GDP of bank credit issued to the private sector significantly enhances income growth and concluded that banks and stock markets provide different services and are both positively associated with long-run growth, capital accumulation and productivity enhancement. These findings were later confirmed by other studies including Levine (2002) and Rousseau (2003). However, Driffill (2003) has argued that a weakness of these studies could also be found in country and period of study selection bias. As such, since their datasets did not include data for 1997 and 1998, their results could have been influenced by the build-up of private credit in South East Asia in the years leading to the 1997 financial crisis.

To improve the validity of prior studies, Beck and Levine (2004) investigated the relationship between financial markets development and economic growth using a GMM dynamic panel system estimator developed by Arellano and Bover (1995), as well as the OLS and the difference panel estimator. They employed a dataset of developed and developing countries from 1978 to 1998 averaged over five-year periods to eliminate business cycle effects. Also, they used a novel procedure developed by Calderon, Chong and Loayza (2000) which reduces over-fitting problems and permits the construction of heteroskedasticity consistent standard errors. Furthermore, they controlled for a host of suggested growth determinants as in Levine and Zervos (1998). Their results suggested that, on average, stock markets and banks positively influenced economic growth during that period, and that their findings are consistent

with models that predict that well-functioning financial systems reduce information and transactions costs thereby improving resource allocation, growth and associated human welfare. A similar conclusion has been reached by Levine (1997), Rousseau (2003) and Beck *et al*. (2007). Though Beck and Levine (2004) used better analytical tools, their findings are still masked by the use of a dataset composed of countries at different levels of economic development.

Contrastingly however, there have been some dissenting voices suggesting that researchers have often forced a linear or monotone structure to the data that have previously been used to analyse the finance-growth nexus and that this could have influenced the outcome of those studies. Rioja and Valev (2004b) and Loayza and Ranciere (2006), Arcand *et al.* (2015), Aizenman *et al.* (2015) are amongst many to have argued that the relationship between financial development and economic growth may not be so straight forward. In fact, they have found using similar datasets some evidence that the relationship could be non-linear.

In effect, Rioja and Valev (2004b) performed threshold regressions using GMM to test the non-monotone effect of financial development on income growth. They employed a dataset consisting of a panel of observations for 74 countries for the period 1961 – 1995. Their data was averaged over 5- year intervals as in previous studies. As control variables, they used initial income per capita, government size (government spending/GDP), average years of schooling, openness to trade ((exports + imports)/GDP), the average inflation rate and the black market premium. Time dummies were also included to capture period-specific effects and the panel of 74 countries was further split into three groups of countries with low, medium and high levels of financial deepening. They found that there was no statistically significant relationship between finance and income growth in countries with low levels of financial depth, that there was a strong and positive relationship at intermediate levels of financial deepening, and a positive but diminishing effect of finance at higher levels of financial deepening.

Concerning the low income sample, they point to the importance of economies of scale in delivering credit to projects with higher rates of return, drawing from Acemoglu and Zilibotti (1997) who argue that higher return projects are indivisible with minimum scale requirements. Thus in such an environment, the financial sector has to develop to a minimum size before being able to pool sufficient funds to finance larger projects. Hence, its impact on income is likely to be insignificant at low levels of development where scale requirements have not yet been met. However, as the financial sector develops and is more able to help investors manage risks through constituting diversified portfolios, less liquid projects with higher returns might become more preferred and this would enhance income growth in the long run (Saint Paul, 1992).

Nonetheless, at very high levels of financial development, there is a suggestion that more capital supplied by financial intermediaries would suffer from diminishing returns which reduces the impact of financial sector deepening on income growth (Greenwood and Jovanovic, 1990). These conclusions have also been reached by Deidda and Fattouh (2002) who also found using cross-country threshold regressions that financial depth has a positive but statistically insignificant impact on output growth in countries with low level of economic or financial development and that financial deepening has a positive and statistically significant impact on income growth in countries with higher levels of financial deepening.

In addition to the threshold effects of the finance-growth nexus, Loayza and Ranciere (2006) used a sample of 75 developed and developing countries with annual data during the period 1960-2000 to study the long and short run relationships between these two variables. They employed the ARDL approach to modelling which allowed them to obtain in the same regression long-run and short-run parameters without observing the long-run and short-run components of the variables included. To estimate the ARDL, they used the pooled mean group estimator (PMG), a panel error-correction estimator which relies on the conditions that residuals are serially uncorrelated and treats all regressors as exogenous.

Owing to the huge requirements of this procedure on the time-series dimension of data used, Loayza and Ranciere (op. cit.) included only countries which had at least 20 consecutive observations. As regressors, they used the growth rate of GDP per capita and employed private domestic credit as share of GDP to measure financial intermediation. They also employed as control variables government consumption as share of GDP, the initial level of GDP per capita, a structure-adjusted variable to capture trade openness, and the inflation rate. In order to capture proportional effects, they specified in natural logs all control variables. They found that over the long run, financial intermediary development sustains and enhances income growth because it entails the deepening of financial markets and services which offer risk diversification and more effective channelling of savings to productive investments. However, in the short-run, the relationship between financial intermediation and income growth is negative because as countries develop and mature, financial deepening may impair economic growth through various financial disruptions of production such as systemic banking crises and boom-busts cycles.

Owing to the differences in earlier findings relating to the finance-growth relationship, Rousseau and Wachtel (2011) have used a further extended cross-sectional and panel dataset on financial and macroeconomic indicators for 84 countries over the period 1960 to 2004 drawn from the 2007 World Bank *World Development Indicators*. To ensure comparability with King

and Levine's original study and others, they used three well-known measures of financial development namely, the ratios to GDP of liquid liabilities (M3), liquid liabilities less narrow money (M2), and credit issued to the private sector. They found that the role of financial deepening in economic development has been vanishing since the significant positive relationships that were found in the data sets for the 1960s and 1980s by King and Levine (1993a) and others. Thus increasing the data set to take into account periods of banking and financial crises has wiped off the effect of financial deepening since financial deepening has negative effects on growth during years of crises.

Going further, Arcand *et al.* (2015) have imposed a non-monotone function to a dataset comparable to that of Rousseau and Wachtel (2011) and employed other methods of analysis to further investigate the finance-growth relationship. In fact, they used three methods of analysis; cross-sectional regressions, semi-parametric regressions and panel regressions to study a non-monotone effect of finance on output growth. In particular, they found that there is a positive and robust correlation between financial deepening and income growth in countries with small and intermediate financial sectors and that there is a threshold which they estimated to be around 80-100% of GDP, above which finance starts having a negative effect on economic growth. Also, they concluded that their results are consistent with the "vanishing effect" of finance reported by Rousseau and Wachtel (2011) using recent data.

Therefore, studies that omit the use of a quadratic term for private credit especially in countries with large financial sectors in their specification are likely misspecified. These results have also been confirmed in a recent study by Aizenman *et al.* (2015) who find a threshold effect in the finance-growth relationship. Using data from the Groningen Growth and Development Centre (GGDC) database, they set out to investigate the effect of quality against quantity of finance on output growth in two regions with similar income levels. They used ten industry sectors in 41 economies amongst which are 11 East Asian and 9 Latin American economies assumed to be at similar levels in the development process. Interestingly, they found large differences between East Asia and Latin America in terms of the impact of financial depth on sectoral growth, and also found a negative impact of financial deepening on output growth in several sectors. They conclude that the impact of financial development on income growth may be non-linear. That is, it may promote growth only up to a point.

Clearly, we observe that the foregoing studies have hugely employed cross-sectional and panel data pooling together developed and developing countries and various methods of analysis

to investigate the finance-growth nexus. However, apart from these cross-sectional and panel studies which constitute the focus of this enquiry, there are also some country specific studies whose outcomes could be interesting especially to inform the interpretation of the findings of this present study.

For example, Baliamoune-Lutz (2010) used time series data from 1960 to 2001 and estimate bivariate vector autoregressive (VAR) equations and performed Granger causality tests to investigate the nature of the relationship between financial development (banking sector development) and economic development (measured by income per capita) in 18 African countries. She found that when financial development is approximated by the ratio of broad money to GDP, finance seems to cause income in only three countries (Botswana, Cote d'Ivoire and Niger) and there is bi-directional causality in two others while income seems to cause finance in 7 other countries. Similar results were obtained using the ratio of private credit to GDP, suggesting that the relationship between financial development and income per capita remains ambiguous especially in Africa where financial systems remain mostly underdeveloped.

However, one has to be cautious with these results owing to two types of misspecification biases associated with (i) the use of per capita GDP instead of its rate of growth and (ii) the fact that the study uses bivariate rather than multivariate regression models in testing for causality. A further problem with this study is that it assumes that finance should work in the same way in all SSA countries whereas the effectiveness of finance in promoting economic growth and associated living standards could depend on some other parameters within these economies such as the quality of institutions and even the average level of income inequality.

Financial development and other measures of human welfare - Empirical evidence: Studies reviewed thus far do not relate their findings directly to the enhancement of human welfare or to the poverty reducing capacity of finance. Empirical studies on the effect of finance on various indicators of human welfare started appearing at the beginning of the 21st century.

Such studies have been interested in testing the efficacy of financial sector development in enhancing one-dimensional measures of human welfare such as income poverty. In this vein, we remark that one of the early cross-country empirical studies to examine the direct relationship between formal financial development and changes in social welfare measured by poverty rates was Honohan (2004a). Using data for 70 developing countries with data on poverty measured in terms of the proportion of population living below the World Bank suggested $1 and $2 a day

poverty line, Honohan employed cross-country regressions to investigate the relationship between financial development (measured by private credit) and poverty rates. Interestingly, he found that deeper financial systems are associated with lower poverty rates. As Rajan and Zingales (2003) note, *'a healthy financial system can be a powerful antimonopoly tool, providing the lubrication for the emergence of competitors that can undermine the power of incumbent firms, and the means for poor households and small-scale producers to escape the tyranny of exploitative middlemen'*(Honohan, 2004a, p.5)[2].

Because the financial system will be adversely affected by inflation, Honohan controls for inflation and still found financial development as strongly significant in lowering the rate of poverty as in the basic model. Also, with the knowledge that politico-institutional variables can influence financial development as well as economic growth, he included the aggregated governance variables available from the World Bank database of Kaufman *et al.* (1999). These additional control variables did not alter the significance of the effect of private credit on poverty rates. Similarly, the inclusion of the ratio of stock market capitalization to GDP or stock turnover variables did not alter the fit of the basic equation. What is more, the coefficients on these latter variables were not significantly different from zero. Consequently, Honohan concluded that stock market development does not seem to be directly beneficial to the poor even though in theory and evidence, stock market development also drives long-run economic growth through liquidity enhancement.

In the spirit of Honohan (2004a), Kraay (2004) decomposed the changes in poverty rate into two major components: (i) average income growth and (ii) its distribution, to study the effect of financial deepening on human welfare. Using data for 80 developing countries and covering the 1980s and 1990s, Kraay constructed two datasets of spells of changes in poverty based on the $1.08 per day 1993 poverty line. He constructed measures for the poverty headcount index, the poverty gap, the square poverty gap, and the Watts index for the initial and final years. He found in each case that there is a strong negative relationship between changes in poverty and the growth in average incomes and that, on average, growth in average incomes explains 65 to 90% of changes in poverty. Contrastingly to Honohan (2004a), Kraay (2004) like Dollar and Kraay (2002) did not find a significant relationship between financial sector development (measured using deposit bank assets to Central bank assets and the ratio of broad money to GDP (M2/GDP)) and their measures of income poverty. This disparity in their

[2]This view is contrary to Greenwood and Jovanovic (1990) who suggest that since there are costs to joining financial intermediaries, poor households will not be in a position to support such costs, let alone set aside savings for such an outlay, hence falling even further behind in the distribution of wealth.

findings could be related to the way that they each estimated the poverty rates and the indicators of financial development employed.

Apart from these studies linking financial sector development and income poverty growth, Claessens and Feijen (2006, 2007) are amongst the most prominent works that employ non-income one-dimensional measures to test the effect of financial deepening on human welfare. Using cross-sectional OLS, panel data 'fixed effects' regressions and data for 49 developing countries for the period 1980-2004, Claessens and Feijen (2006) show that, financial sector development is significantly negatively correlated with undernourishment – a relationship which appears causal. A one percent point increase in the ratio of private credit to GDP reducing undernourishment by between 0.22 and 2.45 percentage points and that was roughly one-quarter of the estimated effect of GDP per capita growth on undernourishment for the same period. They also found that beyond the growth effects of credit market development, it increases agricultural productivity through its positive impact on livestock production, cereals and crop yields, which in turn lead to less undernourishment.

In addition, they found that the improvement in agricultural productivity also works through greater use of productivity enhancing equipment such as tractors and fertilizers. Also, their results suggested that value added per worker increases by 0.14 - 1.7 percentage points for a 1 percentage point increase in private credit to GDP due primarily to the enhancement in the farmers use of agro-pastoral machinery or of more fertilizers. The relationship between financial development and undernourishment remains significant at 10 percent even after controlling for GDP per capita, another known indirect means through which finance works to reduce undernourishment, an important characteristic of human welfare. These findings can however be hardly applicable for most SSA economies since they do not use agricultural machinery for farming and even the use of fertilizers is limited.

Going further than undernourishment, Claessens and Feijen (2007) analysed the impact of financial sector development on a number of welfare measures in their quest to find policy instruments that can accelerate the achievement of the MDGs by 2015. These measures include (i) education measured by schooling (Barro, 1991, 2000), (ii) health approximated by (life expectancy) and under-five infant mortality, (iii) gender equality. Using data averages over the period 1980 – 2004 and at least 54 lower-income and lower-middle income countries and various statistical techniques including 'fixed effects' panel data estimation, they investigated the link between financial development and each of these isolated measures of human welfare. They also included the usual control variables in growth regressions like GDP per capita, government

expenditures to GDP, inflation, and trade to GDP. They found *firstly*, that financial sector development measured by the rate of change of the ratio of private credit to GDP is positively and significantly correlated with growth rates of health measured by life expectancy.

Secondly, they found a strong positive relationship with an elasticity of 0.03 between financial development and life expectancy over time and suggested that this translates into a 0.5 percent increase in life expectancy in the next 10 years (up to 2015) if private credit to GDP continues to increase at an average rate of 1.6 percent per year (the average yearly growth rate over the period of the study). *Thirdly*, they documented a strong negative relationship between the growth rates of private credit to GDP ratio and the under-five mortality rate. However, they did not deal with the issue of reverse causality between financial development and their selected measures of welfare. For example, improvement in life expectancy could result in a higher demand for better financial services. Also, they did not factor in the likely impact of income inequality on their welfare measures.

As a corollary, Claessens and Feijen (2007) hypothesize that the highest contribution of financial services to education is that they help to smooth income volatility, which reduces the need for child labour. They hold that with better functioning financial markets, households can borrow against future income to pay fees and other school related expenditures which potentially should improve school enrolment rates and attendance. Earlier works by some authors tend to comfort this association between financial development and child labour. For example, Flug *et al*. (1998) using data for 122 developed and developing countries for the period 1970 – 1992 and panel data regressions with country specific effects found that financial development measured by broad money has a significant positive effect on school enrolment while growth volatility has a significant negative effect.

They also found that financial markets imperfection, income inequality and volatility account for 45 percent of the difference in enrolment rates between Latin American countries and the industrialized countries. Thus, using cross-country data for lower-income and lower-middle income countries, Claessens and Feijen found that financial sector development and improvements in education are positively associated. As with the case of the health indicators life expectancy, under-five mortality and undernourishment used by these authors and cited above, they fail to correct for the problem of reverse causality between financial development and education and do not include time dynamics which could affect the behaviour of their selected variables.

In addition to the above measures of human welfare, Claessens and Feijen (2007) examined the relationship between finance and household consumption for 142 developed and

developing countries with over 4100 observations for the period 1980 – 2004 using panel data 'fixed effects' regressions. They controlled for government consumption as a share of GDP, trade as a share of GDP, and inflation. They found that 1, 5, and 10 year lagged values of private credit to GDP have a significantly positive effect on contemporaneous household expenditure since financial development reduces income volatility and smoothes consumption expenditures.

Also, they found that average private credit has a profoundly significant impact on the growth of household consumption and average household consumption within the selected period. In their extended regressions, they also used a host of control variables including average added value of an agricultural worker, initial level of government expenditures as a share of GDP, initial level of poverty, initial level of GDP per capita, inflation, average trade as a share of GDP, share of population in rural areas, and share of labour force in agriculture; which are all likely to account for differences in the level and rate of growth of household consumption in both developed and developing countries. All variables in the regressions were in logarithm except inflation to capture proportional effects. Nonetheless, their results are not robust when they substituted financial development with the legal origins dummy variable as instruments in order to control for reverse causality with household consumption (La Porta *et al.*, 1998, Beck *et al.*, 2002).

Subsequent to these, Jeanneney and Kpodar (2011) find that the contribution of finance in the fight against poverty depends on the channels of transmission. Looking at a sample of developing countries, they found a positive relationship between financial development and poverty if financial development is measured by the ratio of liquid liabilities (M3) to GDP. If private credit is used instead, the association turns out to be statistically insignificant. Their results suggest that the poor benefit mainly from the savings and transactions opportunities offered by the banking system rather than through the gains of increased access to credit.

Nonetheless, using exclusively an SSA dataset, Fowowe and Abidoye (2012) like Jeanneney and Kpodar (2008) employed GMM and a sample of 27 SSA countries covering the period 1981 to 2007 to investigate the relationship between financial development measured by private credit as a share of GDP and poverty measured by *the income of the poorest quintile* and the *poverty headcount*. They found that the private credit measure of financial development does not significantly influence poverty in SSA countries and that it was rather macroeconomic variables like inflation and international openness that mattered for the poor. This study does not however look at channels through which financial development could have affected poverty and

does not consider the role of broad money (M2) suggested by Jeanneney and Kpodar (2011) to be more relevant for the poor.

Going further than the previous authors, Singh and Huang (2015) pushed the debate on the relationship between financial development and poverty to a new level. In effect, they argued that the conflicting results that have been obtained so far whereby some researchers find a positive relationship between finance and poverty or the opposite could be because previous researchers did not introduce property rights into their models. As such, they decided to study financial development (measured by credit to the private sector), property rights and poverty by including an interaction term between financial development and property rights. To empirical test their hypothesis, they use a dataset of 37 SSA countries with data from 1992 to 2006 and employ the Feasible Generalized Least Squares estimation method and equally instrument financial development with the rule of law. As measures of poverty, they use the dollar-a-day measure, the poverty gap index, the GINI coefficient and the income of the bottom quintile. They also use control variables as in Dollar and Kraay (2002). The property rights index of the Heritage foundation and the information sharing index from Djankov *et al.* (2005) were used respectively to measure institutional quality and information about borrowers in the financial system.

They found that financial deepening could be associated with lower poverty and income disparities in SSA countries but for this to happen, financial development must be accompanied by strong property rights. Also, they found that, in the absence of clear property rights, wider access to credit is associated with lower income for the poorest quintile and higher poverty. Interestingly, they also found that there is a positive correlation between GDP per capita and income inequality and suggest that this would imply that income inequality is higher in the richer SSA countries, consistent with the Kuznets (1955) hypothesis that in the early stages of development, higher GDP per capita is associated with higher income inequality. However, it is not clear whether these results are supposed to be for the long or the short run. Then too, these authors use income inequality as a measure of poverty when in fact income inequality is supposed to be a cause of poverty and not poverty itself *per se*.

Apart from these cross country and panel studies, some studies pitting financial development and Poverty have also been done for some individual SSA countries. For example, Quartey (2005) used time series data from 1970-2001 to investigate the interrelationship between financial sector development and poverty reduction in Ghana. He found that financial sector

development does not Granger cause poverty in Ghana and suggested that this is because financial intermediaries in Ghana do not adequately channel savings to sectors of the economy that matter to the poor. However, he found a long-run cointegration relationship between financial sector development and poverty reduction. Contrastingly, Aye (2013) does not find a long-run relationship between finance and poverty reduction in Nigeria just like Odhiambo (2009b) who did not find a relation for Zambia.

In conclusion, five key issues have been identified from the empirical literature: (i) financial development measured by either the credit to the private sector percent GDP or size variable M2/GDP have on average been crucial factors for the improvement of living standards as they enhance economic growth and other one-dimensional measures of living standards such as poverty, schooling, under-five infant mortality, undernourishment and life expectancy in samples of developed and developing countries; (ii) current low levels of financial development may not be relevant for welfare improvements in low income countries because financial markets are still limited and cannot provide the needed scale to undertake large above average risk projects which offer higher returns. Then too, the relationship could depend on the quality of property rights;

(iii) there is a suggestion that the relationship between financial development and human welfare could be non-monotone with some researchers suggesting that there could be a threshold from about 80-100 percent of GDP above which credit market expansion becomes detrimental to income growth and associated human welfare; (iv) the long run and short run effects of finance are likely to be different with finance being relevant for income growth and welfare in the long run and most likely detrimental in the short run as volatility and financial fragility in the short run could have dire social costs; (v) there appears to be a diminishing role of financial sector development on income growth coined by Rousseau and Wachtel (2011) as the 'vanishing effect of financial development'.

Hypotheses: Based on the evidence summarized above, two competing hypothesis shall be tested; one for the long run and the other for the short run.

The long run relationship:

The first null hypothesis (1) to be tested is that:

H_0: There is a statistically significant positive long-run relationship between financial development and the index of living standards in SSA, regardless of the extent of inequality in the distribution of national incomes.

H_1: There is no statistically significant positive long-run relationship between financial development and the index of living standards in SSA, regardless of the extent of distribution of national incomes.

The short run relationship:

The second null hypothesis (2) to be tested is that:

H_0: There is a statistically significant negative short-run relationship between financial development and human welfare in SSA, regardless of the extent of inequality in the distribution of national incomes.

H_1: There is no statistically significant negative short-run relationship between financial development and human welfare in SSA, regardless of the extent of inequality in the distribution of national incomes.

3.2.3. Theories linking financial development and income inequality

As we have discussed earlier, the impact of financial sector development on human welfare is not limited to its beneficial effect on economic growth alone. Financial expansion also influences human welfare through its effect on income inequality (area II of the Venn diagram). This is the focus of our theoretical enquiry in this sub-section. Generally speaking, the theory on the relationship between finance and income inequality has been discussed primarily in two main perspectives: (i) explaining persistent income inequality and (ii) political economy implications.

The theory of persistent income inequality: According to this perspective, financial development is at the centre of persistent income inequality (Galor and Zeira, 1993, Banerjee and Newman, 1993, Demirguc-Kunt and Levine, 2009, Galor, 2011). These papers identified two core determinants of intergenerational persistence of income differences. These include human capital and asset endowment. According to this theory, only the rich have access to financial intermediaries or markets and/or the resources to develop their human capital, hence, have access to better paying jobs. Also, the rich have assets to invest either through

entrepreneurship or to invest in higher-return projects to earn additional income in the form of interests, dividends or capital gains.

For the above reasons, Greenwood and Jovanovic (1990) posit that at low levels of economic development, financial development will worsen income disparities while at higher levels of economic development, finance might reverse the trend. In fact, there is an assumption here that owing to financial markets imperfections at the early stages of economic development, the poor have limited access to credit markets due to high transactions costs and lack of credit histories; hence income inequality is perpetuated across generations and dynasties.

However, as the financial sector develops both in the intensive and extensive margins (depth and outreach), it could be reasonable to assume that the binding constraint of credit unavailability will be relaxed such that financial development will play a crucial role in the accumulation of capital, especially amongst poor individuals (Levine, 2007). Such should facilitate economic growth with consequent reduction in income inequality (Galor and Zeira, 1993, Aghion and Bolton, 1997, Galor and Moav, 2004).

Also, financial development that induces banks to lend to the best entrepreneurs and firms rather than only to established businesses will enhance competition among firms and offer opportunities for the creation and expansion of new and more innovative businesses (Demirguc-Kunt and Levine, 2009). This will not only improve on aggregate economic efficiency but also enlarge the job market which is likely to disproportionately benefit the poor who had no prior access because of limited opportunities and skills. An improvement in the wages of the poor who did not have access to better paying jobs is likely to reduce income inequality and enhance welfare. A classic example is the shift during the industrial revolution of labour from low pay agriculture to new and better pay jobs in new and expanding industries which had a significant impact on wages and in the reduction of income inequality in Europe (Engermann and Sokoloff, 2002; Galor, 2011).

The political economy perspective: The second perspective of the financial development – income inequality literature explores the relationship from the viewpoint of political economy theorists. Political economy proponents suggest that financial development could lead to an increase in income inequality if the financial system is captured through regulation by entrenched insiders (Rajan and Zingales, 2003; Claessens and Perotti, 2007). These proponents hold that this is usually the case in developing countries where incumbents and

political insiders erect laws that limit access to outsiders in order to preserve their influence (Acemoglu *et al.*, 2005). Insiders in this context usurp all the benefits of financial development while risks are socialized. For example and according to Claessens and Perotti (2007, p. 749), 'case evidence shows that financial crises arise from perverse incentives and have severe redistributive consequences'. This kind of financial development which evolves through capture is thought to enhance depth (increases in the quantity of credit issued to existing clients or insiders) rather than broaden access to financial markets by including those who had no prior access to financial products like credit. In this case, the development of the financial system is expected to have a negative effect on human welfare because all benefits from the development of institutions and markets are extracted from the system by insiders.

Nonetheless, financial development that increases depth could also be good for growth as it fosters capital accumulation through increased savings, even if growth engineered through this process might have adverse redistributive consequences for the poor (Claessens and Perotti, 2007). On the contrary, financial development that broadens access is likely to be pro-poor as it enlarges opportunities for the poor to improve on their human and physical capital through increased credit access (Demirguc-Kunt and Levine, 2009). It could therefore be reasonable to surmise that in the early stages of financial development when inequality is high and incumbents capture the financial system, financial development will be less favourable for human welfare since the poor have little access to credit markets. Then, as the financial sector develops and competition sets in, financial development that broadens access will improve on the living conditions of the poor. This would be so because financiers tend to look for the best projects and skilled labour rather than only towards fostering the interests of entrenched insiders. Thus, this study suspects that there is an interaction between financial development and income inequality which the literature has not yet adequately covered in discussing the financial development – human welfare nexus especially in developing countries where income distributions are still highly skewed.

3.2.4. Financial development and income inequality: Empirical evidence

As a prelude to more rigorous empirical studies on the finance-income inequality relationship, Li *et al.* (1998) used the database on income inequality developed by Deininger and Squire (1996) to conduct an empirical assessment of international and intertemporal variations in income inequality. They focused on the factors that affect income inequality using pooled OLS

cross-section regressions, but did not control for endogeneity problems. Nonetheless, they found that financial development measured by broad money (M2 to GDP) was strongly and significantly associated with lower income inequality measured by the GINI index. Also, they estimated that financial development raised the average income of the lower 80 percent of the population. They suggested that their findings are consistent with models which postulate that better financial development alleviates credit constraints especially for poorer households, allowing them to make useful investments, especially in human capital.

While Li *et al.* (1998) set out to find the determinants of income inequality, Clarke *et. al*, (2006) carried out an examination of the impact of financial development on income distribution. Their aim was to verify whether the relationship between these two variables depended on the level of financial development. Using a mixed sample of 83 developed and developing countries, they performed pure cross-sectional (OLS) analysis with data averaged over 1960 to 1995 and panel data 'random effects' regressions with data averaged over seven 5-year periods. However, since financial development might be endogenous as suggested by Greenwood and Jovanovic (1990), they used an instrumental variables approach drawing from the literature on law, finance and growth (Levine, 1999) because they were interested only in the exogenous effect of financial development on income inequality.

In this wise, they used the legal origin dummy variable that identifies the origin of a country's legal system rather than the measures of creditor rights also suggested by La Porta *et al.* (1998) because it is largely available. Also, they used as measure of financial development, private credit to GDP and claims on the nonfinancial domestic sector by deposit money banks divided by GDP (bank assets) and measured income inequality using the extended GINI dataset by Squire and Lundberg (2000). Interestingly, Clarke, *et.al* found that, in the long run, inequality is less when financial development is greater, consistent with earlier observations by Banerjee and Newman (1993) and Galor and Zeira (1993). Although their results also tended to show that inequality might increase as financial development increases as suggested by Greenwood and Jovanovic (1990), these results were not robust. Clarke *et al.* thus rejected the view that financial development only benefits the rich. Thus, beyond its beneficial effect on growth, financial development reduces income inequality, consequently reducing poverty and enhancing human welfare.

Using better methods of analysis and an improved dataset, Beck *et al.* (2007) acknowledged that financial development is associated with faster average growth, but questioned why research has not yet settled on the issue of whether financial development benefits the entire population equally, or whether it disproportionately benefits the rich or the

poor. They used an extended dataset with data for the period 1960 – 2005 for 72 developing and developed countries and used two measures of income distribution; the growth in (i) GINI coefficient and in (ii) income share of the poor. They also used an updated version of the financial structure dataset covering the period 1980 – 2005 for the data on private credit as percent of GDP. They ran OLS regressions allowing for the possibility that lagged values of the income share, the GINI and poverty rates could influence present values. In terms of the conditioning information set, they controlled for GDP per capita, growth in the income share of the poorest group of the population and growth of the GINI ratio. They also controlled for educational attainment using schooling, macroeconomic management using inflation, trade openness, population growth and the age dependency ratio.

To overcome the usual endogeneity problems of OLS estimations and to incorporate the time dimension in their analysis not handled by the pure cross-section analysis, Beck *et al.* (2007) used the generalized-method-of-moments (GMM) panel estimator developed for dynamic models by Arellano and Bond (1991) and Arellano and Bover (1995). They found that, financial development measured by private credit lowers the growth of the GINI coefficient even after controlling for economic growth, the interaction between economic growth and initial income inequality and other control variables, suggested by Clarke *et al.* (2006). Also, they found that financial development has a disproportionately positive impact on the poor measured by the growth of the income share of the poorest group of the population.

Furthermore, Beck *et al.* (2007) found that financial development is associated with faster poverty alleviation when measuring poverty as the change in the headcount index. There is a negative relationship between financial development and the growth rate of the headcount index and this relationship is robust when controlling for all commonly cited determinants of absolute poverty. However, trade openness and schooling are unimportant for the income share of the poor when controlling for financial development and initial income of the poor. Such suggests that trade openness and schooling have no distributional effects when controlling for financial development. However, one could argue that these results could have been influenced by the developed countries in their sample and it is unclear how the relationships behave in the short run and whether their findings are actually causal.

Subsequently, to overcome the critique of using countries at different levels of development by Beck *et al.* (2007), Canavire-Bacarreza and Rioja (2008) examine the question of whether financial development tightens income distribution and poverty by using a subset of more similar countries in Latin America and Caribbean (LAC) countries. They examined the effects of financial intermediary development on the incomes of all segments of the population

and not just the bottom quintile as in Beck *et al.* (2007). With data for 21 LAC countries from 1960 to 2005, and GMM estimation techniques, they test the various hypotheses suggested in the literature on the effect of financial development on income distribution and poverty. They compute growth rates for all the income shares of the population (1^{st}, 2^{nd}, 3^{rd}, 4^{th} and 5^{th} quintiles), yearly growth rates of the GINI coefficient, and private credit averaged over five-year periods following the approach of Beck *et al.* (2007). They also included other suggested control variables like trade openness, inflation and schooling.

Surprisingly, they found that financial development does not directly bear on the income share of the bottom quintile contrary to Beck *et al.* (2007). However, they also find that financial development disproportionately improves on the incomes of the 2^{nd}, 3^{rd} and 4^{th} quintile of the income distribution of the selected countries. The coefficient of financial development was insignificant for the 5^{th} quintile even though GDP per capita growth also benefitted the rich. Thus, financial development seems to improve the distribution of incomes in the low-middle, middle and upper-middle segments of the income distribution. Individuals in the lower-middle income group have therefore been able to access financial markets and improve on their situation over time. Thus to improve on the livelihood of the bottom quintile, other less formal credit market instruments like micro-finance could be enhanced to drag the poor gradually into the formal financial system.

While a lot of work has been done with regards to the relationship between finance and income inequality with related welfare implications, these studies do not provide any useful information about the nature of the finance-income inequality relationship in Sub-Sahara Africa (SSA). A notable exception is the country study on the impact of financial openness on economic growth and poverty in Ghana using data for the period 1970 to 2007 by Adam (2011). It was reported that financial development measured by private credit granger-causes improvement in the living standards index created using the principal component analysis method for 13 standard of living dimensions collected from household surveys. While this study is informative, it remains quite localized and limited in scope.

In conclusion, three key findings emerge from this empirical literature: (i) financial sector development measured by either M2 or credit to the private sector as a percentage of GDP is important for reducing income inequality in the long run but income inequality might also increase as financial development increases in the early stages of economic development; (ii) financial sector deepening tends to benefit the poor disproportionately; (iii) financial sector development does not seem to benefit the poorest (bottom quintile of income distribution)

because persons in this segment of the income distribution usually have limited access into formal credit markets.

So far, it is worth taking note that theory has not yet asked nor answered the question, 'how will finance affect welfare or poverty if its development were to occur within a context of high or low income inequality. Since a direct relationship between financial development and income inequality is not the purpose of this thesis, no hypothesis is stated here. Moreover, for the studies that look at finance and poverty, the hypotheses will be the same as in section 3.2.2 above. However, the conclusions of this section will inform the analysis of the data when we analyse the joint and endogenous evolution of financial development, income inequality and human welfare.

3.2.5. Theories linking income inequality and human welfare

The theoretical literature on the relationship between income inequality and human welfare (area III of the Venn diagram) is very limited. It is often discussed through the literature connecting human welfare and economic growth, as we saw earlier. For this reason, the discussion here will concentrate mainly on the income inequality-economic growth linkage, but the implication for human welfare will be adduced where possible. In effect, theoretical models to explain the relationship between income inequality and economic growth date back to the seminal paper by Simon Kuznets in 1955.

Examining data on the distribution of incomes for England, Germany and the United States from about 1875 to 1947, Simon Kuznets conjectured in his 1955 presentation to the *American Economic Association* that income inequality tends to widen in the early stages of economic development, stabilizing for a while and to narrow in the later stages of industrial civilization. In this classical perspective, the relationship is potentially non-linear. However, this literature did not point to any channels that should link these two variables. The Kuznets hypothesis has been extended by two further theories which dominate the recent literature on the income inequality-economic growth nexus; (i) credit market imperfections channel and the (ii) socio-political instability channel. We discuss them in turn in subsequent paragraphs.

The credit market imperfections theory: According to the credit market imperfections channel discussed under the unified theory on the economic development process popularized by

Oded Galor (2011) building on Galor and Zeira (1993), Banerjee and Newman (1993), Galor and Moav (2004), it is reasonable to expect that high income inequality could be good for economic growth in the initial stages of development in the existence of credit constraints and fixed costs to investments. It is so because, in the initial stages, the quality of human capital is low and physical capital is the more productive capital available. To encourage investment in physical capital, those with a higher propensity to save should receive more income. In this way, income inequality will help generate the savings needed to fuel economic growth. Therefore, high income inequality affects growth positively through its interaction with financial development at the early stages of economic development. In this case, income inequality feeds into higher growth and associated human welfare through credit market imperfections.

However, in the later stages of economic development, when human capital becomes more important than physical capital in driving economic growth, income inequality becomes bad for economic growth because it inhibits society-wide human capital formation. This is so because individual human capital formation faces diminishing returns, and the only way to continuously increase the returns to human capital formation is to extend education and training across society. In the presence of persistently high income inequality where individuals lack access to financial resources to improve on their human capital, economic growth with improvement in living standards therefrom will be stymied as the economy operates on a suboptimal equilibrium.

In this connection, Demirguc-Kunt and Levine (2009) and Levine (2007) have argued that by relaxing restrictions in the credit market, financial development enlarges opportunities for access to credit markets for the poor to train and educate themselves with associated higher wages, asset accumulation and entrepreneurship. Such helps to narrow the inequality in the national income distribution and so halt the intergenerational persistence of income differences. In this way, financial development has a positive effect on national income and its distribution, both of which are crucial for welfare advancement.

Also, as countries develop and financial systems develop and improve access to credit markets by reducing transactions costs and improving allocational efficiency, it is likely to favour greater asset accumulation, entrepreneurship and participation in higher-return investment projects by both the poor and the rich alike (Paulson and Townsend, 2004). Under these circumstances, even the less well-off investors will have opportunities to build businesses and assets regardless of parental wealth. Such newly acquired assets could be used as collateral for loans in subsequent investments. Hence, ownership of assets is no longer dependent on parental

bequest which has been theorized to perpetuate income inequality across generations (Becker, 1957, Becker and Tomes, 1979, 1986).

Consequently, at later stages of economic development, financial development can be expected to improve on the condition of the poor by offering new opportunities for them to employ their skills and talents either through entrepreneurship or the building of assets. This scenario is typical of developed countries where access to credit markets is much easier. In developing countries and especially in SSA, underdeveloped financial services and credit market imperfections mean that the poor do not have easy access into credit markets and this may explain the persistence of income inequality in the region.

The credit market imperfections theory might fail if financial institutions and markets do not exhibit the kind of imperfection that its authors have assumed thus far and that is why researchers have explored other channels such as socio-political instability to better understand the relationship between income inequality and human welfare.

The socio-political instability channel: The *second strand* of the recent theories in the income inequality-economic growth relationship is the socio-political instability approach proposed by Hibbs (1973), Venieris and Gupta (1986), Alesina and Perotti (1995), Knack and Keefer (2000) and Halter *et al.* (2011). They posit that in a highly unequal society where the distribution of resources is polarized, there are strong incentives for organized groups of persons to pursue their interests outside of the common channels of political representation or market mechanisms. Thus, according to Perotti (1996, p.4) *'in more unequal societies, individuals are more prone to engage in rent-seeking activities, or other manifestations of socio-political instability, like violent protests, assassinations, coups, etc.'*

Fay (1993), Tornell and Lane (1994) and others, had earlier established theoretical models in which such socio-political instability discourages investment with associated negative consequences on economic growth and associated human welfare. Alesina and Perotti (1995) and Cingano (2014) have also argued that the uncertainty arising from instability in the political and legal conditions as a result of inequalities in income and wealth could disrupt economic activities and labour relations with consequent reduction in economic growth and living standards. Nonetheless, Halter *et al.* (2011, p. 21) have argued that the facets of income inequality which bring about growth-reducing effects, such as the political process, change in institutions and socio-political construction, usually take a long time to materialize. Hence, income inequality may only negatively affect growth in the long run through this channel.

Generally, we have drawn five main points from the theoretical literature: (i) According to the Kuznets hypothesis, income inequality is likely to be positively related to human welfare in the early stages of economic development; (ii) financial development has a positive long run effect on national income and its distribution because financial development reduces credit market constraints in the long run; (iii) the impact of financial development on human welfare in countries like those in SSA is likely to depend on the distribution of incomes because of credit market imperfections in the short run; (iv) income inequality could hamper economic growth and associated human welfare because it causes credit market imperfections in the short run. However, such imperfections could be beneficial for growth at the early stages of economic development when productive capital is more important than human capital; and (v) there are some suggestions that income inequality would dampen growth and consequently human welfare because it tends to create avenues for socio-political instability and disruptive redistributive tax policies that discourage investment.

Hypothesis: The theoretical literatures summarized in Section 3.2.4 and in this section are what suggest the possibility of an interaction term of financial development and income inequality. Hence the hypotheses for the relationship between human welfare and the interaction term will be stated here because there is yet no empirical evidence pitting the three variables financial sector development, income inequality and human welfare together. We also state a long run and short run hypothesis as before based on conclusions (ii), (iii) and (iv) above. Hypothesis 3 and 4 are stated here as:

The long run relationship:

H_0: The interaction between income inequality and financial sector development has a significant positive long run effect on human welfare in SSA, because income inequality is high and SSA is at an early stage of development.

H_1: The interaction between income inequality and financial sector development has no significant positive long run effect on human welfare in SSA, because income inequality is high and SSA is at an early stage of development.

The Short run relationship:

H_0: The interaction between income inequality and financial sector development has a significant negative short-run effect on human welfare in SSA, because of short run volatility in credit markets and the fact that investments of the rich might yield their effects only in the long run.

H_1: The interaction between income inequality and financial sector development has no significant negative short-run effect on human welfare in SSA, because of short run volatility in credit markets and the fact that investments of the rich might yield their effects only in the long run.

3.2.6. Income inequality and human welfare: Empirical evidence and hypothesis development

Studies on the income inequality- human welfare nexus are very limited and the majority of studies in this area concentrate on the linkage of income inequality and economic growth on the assumption that the distribution of the consequent income is unchanged over time. Also, most studies in this area have been theoretical since Kuznets (1955) owing to the lack of data for any meaningful cross-country analysis. However, Perotti (1996) is amongst some of the earliest empirical research works that focused on this relationship using some improved datasets on income inequality. Perotti (1996) constructed the share of national income in the hand of the middle classes from an income distribution dataset that included quintile shares in income from 67 countries. Most of his observations were taken from Jain (1975) and Le Caillon *et al.* (1984) and were as close as possible to 1960, the earliest year for GDP per capita data. Perotti studied the relationship between economic growth, income distribution and political stability by testing various hypotheses based on the existing theories on income distribution and economic growth using a mixture of basic Ordinary Least Squares (OLS) and Two-Stage Least Squares (2SLS) estimation methods.

The findings of Perotti's work suggest that more equal societies have lower fertility rates and higher rates in investment in education, which is reflected in higher rates of economic growth. Also, he found that more equal societies such as the Nordic countries (Denmark, Sweden, Finland, and Norway) tend to be politically stable, which is reflected in higher rates of investment with consequent higher economic growth rates. Finally, the study failed to find support for the claim that more equal societies especially those with democratic institutions grow

faster than their counterparts because they generate less demand for redistribution and thus produce less distortions. This study suffers immensely from the paucity of income inequality data and this could have influenced the conclusions of the study and many others before it. However, with the new and better household dataset on income inequality in a large number of countries by Deininger and Squire (1996), more researchers have sought to clarify the contentious relationship between income inequality and economic growth.

In effect, Deininger and Squire (1998) evaluated the relationship between initial income inequality and economic growth using a high quality sample of the Deininger and Squire (1996) income inequality dataset and the land inequality dataset of the Food and Agricultural Organisation (FAO). They used data for economic growth covering the period 1960 to 1992 and justify their choice of 1960 for data starting year on the grounds that land inequality data from the FAO is unavailable before 1960. Their cross-country regressions reveal a negative and significant relationship between income inequality and economic growth. However, this correlation breaks down upon the inclusion of regional dummies in the model specification. Also, they found a significant negative relationship between initial land inequality and economic growth which remains robust to the inclusion of regional dummies. They concluded that initial asset endowments may be more important in explaining long run growth rates than income inequality, a suggestion that has been espoused by bequest theories and lately Piketty (2014) and Stiglitz (2015a, b, c, d).

Subsequently, Barro (2000) used growth data and inequality data from Deininger and Squire (1996) for 100 developed and developing countries averaged over two ten-year periods from 1975 to 1995 to investigate the income inequality-growth relationship. He employed three-stage least squares (3SLS) estimation method in which lagged values of regressors were used as instruments to evaluate the relationship between income inequality and income growth. The other regressors in his extended model included an array of policy variables—the ratio of government consumption to GDP, a subjective index of the maintenance of the rule of law, a subjective index for democracy (electoral rights), and the rate of inflation. Also included were the ratio of investment to GDP, a measure of school attainment at the start of each period, the total fertility rate and the growth rate of the terms of trade.

Interestingly, Barro found no significant relationship between income inequality and economic growth in the full sample. However, upon splitting his sample into developed and underdeveloped countries, he found a negative relationship in the underdeveloped countries sub-sample and a positive relationship in the developed countries sub-sample. He concluded that this finding could be due to credit market imperfections which are especially more serious in poor

countries thus resulting in the negative relationship between income inequality and economic growth in these countries. Thus, income inequality is bad for growth and consequently for human welfare in poor countries because of credit market imperfections according to this work.

However, Forbes (2000) outlined a number of weaknesses in prior studies which did find a negative relationship between income inequality and growth. They include amongst others, the fact that such results are not robust to the inclusion of additional explanatory variables and regional dummies. Also, measurement errors in the inequality data and omitted variable bias could have dominated some of these results. Finally, Forbes remarks that these papers do not answer the important policy question of whether changes in inequality have a causal effect on changes in economic growth which she says can only be answered using the GMM technique.

In effect, Christine Forbes analyzed the relationship between economic growth and income inequality using the generalized method of moments (GMM) regression technique for panel data. This author employed data on economic growth covering the period 1966 to 1995 and inequality data for 45 countries abstracted from the so-called 'high quality sample' of the Deininger and Squire (1996) dataset. Forbes averaged her data over 5-year periods to reduce serial correlations from yearly business cycles and had a total of 180 observations for her entire study. She found that income inequality is positively related to economic growth in the short and medium run contrary to Perotti (1996) who finds a negative relationship in the long run.

The difference in the findings of Forbes and Perotti could stem from the fact that Forbes used a 5-year averaged panel structure while Perotti used a cross-sectional average over 30 years. Also, while Perotti used only OLS and instrumental variable (2SLS) techniques, Forbes used the more advanced GMM technique which is more suitable for panel data. However, while Forbes developed a better dataset for inequality and used a more powerful tool than cross-sectional OLS and 2SLS, her dataset did not include developing countries especially African countries. Also, Forbes' results might have been biased owing to excessively small standard errors that arise due to finite sample bias when using the GMM technique (Blundell and Bond, 1998). Nevertheless, Forbes' findings are consistent in part with Barro (2000) who found a positive relationship between income distribution and economic growth for his developed country sub-sample. Thus, inequality could have driven technological advancement in the developed countries as more highly skilled workers concentrate on the advanced technological sector, which generates higher rates of technological progress and income growth therefrom (Galor and Tsiddon, 1997).

In order to take into consideration the critique that the foregoing findings might have been influenced by the dissimilarity of countries in their datasets, Sukiassyan (2007) employed data exclusively for 26 transition economies from 1988 to 2002 to examine the relationship

between income inequality and growth for countries that started off with similar characteristics around 1990. He used OLS and GMM techniques to evaluate models similar to Perotti (1996) and Barro (2000) and found that income inequality negatively impacts income growth at least, for this group of countries and that this finding was robust to the inclusion of the other economic growth regressors. Such is consistent with theories which suggest that income inequality generates socio-political instability and discourages investment and subsequent growth in developing and transition countries. However, Neves and Silva (2014) reviewed most studies that have investigated the relationship between income inequality and growth and concluded that differences found in the results are due to disparities in the types of countries and time period used, the variable used to measure income inequality, the structure of the data and the estimation techniques.

These notwithstanding, and in a rather broad study covering various facets of studies relating finance, income inequality and living standards, Go *et al.* (2007) set out to study the evolution of income inequality and poverty in SSA. They empirically tested a growth model with a host of predictors including the ratio of broad money to GDP (M2/GDP), income inequality (GINI index), severity of conflict, a measure of institutional quality, civil liberties, population size, the ratio of Foreign direct investment to GDP (FDI/GDP) and the ratio of Official Development Assistance to GDP (ODA/GDP). Data for their study covered the period 1980 to 2002 and included the United Nations, World Institute of Development Economics Research (UN – WIDER) inequality dataset with 152 countries. All other data came from *World Bank, World Development Indicators* (WDI) except official development assistance (ODA) and conflict data that was obtained from OECD and Gleditsch *et al.* (2002) respectively. They ran OLS and yearly random effects regressions with SSA dummies in some specifications of their model.

Interestingly, they found that income inequality and financial development (M2/GDP) are negatively and significantly correlated with economic growth in the full sample but upon the inclusion of the SSA dummies, inequality remained a significant predictor of growth while the effect of finance weakened, *suggesting that income inequality and finance may be interacting in SSA*. Equally interestingly, they found that when they controlled for the initial levels of educational attainment and health, the effect of income inequality became insignificant. This suggested that income inequality stunts growth because it interferes with human capital accumulation. This is so because income inequality tends to exclude the poor from education and health in SSA.

Thus according to the above finding, controlling for the initial level of human welfare would wipe out the likely effect of income inequality and financial sector deepening on living standards in SSA. Nonetheless, theories considered so far suggest that the poor would only be excluded from education and healthcare if there are credit market imperfections. The consequence of this is that the poor are locked-out from credit markets where loans to support schooling and healthcare services could be obtained thus enhancing child labour and further income inequalities. Nonetheless, this study only used OLS and random effects regressions and did not deal with problems of endogeneity. Furthermore, with the paucity in income inequality data for SSA, we suggest that there are limitations to these findings.

In conclusion, three main findings emerge from the income inequality - human welfare empirical literature: (i) income inequality is significantly negatively correlated with growth in developing countries because of credit market imperfections and because it generates political instability that disrupts investments and growth; (ii) income inequality has a positive relationship with income growth in developed countries because such income growth has largely occurred in the technological sector (iii) controlling for the initial level of human welfare could wipe out the likely effect of income inequality and financial sector deepening on living standards in SSA.

The hypothesis here is based on the Kuznets (1955) hypothesis discussed in section 3.2.5 above:

H_0: Higher income inequality is positively and significantly associated with a higher level of human welfare in SSA.

H_1: Higher income inequality is not positively and significantly associated with a higher level of human welfare in SSA.

3.3. Human welfare and the interaction between income inequality and financial development: theoretical literature and hypothesis development

Here, we discuss some theoretical expectations relating to area IV of the Venn diagram. This is the gap in the theoretical and empirical literatures discussed thus far. We hope to extend this literature by highlighting some theoretical suggestions on the joint and endogenous evolution of financial development, income inequality and human welfare.

According to one strand of theory, financial development enhances living standards by boosting economic growth and tightening the distribution of incomes. It follows that improvements in financial systems reduces credit market frictions and enhances investment opportunities for all in the long run (Beck *et al.*, 2007; Levine, 2007; Demirguc-Kunt and Levine, 2009; and Galor, 2011). As such, where income inequality is high, improved access to finance will have a more than proportionate impact on human welfare than if such development occurs where income inequality is low. This is so because the distributional effects of financial development which is one avenue through which it reduces poverty or enhances welfare should be higher where incomes are more unequal. Beck *et al.* (2010b) and Levine *et al.* (2012) have demonstrated this in studies of bank branching deregulation in the US where the policy for local banks to do business in other States led to a decline in the income gap between black males and their white counterparts. However, they did not use an interaction term and did not look at changes in human welfare within the population of black males following the policy change in the financial sector.

This kind of financial development which reduces credit market frictions and benefits both the poor and rich alike should be good for human wellbeing but could depend on whether income inequality is high and whether countries in which it occurs have reached a later stage in economic development. This is so because as Galor (2011) building on Galor and Zeira (1993), Banerjee and Newman (1993) and Galor and Moav (2004) has suggested in his unified theory on the development process, it could be reasonable to expect high income inequality to be good for economic improvement in the initial stages of development where there are credit constraints and fixed costs to investments. This is so because, in the initial stages, the quality of human capital is low and physical capital is the more productive capital available. To encourage investment in physical capital, those with a higher propensity to save should receive more income. In this way, income inequality will help generate the savings needed to fuel economic growth. Therefore, high income inequality affects growth positively through its interaction with financial development at the early stages of economic development. In this case, income inequality feeds into higher growth and associated human welfare through credit market imperfections. *Thus a long run positive effect of the interaction between financial development and human welfare could be expected through this mechanism.*

However, according to Greenwood and Jovanovic (1990) and Claessens and Perotti (2007), in the early stages of economic development, financial sector development would widen income inequality since entrenched insiders can set up blocking laws to appropriate all benefits of financial development at least in the short run. Such indicates that improvements in financial

systems development should have a negative effect on overall human welfare in economies where income is highly unequally distributed, at least in the short run. *As such one can expect a negative and significant short run relationship between human welfare and the interaction between financial development and income inequality*.

Galor (2011) and Demirguc-kunt and Levine (2009) contrast this latter view by suggesting that, it is in the later stages of economic development, when human capital becomes more important than physical capital in driving economic development that income inequality is bad. This is so because income inequality inhibits society-wide human capital formation and since individual human capital formation faces diminishing returns, the only way to continuously increase the returns to human capital formation is to extend education and training across society. In the presence of persistently high income inequality where individuals lack access to financial resources to improve on their human capital, economic growth with improvement in living standards therefrom will be stymied as the economy operates on a suboptimal equilibrium.

In this connection, Go *et al.* (2007) using a global sample of 152 countries, found that income inequality and financial development (M2/GDP) were negatively and significantly correlated with economic growth in the full sample but upon the inclusion of an SSA dummy, inequality remained a significant predictor of growth while the effect of finance weakened, suggesting that income inequality and finance may be interacting in SSA. Equally interestingly, they found when controlling for the initial levels of educational attainment and health that the effect of income inequality became insignificant. They suggested that income inequality stunts growth because it interferes with human capital accumulation. The reason for this is that income inequality tends to exclude the poor from education and health in SSA since they lack adequate access to finance. However, since they did not use an interaction term and considered SSA as a dummy, we do not think that they dealt in any way with the empirical gap we have identified in the literature. A failure to adequately answer the question on how financial development, income inequality and human welfare evolve together might lead policy makers in SSA to implement financial sector policies which are counter-productive because such policies do not augur well with the level of development and the nature of income distribution of the countries concerned.

Hypothesis development: The theoretical literatures summarized above suggest that there is a possibility of an interaction between financial development and income inequality whose consequence may depend on the level of income inequality and the stage of development of the countries considered. As such, financial sector policies in SSA must be informed on how

the interaction of finance and income inequality affects social welfare. This knowledge should be crucial in the design of adequate policies on a country by country basis as one-size definitely does not fit all. Hence, the hypotheses for the relationship between human welfare and the interaction between financial development and income inequality for SSA are stated for both the long and short run as informed by these earlier studies.

The long run relationship:

H_0: The interaction between income inequality and financial sector development has a significant positive long run effect on human welfare in SSA since income distribution remains highly skewed.

H_1: The interaction between income inequality and financial sector development has no significant positive long run effect on human welfare in SSA, since income distribution remains highly skewed.

The Short run relationship:

H_0: The interaction between income inequality and financial sector development has a significant negative short-run effect on human welfare in SSA, since income distribution remains highly skewed.

H_1: The interaction between income inequality and financial sector development has no significant negative short-run effect on human welfare in SSA, regardless of the extent of inequality in the distribution of national incomes.

3.4. Summary of Chapter

In this chapter, we have summarized the main tenets of the theoretical literature and key aspects of the empirical evidence on the relationship between financial sector development, income distribution and human welfare.

In terms of empirical evidence, the literature reveals the following five key points. *First*, financial sector development measured by the credit to the private sector percent GDP and M2/GDP indicators have, on average, been crucial factors for the improvement of living standards because it has been found to enhance economic growth and other one-dimensional

measures of living standards such as poverty, schooling, under-five infant mortality, undernourishment and life expectancy, in samples of developed and developing countries. However, some researchers are suggesting that this relationship could depend on the quality of property rights in SSA;

Second, current low levels of financial development may not be relevant for welfare improvements in low income countries because financial markets are still limited and cannot provide the needed scale to undertake large above average risk projects which offer higher returns. In this vein, there is a suggestion that a threshold of 25 percent of GDP of credit to the private sector is necessary to effect higher income growth whereas the relationship between financial development and income growth could be non-monotone with some researchers holding that there could be a threshold from about 80-100 percent of GDP above which credit market expansion becomes detrimental to income growth and associated human welfare.

Third, the long run and short run effects of finance are likely to be different with finance being relevant for income growth and social welfare in the long run and most likely detrimental in the short run as volatility and overall financial fragility in the short run provoke economic crises with dire social consequences; *Fourth*, financial development tends to reduce income inequality and enhance welfare approximated by the rate of change of absolute poverty in global cross-country samples. However, in a cross-country study for Latin America and the Caribbean where income distribution is highly unequal and persistent over a long time period, financial development was found to benefit mostly those in the lower-middle and upper-middle quintile of the income groups; *Fifth*, in the long-run, income inequality is lower in countries where financial development is higher, even if the relationship between income inequality and income growth in highly developed financial systems is ambiguous and the relationship seems to be negative for developing countries including SSA.

Despite the afore findings, we note that most of the empirical studies summarized in this chapter have investigated the relationship between financial development, income inequality and human welfare separately and for cross-country datasets of developed and developing countries with the notable exception of Go *et al.* (2007) who include an SSA dummy in their regression models using a global dataset. Consequently, the current study aims to contribute to the literature in five significant ways:

First, it focuses on the effect of financial development on human welfare measured by a more comprehensive human welfare indicator – the Human Development Index (HDI) rather

than one-dimensional indicators like undernourishment, life expectancy or schooling which have been argued to be insufficient. *Second*, it uses a dataset covering all the available data on the UN HDI - for the 1990 to 2010 period. This period corresponds to the years when most African countries reformed their policies in order to achieve the Millennium Development Goals by 2015 and especially liberalizing their financial sectors. *Third*, it uses an exclusive sample of SSA countries rather than including an SSA dummy in a global analysis or using a mixed sample of SSA and non-SSA developing countries. *Fourth*, it considers how the potential interaction between financial sector development and average income inequality affects the relationship between financial sector development and human welfare in SSA. *Fifth*, it introduces panel cointegration and vector error correction modelling (VECM) to establish the direction of causality, the long-run and short run relationships between human welfare and financial development indicators conditional on the average level of income inequality during the process.

This modelling strategy is similar to Loayza and Ranciere (2006) with the exceptions that it includes an interaction term to capture the additional impact of financial sector development on human welfare in the group of highly unequal countries in SSA, and in that Loayza and Ranciere (2006) used the ARDL model to capture long and short run effects with a dataset sub-divided into low, intermediate and high income countries.

In the following chapter, the research design of this study shall be discussed. It shall include a presentation of the sources of data, transformation of data, descriptive statistics and underlying trends in our main variables as well as the interrelationship amongst them.

CHAPTER FOUR

FINANCIAL SECTOR DEVELOPMENT, INCOME INEQUALITY AND HUMAN WELFARE: DATA SOURCES, TRANSFORMATION AND DESCRIPTION

Introduction

The purpose of this chapter is to examine the data that would subsequently be used to test the different theories and hypotheses that have been developed in the previous chapter. Its objectives are threefold. *First*, it discusses the sources of data and the techniques employed in the collection, validation and transformation of data. *Second*, it describes and discusses the underlying trends in the dependent and independent variables. *Third*, it explores the basic relationships amongst the dependent and independent variables which form the basis of our empirical analysis in subsequent chapters. They are: (i) human welfare (ii) financial development, and (iii) income inequality.

4.1. Sample Selection and Data

We discuss in turn (i) sample selection (ii) data sources and validation, (iii) transformation of data (iv) principal component analysis (v) the construction of the panel framework that will be used for subsequent regression analyses.

4.1.1: Sample selection

Countries used to explore the joint and endogenous relationship between financial sector development, income inequality and human welfare are drawn from the group of 48 SSA countries excluding South Africa that were employed for the analysis in Chapter Two. For the purposes of this study, countries to be included were selected on the primordial basis that they had consistently available data on the Human Development Index from at least 1990 to 2010,

which was the last available data year at the time of writing. This was done because the HDI is the main dependent variable of this study and our objective was to have a balanced panel even though the difference between balanced and unbalanced panel in modern econometric analysis tends to be trivial (Greene, 2006, p. 184).

Based therefore on this simple selection rule, 29 countries were extracted from the original list of 48 SSA countries. The selected group represents 60 percent of the available countries whose data could have been used for this study. This is a clear indication of the unavailability of data that has often marred studies that rely on SSA datasets (Adjasi and Biekpe, 2006). As you would find in Table 4.1 in Appendix II, the largest economy in Africa, that is Nigeria, has no available data for the HDI in 1990. Therefore, included countries were selected systematically using the availability or not of HDI data from 1990. Hence the final sample selected was random.

4.1.2. Data Sources and validation

Data for this study was derived from four main sources – the Economic and Social Data Services (ESDS)'s World Bank World development indicators online database, the United Nations Development Program's Human development report 2010 online database, Freedom House's database on political rights and civil liberties 2011 and the United Nation University's WIID2 database on income inequality. However, income inequality data for Sudan was extracted from the 2014 Standardized Income Inequality Data (SIID). Our data spans from 1985 to 2010 even though the study is restricted to the period 1990 to 2010 where all our sample countries have continuous data on the human development index from 1990.

The data for the year 1985 was included to safeguard against the eventuality of having to lag our variables. The year 1990 was chosen as the starting point for analysis because it corresponds to the starting year for the setting of the millennium development goals and the liberalization of the financial sector in many developing countries including those in the SSA sub-continent. A complete list of all the variables in our dataset, their definitions and sources are included in Table 4.2 of Appendix II.

Elsewhere, the authenticity of our data is anchored on the fact that they all come from official sources like the World Bank and the United Nations who tend to provide standardized

and comparable data across countries. Besides, data from these official sources have been used by previous authors including Beck *et al.* (2007), for the World Bank Dataset and the WIID2 dataset, and Gomanee *et al.* (2005) amongst others whom we cited in the previous chapter for the HDI dataset.

4.1.3. Data transformation

With the exception of the HDI data series which is provided by the UNDP HDR 2010 report datasheet online in five year intervals and the income inequality variable which is a dummy and constructed as indicated in Section 4.2 below, all other data series are five-year averages. That is, data for 1990 is the average for the years 1985-1989; 1995 is the average for 1990-1994 and so on. This averaging does not only enable the ironing out of business cycle effects, but has also been suggested by Singh and Huang (2015) to reduce concerns about endogeneity. For the sake of brevity, data averaging is not presented here. We also constructed two control variables: the real bilateral exchange rate and an index of institutional quality using the principal components method.

Construction of a real bilateral exchange rate index: A bilateral real exchange rate index was constructed in order to capture a country's ability to manage inflation relative to its trading partners. Such changes in the real value of the local currency could lead to economic hardships (Prasad *et al.,* 2006; Elbadawi *et al.,* 2011; Du *et al.,* 2013). The steps involved in the creation of the bilateral real exchange rate index may be summarised as follows:

In the absence of complete data for the consumer price index (CPI), we used the GDP deflator which is continuously available for all our selected countries as a measure of the domestic price level. Whereas the GDP deflator and the CPI are similar, they diverge in a number of ways. *First*, the GDP deflator allows the weights placed on different goods and services for its calculation to change over time and is a Paasche type of index, while the CPI is revised infrequently and is a Laspeyres type of index (Crawford *et al.,* 1998; Koga, 2003; Littra, 2009). Thus, the GDP deflator allows for variations in quantities purchased due to changes in tastes, income or product quality while the CPI ignores the possibility of substitution identified by a number of biases including substitution bias, quality bias and new goods bias. *Second*, because the basket of commodities used in calculating the GDP deflator changes frequently whereas the CPI indicates the price of a fixed representative basket of products, the GDP deflator

remains consistent even with the introduction of new products. *Finally*, it is also worthy to note that the GDP deflator also includes the prices of capital goods while the CPI does not.

From these differences, we note that the GDP deflator is not easily falsifiable as it uses the prices of all goods and services in measuring the general price level. On the contrary, the CPI index and other indicators of the price level such as the wholesale and producer price indices used by other authors can easily be manipulated by using for their determination whatever basket of goods public authorities choose which may hide their inability at macroeconomic policy management.

To achieve our goal here, we first converted the GDP deflator series to the same base year 2005 because the World Bank *World Development Indicators* (WDI) reports them with different base years for different countries. For ease of comparability, we constructed the bilateral real exchange rate index using the US GDP deflator with base year in 2005 as a measure of international price level. The bilateral real exchange rate in local currency unit per US dollar is expressed as follows:

$$\text{Real Exchange rate index } (RER_t) = \frac{\text{GDP deflator SSA country for year t}}{\text{US GDP deflator year t*official exchange rate}}$$

This definition is the opposite of what is usually used in some publications (Ellis, 2001; Chinn, 2006). Consequently, an appreciation of the real bilateral exchange rate is interpreted here as an increase in the index. In which case, more units of the US dollar will be needed to purchase a unit of the local currency

.

Construction of an index of institutional quality: An index of institutional quality was constructed using Freedom House's indices of political rights and civil liberties. We have combined these two indices using principal components analysis to create one index because they usually tend to capture the same thing in regression models. As Doppelhofer and Weeks (2009) have remarked, they exhibit negative jointness in that if only one is included in a regression model, it picks up the impact of the other and the significance of its coefficient is exaggerated; but if both are included together they each tend to be insignificant. Indeed, the results of our initial regressions show that when these variables are included together they are insignificant while separately they tend to be significant. Also, upon examination of the data we

noted that the values for each year for the two variables are quite similar. Thus, we create an institutional quality index using the method of principal component analysis.

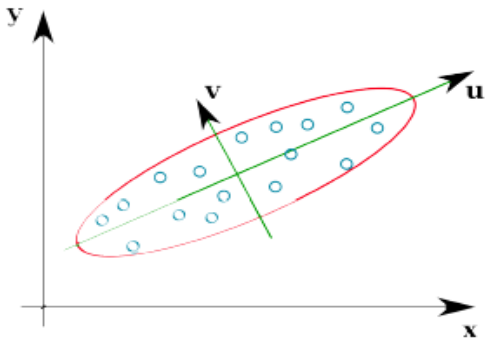
4.1.4. Principal component analysis

Multivariate analysis similar to the one intended for this thesis usually involves variables that are closely related such as the measures of *political rights* and *civil liberties* used to measure institutional quality. In order to avoid using both strongly correlated indicators in the same regression and thereby reducing their individual effect as Doppelhoffer and Weeks (2009) have pointed out, researchers now prefer to use a method of analysis that reduces the number of variables in a set of closely related variables that keeps most of the information in the original larger set of variables known as Principal Components Analysis, or PCA.

Principal component analysis (PCA) is a statistical procedure that transforms a number of correlated variables into a reduced number of uncorrelated artificial variables known as principal components. Usually, the first principal component captures most of the variability in the data, whereas each subsequent component accounts for as much of the remaining feasible variability. For example, in figure 4.1 below, suppose that we represent the two variable dataset *political rights* and *civil liberties* measured in the x-y coordinate system.

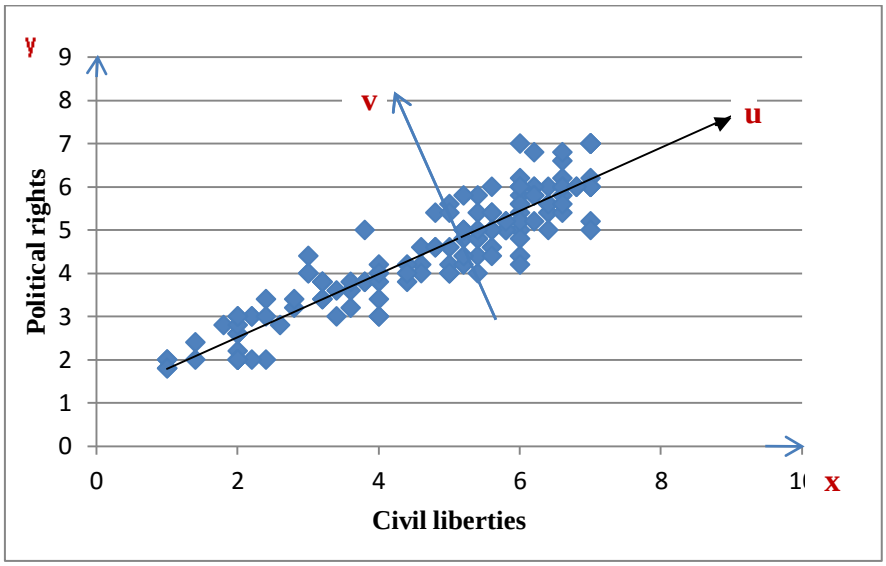
The primary direction in which the data varies is represented by the u-axis and the second most essential direction is the v-axis which is orthogonal to it. If the u − v axis system is placed at the mean of the data, we get a more compact representation. Then, if we translate each (x, y) coordinate into its corresponding (u, v) coordinate, the data is de-correlated. That is, the co-variance between the u and v variables will be zero. For any given dataset, PCA finds an axis system defined by the main directions of variance (that is the u − v axis system as in figure 4.1 and 4.2 below). The directions u and v are known as the principal components.

Figure 4.1: PCA for data representation



Source: Doc 493: Intelligent data analysis and probabilistic inference

Figure 4.2: PCA for dimension reduction demonstrated by correlation plot of political rights vs civil liberties



Source: Freedom House data 2011 and author's plot

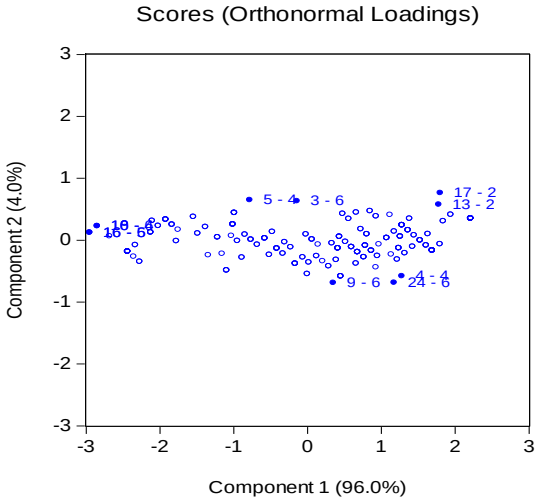
The variation in a dataset could be caused by natural factors or by some other relationship among the dataset. If the variation is caused by natural or random phenomena, then it could be expected to be normally distributed and take the form of a two dimensional ellipse as in figure 4.1 which encloses data points expected to be part of the same class. But if the variation in the dataset is as a result of some other relationship then by using PCA we have a means through which we can reduce the dimensionality of the dataset. Consider the two variables *political rights* and *civil liberties* that are very closely linearly related as shown in the scatter plot (figure 4.2). It shows that the primary direction in which the data varies is along the u-axis and the secondary direction by which it varies is the v-axis. However, and as we can see, all the v-

coordinates are nearly close to zero and one may even assume, for instance, that they are only non-zero because of noise in the data.

Thus in this simplified two variable u − v axis system, one can represent the data set for *institutional quality* by a single variable u and ignore v. Hence, the dimensionality problem has been reduced by 1. Computationally however, the principal components are found by estimating the *eigenvectors* and *eigenvalues* of the data covariance matrix which is equivalent to obtaining the axis system in which the co-variance matrix is diagonal. The direction of greatest variation is represented by the eigenvector with the biggest eigenvalue, whereas the one with the next highest variation represented by the second largest eigenvalue is the orthogonal direction and so on in case of more than two variables.

We used EViews version 8.0 to perform principal components analysis in constructing our *institutional quality* measure (PCI2). As can be seen in Appendix II Table 4.2 and figure 4.3 below, the first or principal component accounted for 96 percent of the variation whereas the secondary component accounted for about 4 percent of the variation. Thus, the two dimensional space represented by the variables *political rights* and *civil liberties* has been reduced through this procedure to a single measure of *institutional quality* which captures about 96 percent of the variability of the two dimensional dataset. This is the measure that will be used in our subsequent regression analysis.

Figure 4.3: PCA Component Scores Plot



Source: Author with data from Freedom House (1990-2010)

4.1.5. Panel data construction

The reference series for the construction of the panel for analysis was the HDI series. Our aim was to obtain a balanced panel and this guided our selection of 29 SSA countries for which the HDI data was complete from 1990 to 2010 in five year intervals. Since the HDI is our main dependent variable, and because we suspected problems of endogeneity, our five year average data for any corresponding data point to the HDI had a lag. For example, the values for any of the other data series relating to the HDI for 1990 were the averages for the period 1985-1989. Thus, the explanatory variables data series in the panel always came with a lag compared to the HDI data series.

As we said earlier, the use of such lagged variables helps partially resolve the potential problem of simultaneity. But the five-year averaged series have reduced the frequency of the data points which is a quality sort when using time series data in econometric analysis. However, averaging reduces business cycle effects which tend to be short term phenomena and not crucial for the analysis of long-term relationships (Beck *et al.*, 2007). Furthermore, pooling the data series of the 29 selected SSA economies increases the sample size significantly, paving the way for more accurate and reliable statistical tests due to higher degrees of freedom achieved by the panel. Panel data also reduces collinearity between regressors (Costantini and Martini, 2009).

The overall panel dataset is unbalanced in the sense that some countries do not have complete data for all the variables included in our regression model. In general, the number of observations used in our analysis ranges between 143 and 144 for some variables. However, the differences between balanced and unbalanced panels tend to be more historical than crucial (Greene, 2006, p.184). It follows from the fact that before the introduction of computers to conduct analysis of variance, it was easier to work on a balanced panel using paper and pen than dealing with an unbalanced panel data framework. This notwithstanding, unbalanced panels have the effect of introducing more noise due to country heterogeneity. Nonetheless, EViews 8.0 software used in our empirical analysis tends to correct the unbalanced panels by adjusting them into balanced panels but which may reduce the efficiency of estimated parameters as sample size reduces.

4.2. Data Description

For brevity, we shall limit the discussions here to the pattern of movement of our dependent and independent variables; (i) human welfare (dependent) (ii) financial sector development (independent) and (iii) Income inequality (independent). We use standard summary statistics for measures of central tendency and variability. Also, graphical representations are used to inspect underlying trends in the variables individually and collectively for a sample of 29 SSA countries. The summary statistics for the main and control variables included in our regression model are also shown in Table 4.1 below.

Table 4. 4: Descriptive statistics of included variables

	Mean	Median	Max	Min	Std. Dev.	Skewness	Kurtosis	No. Observations
Human development index (HDI)	0.38	0.37	0.70	0.14	0.13	0.49	2.73	141
Under-five infant mortality (IMRU5)	138.69	131.76	314.88	15.58	55.31	0.53	3.74	141
Broad money % GDP (M2Y)	23.59	20.35	96.23	0.00	14.03	2.25	10.41	141
Domestic credit to private sector % GDP (DCPSY)	15.62	12.06	78.35	0.00	12.72	1.83	7.77	141
Official development assistance (ODAY)	12.26	10.42	58.06	0.33	9.69	1.44	6.22	141
Trade % GDP (TRDY)	70.46	61.93	191.18	14.38	35.41	1.02	3.56	141
Rural population (RPOP)	67.27	66.52	94.78	15.44	15.28	-0.63	3.93	141
Government consumption expenditure (GCY)	15.14	13.70	41.71	5.83	6.25	1.59	6.32	141
Institutional quality (PCA) (PCI2)	-0.02	0.46	1.73	-3.95	1.40	-1.02	3.17	141
GDP per capita growth (YPCG)	0.73	0.96	9.50	-12.05	3.09	-0.52	5.01	141
GDP per capita Constant 2000 (YPC2)	778.42	332.36	4645.12	85.21	1085.14	2.38	7.67	141

Descriptive statistics are for 5-year averaged data. Maximum here is the highest 5-year averaged value for all the 5 periods from 1990-2010.
Source: WDI (2011) and author's calculations

4.2.1. Human welfare (Dependent variable)

It has been remarked by earlier researchers including Sen (1999), Kakwani and Pernia (2000), Thirlwall (2006), and UN HDR (2013) that the use of GDP growth to measure living standards is an inadequate measure of overall human welfare. This is so because it is possible to have income growth without the enhancement of the situation of the poor, especially when such growth does not tighten the distribution of incomes between the rich and the poor. Also, it is possible to find situations where living standards improve more than the growth rates experienced. For example, Ferreira *et al.* (2009) have found that taming hyperinflation in 1994, and substantially improving social security and social assistance transfers, led to an increase in overall social welfare in Brazil during the period 1985 to 2004, when in fact the country experienced very slow growth. However, as Kakwani *and Pernia* (2000) have also suggested, if growth is equitable, that is, accompanied by an appropriate redistribution of wealth, it could be considered as an adequate measure of changes in overall social welfare.

Owing to the foregoing, a multidimensional measure of social welfare like the human development index (HDI) which is a composite of income, education and life expectancy is usually deemed to be a better measure of overall living standards (Akire, 2002; HDR, 2010; Akire and Foster, 2011). This is because in addition to income, it accounts for changes in health and education which are vital components for future wealth creation. It also compares favourably with the other measures of human welfare used in the previous studies whose key findings were summarised in Chapter Three. Furthermore, because the HDI used for this study is not adjusted for the level of income inequality, we have included a measure of income inequality as one of our determinant variables in our subsequent regression analyses. However, the problem with country specific factors such as income inequality is that they are persistent over a long-time period.

Human welfare is quite a broad concept that can be measured in various ways depending on what researchers consider to be important in measuring the quality of life that individuals or communities enjoy. Whereas previous studies like Beck *et al.* (2007), Go et *al.* (2007) and Chen and Ravallion (2010), tend to focus on one dimensional measures like the dollar–a-day and infant mortality measures to capture this concept, it is continuously being recognized that only a multidimensional measure of poverty or welfare can adequately tell the poverty or welfare story (Sen, 1999; UN HDR, 2010, Akire and Foster, 2011).

At present, the only widely available multidimensional measure of welfare is the Human Development Index (HDI) which is a composite indicator of human welfare. It measures human welfare along three dimensions: *a long and healthy life*, *access to knowledge* and a *decent standard of living*. It uses four indicators to construct three indices which capture the three key dimensions of human development; life expectancy at birth to construct the life expectancy index, mean years of schooling and expected years of schooling to construct an education index, and Gross National Income (GNI) per capita (PPP $US) to construct the GNI index.[3] The index ranges from zero (worst quality of life) to one (best quality of life). We discuss the advantages and critiques of using a multidimensional index such as the HDI and its evolution from 1990-2010 compared with the one dimensional index such as the under-five infant mortality rate also used as a measure of welfare and as a robustness check in this study.

Advantages of using the HDI as a measure of human welfare: Despite criticisms against the use of the HDI in quantitative studies as we shall see below, the HDI is intuitive and straightforward in its construction as an indicator of the quality of human welfare. It measures the progress or regress of human development of nations with regards to some reference points. Improvements from the reference points would mean that human welfare across all or most of the dimensions is improving while a regress would mean welfare is deteriorating across all or some of the dimensions. Thus, an increase in the value of the HDI could be interpreted as an improvement in the living standard of residents in the country in question, even if one cannot specify which component of the index is most affected.

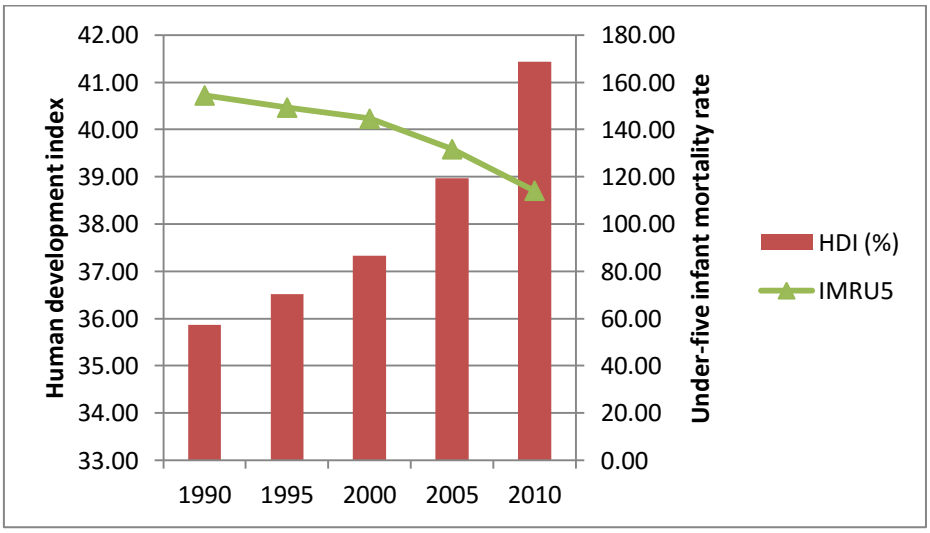
Also, the HDI serves as a standard by which comparisons between nations can be done. As such, changes in the HDI would show which nations are advancing their quality of life and which are falling behind, at least, with regards to the three dimensions that make up the index. In addition, some researchers including Sen (1999) have suggested that it is a better indicator of the quality of living standards than one-dimensional indicators such as the poverty head count index, shelter, life expectancy or infant mortality which have frequently been used in empirical studies researching the determinants of poverty or human welfare. This is so because welfare involves a number of interlocking factors which only a multidimensional index can adequately capture.

[3] The steps involved in the creation of this index are provided in the Human Development Report (2010).

Critique of the HDI as a measure of human welfare: Despite the conceptual improvements in measuring the HDI[4], it sparingly has been used by researchers for empirical work as an indicator of human welfare. The limited use of the HDI stems from three criticisms in the literature as identified by Go et *al.* (2007), Cahill (2005) and Klugman *et al.* (2011). *Firstly*, these researchers argue that there is no conceptual basis for selecting the indicators and the way the different sub-indices are aggregated to obtain the HDI index. *Secondly*, they raise the issue of interpretation of the index in a regression model. That is, what is the coefficient of the HDI index in a model supposed to mean? *Thirdly*, they ask the question, why should the different components be given equal weightings in constructing the HDI index? Whereas there are no straight answers to these questions, it should be noted that in addition to income, it accounts for the quality of health and education which are crucial components of future income growth.

Evolution of dependent variables: HDI and under-five infant mortality 1990-2010: According to Figure 4.4 below, living standards have been improving in SSA, contrary to common knowledge. For example, the HDI series shows that the standard of living has been gradually increasing in our SSA sub-sample from 0.36 in 1990 to 0.41in 2010 on a scale of one . Similarly, the indicator for the rate of mortality of infants under the age of five has been decreasing from about 154 babies per 1000 born in 1990 to about 114 babies per 1000 born in 2010.

Figure 4.5: Evolution of average HDI and under-five infant mortality rate 1990 to 2010



Source: World Bank World Development indicators, HDR Report 2010 and author's calculations

[4] See HDR report 2010 for conceptual improvement in the calculation of the HDI from simple arithmetic averages to geometric averages.

Even though the rate of decrease here is slower than expected by the Millennium Development Goals (MDGs) which targeted that the 1990 levels will fall to one-third by 2015, we remark that about 40 less babies under-five years of age were dying in 2010 compared to 1990. Owing to the combined efforts of the global community through the MDGs, most SSA countries have received substantial grants in Aid especially in education and healthcare which have significantly improved the standards of living in many of these countries even with the absence of economic growth in the 1990s as we saw in Chapter Two. Nonetheless, as 2015 approaches with the consequence that Aid resources may dry-up when the MDGs expire, there was a feeling that living standards in SSA could deteriorate after this target deadline. Fortunately, 17 Sustainable Development Goals have been adopted by the United Nations in September 2015 which adds on the goals already pursued by the international community in implementing the MDGs.

Average human development for the 29 selected SSA countries during the period 1990-2010 was 0.38 with a maximum of 0.70 on a scale of 0 to 1 in Mauritius for 2010. Worse levels of human development were recorded in Zimbabwe and Niger with an average of 0.22 while the best average levels were recorded in Mauritius (0.66), Gabon (0.62), Botswana (0.59) and Namibia (0.56). These latter countries are also those with the highest levels of income per capita, educational attainment and life expectancy in our selected SSA sample.

4.2.2. Financial sector development

According to Levine (1997), a country's financial system is more developed than that of another if its costs of bringing borrowers and savers together is lower and if it enhances the efficiency with which capital is allocated amongst competing projects. Unfortunately, there are no direct or sufficient measures which adequately capture this sort of activity. That is, there is no single indicator that adequately captures all the functions of the financial system, including enhancing allocational efficiency of capital, fostering risk sharing and channelling savings from savers to borrowers (Demirguc-Kunt and Levine, 2004). For the purpose of this study, we focus our attention on two frequently used indicators of financial intermediary development in the selected countries because stock market development is still quite limited in Sub Sahara Africa.

Regarding financial intermediary development, researchers normally focus on the liability side of the balance sheet of financial intermediaries to construct a measure of absolute size based on liabilities. It is the measure of broad money to GDP and equals the sum of currency and interest-bearing demand deposits of retail banks and other financial intermediaries to GDP. It is the broadest indicator of financial intermediation or financial depth and does not distinguish among the financial sectors or the use of the liabilities. It is more commonly expressed as the ratio of M2 to GDP (Rousseau and Wachtel, 2011; Go *et al.*, 2007; Kraay, 2004). The other measure of financial intermediary development frequently used is the ratio of credit issued to the private sector by banks and other financial intermediaries as a share of GDP. It is reported in the World Bank's World *Development Indicators* and the *Financial Structure Dataset* and used by authors already cited in the literature including Rousseau and Wachtel (2011).

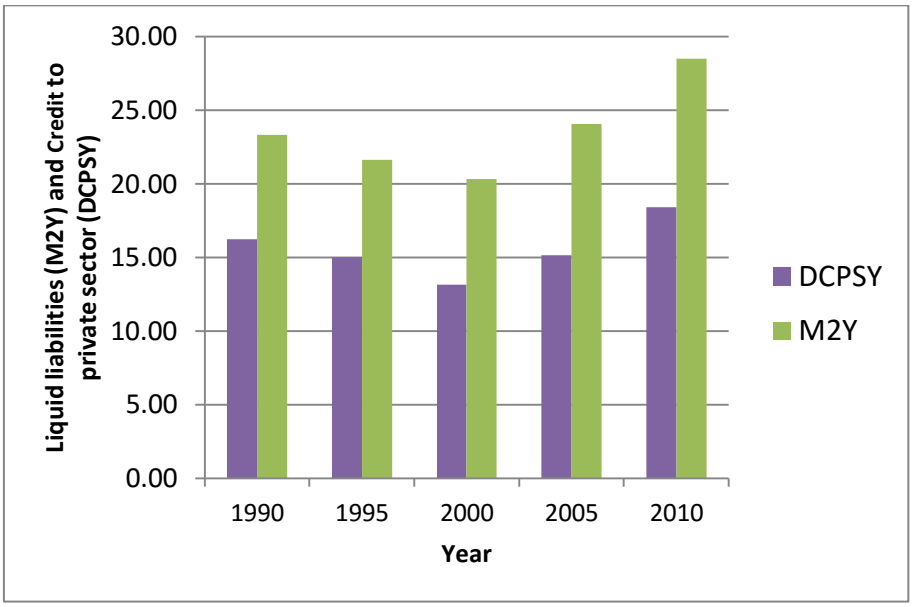
Though both measures are usually used interchangingly, we believe that M2/GDP is a more appropriate measure of financial development for SSA than the ratio of private credit to GDP suggested by Beck *et al.* (2007) as the best measure. This is because government corporations which also benefit from the development of the financial sector usually represent a greater part of the productive sector than private enterprises in SSA. Private credit which excludes finance to such entities may not adequately tell the story of the evolving roles and the impact of the financial system on socio-economic welfare in SSA. We would therefore use private credit only for a robustness check of our results.

Evolution of the independent variables: Broad money (M2) and Credit to the private sector: Figure 4.5 below shows the trend in the movement of the financial intermediary development variables - broad money as a share of GDP (M2Y) and domestic credit to the private sector as a percentage of GDP (DCPSY) averaged for the selected 29 SSA countries during the period under consideration.

It can be observed that for our sample countries, financial intermediary development was on average higher in the 1990s than in the early 2000s. This observation can be explained by some key issues with both our data structure and economic disruptions which affected the SSA region in the 1990s. In effect, the data for year 2000 is the average for 1995-1999 when the financial sectors had shrunk owing to economic crises that rocked most of the region from the second half of the 1980s, whereas that for 1990 is the average for 1985-1989 when the financial sectors were larger. The adverse effects of the economic and financial crises that rocked SSA countries from the mid-1980s, causing the collapse of many financial institutions by the early

1990s, led to the shrinking of the financial sector. In fact, in most countries in West and Central Africa, for example, Benin and Cameroon, where private credit had attained over 30% of GDP by 1985, restructuring of the banking sector plummeted private credit to less than 6 percent and 6.5 percent respectively in Benin and Cameroon in 1997 (World Bank, WDI, 2011).

Figure 4.6: Evolution of average financial intermediary development 1990-2010



Source: World Bank World Development indicators (2011) and authors calculations

Also, Structural adjustment programmes in a large number of SSA countries from about the mid-1980s including many which form part of our dataset limited the productive capacities of SSA countries during the 1990s (Heidhues and Obare, 2011). The implication is that risks were high and new investments were scarce during that period consequently limiting the capacity of banks to allocate loans. Then too, financial liberalization measures taken by various SSA governments in the 1990s to deepen the financial sector only started producing significant improvements on the size and depth of the financial sector after year 2000, when many of these countries were graduating from the various adjustment programmes including the heavily indebted poor countries initiative (HIPC). Thus, the joint effect of the end of the economic crises by year 2000, financial liberalization reforms and the end of structural adjustment programmes in many of these countries in the early part of the 2000s, is what is being captured by the improved levels of financial intermediary development since year 2000.

We note from the descriptive statistics in Appendix II Table 4.3, that financial development measured by M2Y attained an average 23.58 per cent of GDP for the 29 SSA countries during the period 1990 – 2010 whereas DCPSY attained an average of 15.6 per cent of GDP over the same period. However, the average M2Y for the highly unequal countries was about 25 percent of GDP whereas average DCPSY was about 18 percent. For the more equal countries, that is countries with a GINI less than 45% (as seen in Table 6.1 in Chapter Six), these values were about 22 percent and 14 percent respectively for M2Y and DCPSY.

4.2.3. Income Inequality

There are quite a few measures of income inequality such as the decile dispersion ratio, the Sen Index, and the GINI coefficient which are frequently used in empirical research. However, the most preferred is the GINI coefficient which varies from zero (absolute equality) to one or one-hundred percent (absolute inequality). The GINI is a preferred measure of income inequality because it is standardized between zero and one or one-hundred percent for all countries and its interpretation is quite simple and straight forward. It has been used by researchers including Barro (2000), Beck *et al.* (2007), Pinkovskiy and Sala-i-Martin (2010) and Chen and Ravallion (2010) amongst others. We follow these authors in using the GINI coefficient to capture the extent of income inequality in each of our selected 29 SSA countries.

As was said earlier, the extent of inequality in the distribution of incomes for the 29 SSA countries of this study is captured by the GINI coefficient. However, due to a lack of continuous time series data on this variable for our SSA States over the twenty one years of study, our available data on the GINI coefficient was transformed into a dummy variable which takes a value of 1 or otherwise zero depending on whether the country is classified as high or low where the distribution of its income is concerned. The categorisation is based on an average GINI cut-off point of 45 per cent. This threshold, which corresponds to the average GINI for the 48 SSA countries excluding South Africa as we saw in Chapter Two, has also helped to ensure that roughly equal number of countries are categorised in each group; fourteen versus fifteen in the high and low inequality subsamples respectively.

Nevertheless, there are a number of problems with our estimated index of inequality. One such difficulty relates to the fact that averaging our data on GINI coefficient for each country

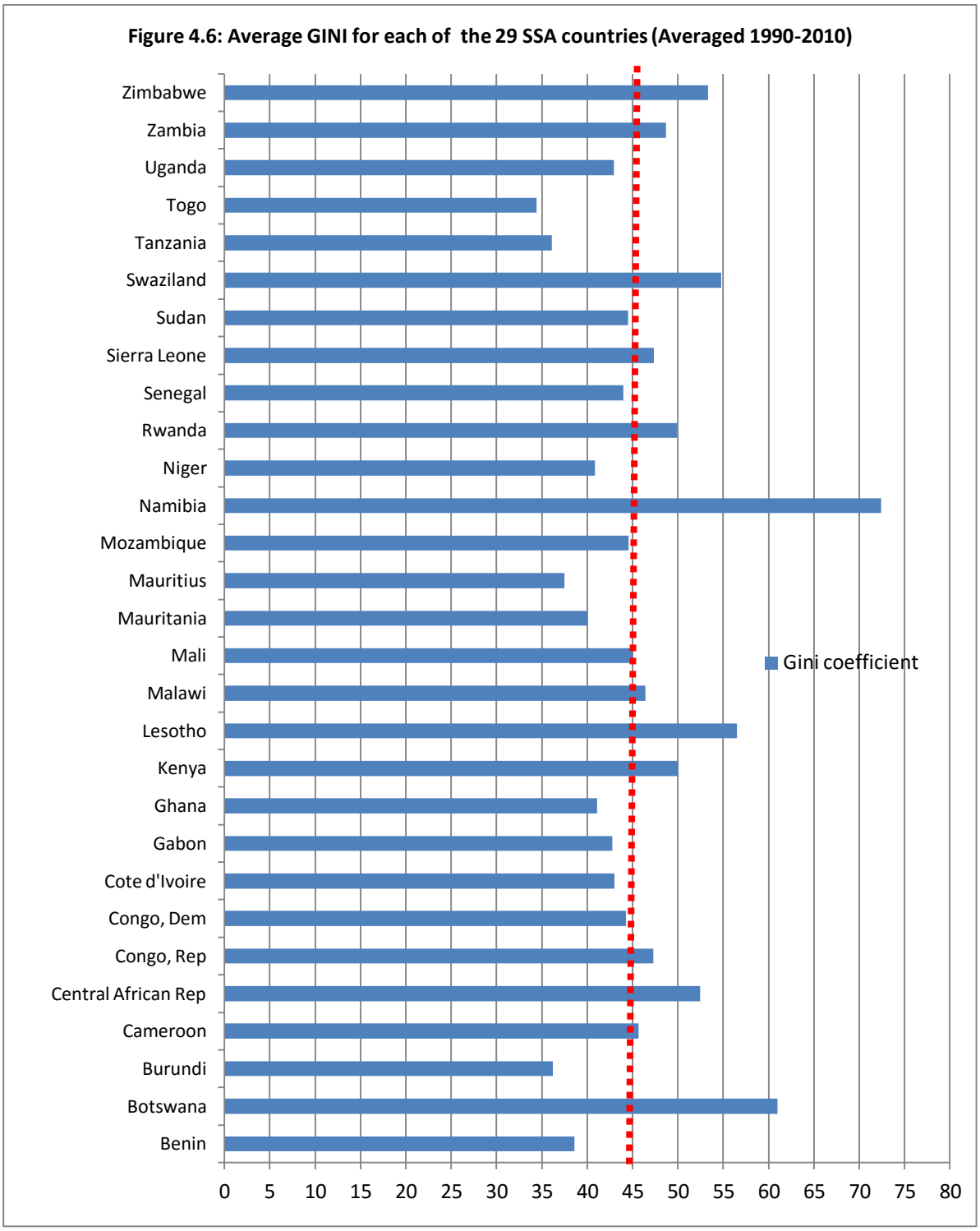
removed the variability in the annual series. This means that we are unable to capture the impact of changes in inequality on Human welfare in a manner that is comparable to our indicators of financial sector development. Nevertheless, our research is concerned with the effect of financial policies on living standards in societies that are highly unequal compared to those that are relatively more equal so we shall include an interaction term of financial sector development and the dummy of income inequality. Future studies will attempt to rectify this weakness by using annual data in GINI coefficient if and when data becomes available for our sample of SSA countries.

Figure 4.2 below shows the GINI coefficient for each State averaged from 1990 to 2010. We note however that due to a lack of continuous time series data on this variable over the twenty years, the number of observations used in our mean calculations varies considerably amongst the countries. The outcome of this exercise is shown in Figure 4.6 below.

This figure indicates that the Southern African economies which are persistently identified in the literature as being highly unequal have average GINI coefficients considerably in excess of the regional average of 45 percent. These include Zimbabwe, Swaziland, Lesotho, Botswana and Namibia. Income inequality in these countries is usually attributed to the colonial settlement patterns in SSA and land distribution between the local populations and the European settlers (Acemoglu *et al.,* 2001). Indeed, the afore mentioned countries all have large white populations which tend to be wealthier than the local populations because the white colonial settlers owned and operated large farmlands, mines and most of the industrial and financial sectors whereas most of the locals served as labourers or lived on subsistence agriculture in the country side. On the contrary, countries with lower income inequality like Tanzania, Togo and Benin have no white settler populations and also have lower endowments in natural resources.

Land and incomes are more evenly distributed in a country like Tanzania because of its history with socialism, especially with the 'Ojamaa village' settlement programmes based on the principles of socialism (Omari, 1974). It is also noteworthy that these more equal countries are less endowed in natural resources such as oil as we saw in Chapter Two. The abundant availability of natural resources is usually a source of inequality and conflict as the elites seek to expropriate the masses and provide very little redistribution of available resources (Collier, 2006).

Figure 4.7: Average GINI for each of the 29 SSA countries (Averaged 1990-2010)

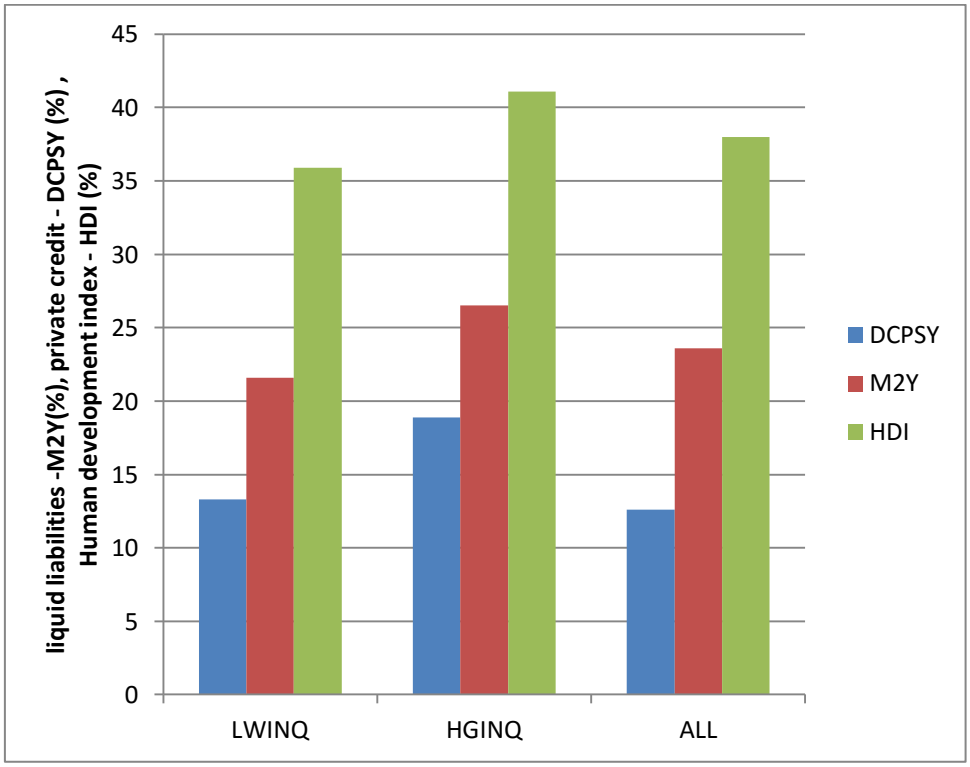


Source: World Bank World Development indicators, UNU WIDER and author's calculations

4.3. Human Welfare, Income inequality and Financial Sector Development

By using the estimated income inequality dummy, this study has categorized the data on financial development and human welfare into two categories; countries with higher income inequality (GINI>45) and those with lower income inequality (GINI<45). The mean for the financial development and human welfare variables are shown in Figure 4.7 below for the higher and lower income inequality economies, as well as for the overall sample of 29 countries.

Figure 4.8: Mean of financial sector development indicators and the HDI categorized by the average level of income inequality



LWINQ = low inequality; HGINQ = High inequality; All = all sample periods.
Source: World Bank World Development Indicators, UNU WIDER and authors calculations.

The figure above reveals an interesting relationship between the dependent variable, the human development index (HDI), and the two independent variables, that is, financial development (measured both by domestic credit to the private sector percentage GDP (DCPSY) and broad money as a share of GDP (M2Y)) and income inequality.

In SSA, lower income inequality tends to be associated both with a lower level of financial sector development (measured by DCPSY or M2Y) and lower human welfare

measured by the HDI. But when average income inequality is higher, there is a tendency also for average financial sector development and human welfare to be higher. That the quality of living standards appears to rise with higher income inequality in SSA is somewhat consistent with the Kuznets (1955) hypothesis. This states that in the early stages of economic development, higher welfare measured by GDP per capita is associated with higher income inequality because at the early stages of economic development, wealth tends to be concentrated into the hands of a few who possess productive capital such as land, education and savings. However, this theory does not say why financial development should also be higher in this circumstance. That is, it is not clear how the three variables should evolve together over time.

Recent theories by Demirguc-Kunt and Levine (2009) and Galor (2011) tend to suggest that it is important in the early stages of development for capital to be concentrated into the hands of a few because physical capital is more important than human capital. The few who hold most of the productive capital or the wealthy tend to have a higher capacity to save and improve subsequent production which is welfare enhancing. Thus, according to these theories, in the early stages of development, unequal countries in their distribution of incomes should enjoy higher levels of financial intermediation with associated improvement in the levels of human welfare than in more equal ones where wealth is diffused and savings capacity of the economies are low.

Therefore, because human capital (education) is less important for production at the early stages of the development process, human welfare should be lower in the more equal countries where productive capital is also scarce. Hence, in more equal developing countries, the scarcity of physical capital for production is more severe because savings are lower than in more unequal societies. Thus, production and human welfare should be much reduced. However, as the financial systems develop and reduce credit constraints, access to credit which enhances the productive capacity of the rich and poor alike, will lead to a tightening in the distribution of incomes and enhancement of overall human welfare. This is so because at the later stages of economic development, human capital (education) becomes more important than physical capital to the development process (Galor, 2011).

As we have indicated above, the wealthy in the more unequal societies have a higher capacity to deposit money as savings with banks and because these higher income inequality economies are more productive than the lower income inequality societies, there could be a tendency for more money to be in circulation for transaction purposes at comparatively lower

interest rates. The discussion of the statistics on this relationship will further be discussed in Chapter Six where we present our empirical results.

4.4: Chapter Summary

Our analysis of data thus far points to three crucial tendencies. The *first* is that for the 29 SSA countries selected, on average, the financial sector declined steadily from 1990 until year 2000 before rebounding to higher levels. *Secondly*, we find on average that human welfare whether measured using the UN Human Development Index or the under-five infant mortality rate has been steadily improving since 1990 for the 29 selected SSA countries. *Thirdly*, in SSA on average, when income inequality is higher, financial sector development and human welfare also tend to be higher and vice versa.

In the next chapter this study discusses the key characteristics of our empirical methodology including the econometric models, their limitations and techniques employed in resolving them. More specifically, we identify the control variables to be included in the information conditioning set and deal with issues relating to endogeneity, stationarity, cointegration and vector error correction modelling (VECM) amongst others.

CHAPTER FIVE

RESEARCH METHODOLOGY

This chapter purposes to elaborate on the major characteristics of the model and estimation techniques to be used in the empirical analysis subsequently. These include the conventional Vector Autoregressive co-integration analysis (co-integration VAR) and Error Correction Model (ECM). Past studies using similar variables to this study have used either cross-sectional or panel data and various estimation techniques including OLS and the generalized method of moments (GMM). They have been used to estimate models in which financial sector development is related to either income growth, income inequality or some other indicator of living standards like the dollar-a-day poverty measure or infant mortality as discussed in Chapter Three. These latter estimation techniques tend to rely on using differenced terms of variables in order to avoid the problem of spurious regressions caused by the existence of unit roots in most economic time series variables. Therefore, they cannot permit a joint analysis of short and long term relationships amongst the variables.

Only Loayza and Ranciere (2006) used an autoregressive distributed lag (ARDL) specification and the pool mean group (PMG) estimator to analyse in the same panel model, the long and short run relationships between financial development and income growth. However, this study uses panel co-integration and vector error correction model (VECM) which does not assume that all independent variables are exogenous like the ARDL to analyze the impact of financial development on human welfare conditional on the level of income inequality in our selected twenty-nine SSA countries from 1990-2010. In addition, the VECM also gives long-run and short-run marginal effects in one regression output.

The argument in this Chapter begins *first* by outlining the major characteristics of the parametric model specification which outlines the cointegration and error correction model to be used for subsequent empirical analysis. *Secondly,* it discusses the variables that are included in the models to be estimated. *Thirdly,* it reviews various tests related to performing VECM estimation. *Finally,* it reviews the econometric biases that could influence the results but which are usually corrected by the VECM model. We deal with each in turn.

5.1. Parametric Model Specification

The objective of this section is to specify the models that will be used for subsequent analysis. The models to be used for subsequent analysis are panel cointegration and vector error correction models which though containing similar variables, depart from those popularized by Beck *et al.* (2007), Go *et al.* (2007) and Singh and Huang (2015) in the previous Chapter in that, they allow us to obtain simultaneously, long run and short run relationships amongst our included variables. Also, because past levels of human welfare are likely to affect current levels, a vector autoregressive approach to modelling should be more apposite. Our variables have been modelled in the fashion of Costantini and Martini (2009). These latter researchers model GDP growth against energy consumption and energy prices for a sample of developed and developing countries in a multivariate and multi-sector panel cointegration and VECM. In our case, human welfare is a function of financial development, income inequality and a set of control variables.

To achieve its purpose here, the following section presents firstly, panel cointegration and panel Vector Error Correction Modelling and then discusses the expected signs of the included variables.

5.1.1. Panel Cointegration model: The long run equilibrium model

The finding that many macroeconomic time series exhibit a unit root process has led to the development of a theory of non-stationary time series (Green, 2006). According to Engle and Granger (1987) a linear combination of two or more non-stationary time series may be stationary. Thus, if such a stationary linear combination were to exist, the non-stationary time series will be said to be *co-integrated*. The *co-integrating equation* from this specification is the stationary linear combination and may be interpreted as a long-run equilibrium relationship among the series. According to Asteriou and Hall (2011), the purpose of the co-integration test is to establish whether a group of non-stationary time series variables are co-integrated.

For the purposes of this thesis, the theory on panel cointegration is not discussed but we refer readers to Breitung and Pesaran (2007) who have developed theories on the panel counterpart of single time series cointegration models popularised by Engle and Granger (1987), Johansen (1991, 1995) and Philips (1991). However, there are some advantages to using panel cointegration. *First*, it allows for heterogeneity between countries. *Secondly*, and according to Rapach and Wohar (2004), when testing the stationarity of the residual series in a level

regression, the number of observations available is substantially increased in a panel framework and this greatly increases the power of the panel cointegration tests.

The discussions here shall begin by presenting a panel bivariate model of our main dependent variable (human welfare (HDI)) and the independent variable (financial development (FD)). In this case, cointegration between the two variables will mean that error correction terms (ECTs) can be estimated as the residuals (ε_{it} and η_{it} respectively) from the following system equations:

$$HDI_{i,t} = \alpha_i + \beta_i FD_{it} + \varepsilon_{it}$$

$$FD_{i,t} = \alpha_i + \beta_i HDI_{it} + \eta_{it} \qquad (1)$$

If human welfare and financial development are cointegrated, then there exist one or more linear combinations for which the residuals are stationary. If such combinations do in fact exist, then the variables are cointegrated and ECTs can be calculated from the long run cointegrating equations.

For multivariate models with more than two variables for which there exist one or more cointegration relationships as in our specification below, ECTs are estimated for (ε_{it}, η_{it} ,ϕ_{it}, ω_{it} respectively) from the following four or more separate cointegrating equations:

$$HDI_{i,t} = \alpha_i + \beta_i FD_{it} + \gamma_i FD_{it} * INQ + \omega_i INQ + \lambda_i X_{it} + \varepsilon_{it}$$

$$FD_{i,t} = \alpha_i + \beta_i HDI_{it} + \gamma_i FD_{it} * INQ + \omega_i INQ + \lambda_i X_{it} + \eta_{it}$$

$$FD_{i,t} * INQ = \alpha_i + \beta_i HDI_{it} + \gamma_i FD_{it} + \omega_i INQ + \lambda_i X_{it} + \phi_{it} \qquad (2)$$

$$X_{i,t} = \alpha_i + \beta_i HDI_{it} + \gamma_i FD_{it} + \lambda_i FD_{it} * INQ + \omega_i INQ + \upsilon_{it}$$

These system equations are consistent with the suggestion of Brambor *et al.* (2006) on how to represent equations with interaction terms.

Where:

α_i is a common constant term for the entire group;

$HDI_{i,t}$ is an indicator of human welfare for country *i* at time *t*. We check the sensitivity of our model to an alternative definition of human welfare by replacing the human development index (HDI) with the under-five infant mortality rate (IMRU5).

$FD_{i,t}$ stands for a measure of financial sector development which for this study is approximated by the ratio of broad money to GDP (M2Y). Again, to investigate the robustness of our choice of financial sector development variable, we replace the ratio of broad money with domestic credit to the private sector percentage GDP (DCPSY).

INQ is an income inequality dummy which takes the value 1 for countries with average GINI > 45 and 0 for countries with average GINI < 45.

FD_{it} * ***INQ*** is created by multiplying the income inequality dummy ***(INQ_i)*** with any of our two indicators of financial sector development.

$X_{i,t}$ represents an N x 1 vector comprising the set of control variables which include the bilateral real exchange rate (RER), government consumption expenditure percentage GDP (GCY), Trade percentage GDP (TRDY), Official Development Assistance (ODA), Rural population (RPOP), and Institutions (PC2). A complete definition and the sources of these variables are found in Appendix II.

ε_{it}, η_{it}, ϕ_{it}, ω_{it} are stationary error terms with zero conditional mean and constant variances which fulfil the Gauss-Markov assumptions to obtain best linear unbiased estimators in regression analysis.

- β_i, γ_i, λ_i are parameter coefficients to be estimated.

In past studies, long-run equilibrium coefficients have been estimated by using single equation or system estimators. Single equation estimators include the dynamic OLS (DOLS) estimator developed by Saikkonen (1991), the fully modified OLS procedures (FMOLS)

popularised by Pedroni (2000), the pooled mean group estimator (PMG) promoted by Pesaran *et al*. (1999). Whereas, system estimators include panel VARs estimated with Generalized Method of Moments (GMM) or Quasi Maximum Likelihood. The literature suggests that single equation methods are based on stringent assumptions such as that there is homogeneity between cross section units for the long-run relationship whereas short-run dynamics are cross section specific (Breitung and Pesaran, 2005).

However, in this study, a system estimator in panel VARs, Johansen's Maximum Likelihood (MLE), is used for the estimation of the residuals which are incorporated into the panel VECM as the error correction terms (ECTs). This system estimator is applied repeatedly to as many single equations as there are variables in the VECM that are I(1) and cointegrated.

5.1.2. The Vector Error Correction Model: The short run model

A vector error correction model or VECM is a restricted vector autoregressive model (VAR) designed for use with nonstationary series that are known to be cointegrated. Cointegration relations are built into an ECM specification so that it restricts the long-run behaviour of the endogenous variables to converge to their cointegrating relationships while allowing for short-run adjustment dynamics when the stochastic environment is shocked. The cointegration term in the ECM is known as the error correction term since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments.

After setting up the long run model as in equations (2) above, the next step is to build a model with a dynamic error correction term in the fashion of Holtz-Eakin *et al*. (1988). This requires that the residuals from the long-run equation be incorporate into a panel VECM.

Usually, the GMM technique developed by Arellano and Bond (1991) can be adapted to estimate panel VARs, using lags of the endogenous variables as instruments in order to obtain unbiased and consistent estimates of the coefficients. However, EViews 8.0 uses a MLE estimator to estimate the error correction term from the long run regression which is then incorporated into the panel VECM.

In practice, for a panel of M countries covering T years, bivariate vector auto-regressions (VARs) with fixed effects can take the following form:

$$HDI_{i,t} = \sum_{j=1}^{m} \alpha_{i,j}^{hdi} HDI_{i,t-j} + \sum_{j=1}^{m} \gamma_{i,j}^{hdi} FD_{i,t-j} + \eta_i^{hdi} + \phi_i^{hdi} + u_{i,t}$$

$$FD_{i,t} = \sum_{j=1}^{m} \alpha_{i,j}^{fd} FD_{i,t-j} + \sum_{j=1}^{m} \gamma_{i,j}^{fd} HDI_{i,t-j} + \eta_i^{fd} + \phi_i^{fd} + v_{i,t} \quad (3)$$

where $HDI_{i,t}$ and $FD_{i,t}$ are two cointegrated variables as described above for country i at time t; $\eta_i^{hdi,fd}$ and $\phi_i^{hdi,fd}$ are individual fixed and time effects for the i^{th} panel member and $u_{i,t}$ and $v_{i,t}$ are random disturbances which satisfy the Gauss-Markov assumptions.

The way in which model (3) has been specified as a set of equations has the implication that the error terms are orthogonal to both the fixed and time effects and the lagged values of the endogenous variables. In addition, the lagged dependent variables are correlated both with the error terms and the fixed effects. As such, estimates of the above model using OLS will be biased. This is usually resolved by removing the fixed effects through differencing. The model from differencing will be as follows:

$$\Delta HDI_{i,t} = \sum_{j=1}^{m} \alpha_{i,j}^{hdi} \Delta HDI_{i,t-j} + \sum_{j=1}^{m} \gamma_{i,j}^{hdi} \Delta FD_{i,t-j} + \Delta u_{i,t}$$

$$\Delta FD_{i,t} = \sum_{j=1}^{m} \alpha_{i,j}^{fd} \Delta HDI_{i,t-j} + \sum_{j=1}^{m} \gamma_{i,j}^{fd} \Delta FD_{i,t-j} + \Delta v_{i,t} \quad (4)$$

Unfortunately, differencing creates a simultaneity problem in that the differenced error term would be correlated with the lagged endogenous variables on the right-hand side. Also, because heterogeneous errors might be present for the different panel members, heteroskedasticity can be expected. These kinds of problems are usually resolved by using an instrumental variable procedure which employs predetermined lags of the system variables as instruments in a GMM setting in order to produce consistent estimates of the parameters as suggested by Arellano and Bond (1991). However, Johansen's ML approach enables us to achieve better results in which the ECTs are directly integrated into the short run ECM.

In effect, a final bivariate dynamic error correction model could be specified thus:

$$\Delta HDI_{i,t} = \alpha_i^{hdi} + \beta_i^{hdi} ECT_{i,t-1}^{hdi} + \sum_{j=1}^{m} \delta_{i,j}^{hdi} \Delta HDI_{i,t-j} + \sum_{j=1}^{m} \gamma_{i,j}^{hdi} \Delta FD_{i,t-j} + u_{i,t}$$

$$\Delta FD_{i,t} = \alpha_i^{hdi} + \beta_i^{fd} ECT_{i,t-1}^{fd} + \sum_{j=1}^{m} \delta_{i,j}^{fd} \Delta HDI_{i,t-j} + \sum_{j=1}^{m} \gamma_{i,j}^{fd} \Delta FD_{i,t-j} + v_{i,t} \quad (5)$$

where, $ECT_{i,t-1}^{hdi,fd}$ are the lagged residuals derived from the long-run cointegrating relationship in equation (2), $\delta_{i,j}^{hdi,fd}$ and $\gamma_{i,j}^{hdi,fd}$ are the short-run adjustment coefficients and $\mu i,t$ and vi,t are disturbance terms assumed to be uncorrelated with mean zero. In these models, the optimal lag length for the two variables (m) is chosen by selecting the lag length that minimizes the Schwarz Bayesian Criteria (SBC) for the different VECM models.

If we consider a third variable like the interaction term between financial development and income inequality (FD_{it} * INQ) and related to human welfare in a multivariate context is added to the above bivariate model, we obtain a panel VECM as follows:

$$\Delta HDI_{i,t} = \alpha_i^{hdi} + \beta_i^{hdi} ECT_{i,t-1}^{hdi} + \sum_{j=1}^{m} \delta_{i,j}^{hdi} \Delta HDI_{i,t-j} + \sum_{j=1}^{m} \gamma_{i,j}^{hdi} \Delta FD_{i,t-j} + \sum_{j=1}^{m} \lambda_{i,j}^{hdi} \Delta (FD * INQ)_{i,t-j} + u_{i,t}$$

$$\Delta FD_{i,t} = \alpha_i^{fd} + \beta_i^{fd} ECT_{i,t-1}^{fd} + \sum_{j=1}^{m} \delta_{i,j}^{fd} \Delta HDI_{i,t-j} + \sum_{j=1}^{m} \gamma_{i,j}^{fd} \Delta FD_{i,t-j} + \sum_{j=1}^{m} \lambda_{i,j}^{fd} \Delta (FD * INQ)_{i,t-j} + v_{i,t} \quad (6)$$

$$\Delta FD * INQ_{i,t} = \alpha_i^{fdq} + \beta_i^{fdq} ECT_{i,t-1}^{fdq} + \sum_{j=1}^{m} \delta_{i,j}^{fdq} \Delta HDI_{i,t-j} + \sum_{j=1}^{m} \gamma_{i,j}^{fdq} \Delta FD_{i,t-j} + \sum_{j=1}^{m} \lambda_{i,j}^{fdq} \Delta (FD * INQ)_{i,t-j} + \eta_{i,t}$$

The above three variables model can be extended to include all other selected independent and control variables such as seen in (7) below for which just one of the system equations has been represented for brevity:

$$\Delta HDI_{i,t} = \alpha_i^{hdi} + \beta_i^{hdi} ECT_{i,t-1}^{hdi} + \sum_{j=1}^{m} \delta_{i,j}^{hdi} \Delta HDI_{i,t-j} + \sum_{j=1}^{m} \gamma_{i,j}^{hdi} \Delta FD_{i,t-j} + \sum_{j=1}^{m} \lambda_{i,j}^{hdi} \Delta (FD * INQ)_{i,t-j} + \psi^{hdi} INQ_i + \sum_{j=1}^{m} \theta_{i,t-j}^{hdi} \Delta X_{i,t-j} + u_{i,t}$$

(7)

All variables are as described above, $\theta_{i,t-j}^{hdi}$ are parameters to be estimated for all the included control variables. In practice, the number of cointegrating equations in the system will depend on the number of endogenous variables included. EViews 8.0 performs a VECM analysis which combines system equations (2) and the system represented by equation (7) using Johansen (1991)'s ML method for Panel data. Johansen's method also permits for more than two variables in the cointegrating relationship. In addition, it facilitates the estimation of systems where restrictions on cointegrating relations can be tested and the possibilities of short-run adjustments can be investigated concurrently (see, among others, Stern, 2000; Asafu-Adjaye, 2000; Oh and Lee, 2004).

5.2. The included variables

This sub-section discusses our dependent, independent and control variables as included in the equations above and re-specifies the hypothesis that had been developed in Chapter three for the independent variables. It also states hypotheses for the control variables. First, the dependent and independent variables shall be discussed before discussions of the control variables in a final section.

5.2.1. The dependent variable: Human welfare

For the sake of brevity we refer readers to section 3.1.1 where the literature on the human welfare variable is discussed as well as in section 4.2.1 where its construction and description were treated. However, as has been suggested by Sen (1999), and Akire and Foster (2011), welfare indicators such as the HDI which include non-monetary indicators of welfare are normally preferred because they capture the hardship faced by the poor better than monetary indicators like the dollar-a-day poverty measure used in past studies like Honohan (2004a), Beck *et al.* (2007), Singh and Huang (2015). Though the former authors suggest that one-dimensional indicators are not adequate measures of human welfare, these latter authors reported that financial development is crucial for poverty reduction using the dollar-a-day measure. However, the main dependent variable for this study shall be the HDI and we shall check its robustness as a measure of human welfare by substituting it with the under-five infant mortality rate variable

which has also been used by past authors including amongst others Go *et al.* (2007), Claessens and Feijen (2007).

5.2.2. The Independent variables: Financial development and income inequality

For the sake of brevity, we do not discuss the independent variables, financial development and income inequality here. They have already been extensively discussed in sections 3.1.2 and 3.1.3 of Chapter Three and Sections 4.2.2 and 4.2.3 of Chapter Four. The hypotheses linking these independent variables and the dependent variable (human welfare) have also been extensively discussed in Chapter Three. We refer readers to these sections of the thesis. However, we restate and summarize the discussions relating to the interaction term between financial development and income inequality. These hypotheses are fundamental for this study.

Interaction between financial development and income inequality: This study also uses the dynamic nature of the financial development variable to test a long and short run relationship between financial development and human welfare conditional on the level of income inequality. This in fact, is the key hypothesis of this study and is presented here as in Chapter Three section 3.3.

The long run relationship:

H_0: The interaction between income inequality and financial sector development has a significant positive long run effect on human welfare in SSA, because income inequality is high and SSA is at an early stage of development.

H_1: The interaction between income inequality and financial sector development has no significant positive long run effect on human welfare in SSA, because income inequality is high and SSA is at an early stage of development.

This long-run conjecture is captured by the multiplicative interaction term $(FD_{it} * INQ_i)$. It is well established in literature that the intuition behind such conditional hypothesis is captured by multiplicative interaction terms (Friedrich, 1982; Aiken and West, 1991, Brambor *et al.*, 2006). We adopt that approach in this analysis. According to one strand of theory, financial development enhances living standards by boosting economic growth and tightening the

distribution of incomes. It follows that improvements in financial systems reduces credit market frictions and enhances investment opportunities for all in the long run (Beck *et al.*, 2007; Levine, 2007; Demirguc-Kunt and Levine, 2009; and Galor, 2011).

As such, where income inequality is high, access to finance will have a more than proportionate impact on welfare than if such development occurs where income inequality is low. This is so because the distributional effects of financial development which is one avenue through which it reduces poverty or enhances welfare should be higher where incomes are more unequal. Beck *et al.* (2010b) and Levine *et al.* (2012) have demonstrated this in studies of bank branching deregulation in the US where the policy for local banks to do business in other states led to a decline in the income gap between black males and their white counterparts even though they do not use an interaction term. This kind of financial development which reduces credit market frictions and benefits both the poor and rich alike should be good for human wellbeing especially where income inequality is high.

The Short run relationship:

H_0: The interaction between income inequality and financial sector development has a significant negative short-run effect on human welfare in SSA, because of short run volatility in credit markets and the fact that investments of the rich might yield their effects only in the long run.

H_1: The interaction between income inequality and financial sector development has no significant negative short-run effect on human welfare in SSA, because of short run volatility in credit markets and the fact that investments of the rich might yield their effects only in the long run.

According to Greenwood and Jovanovic (1990) and Claessens and Perotti (2007), in the early stages of economic development, financial sector development would widen income inequality since entrenched insiders can set up blocking laws to appropriate all benefits of financial development at least in the short run. Such indicates that improvements in financial systems development should have a negative effect on overall human welfare in economies where income is highly unequally distributed at least in the short run. In fact, Ozer and Sen (2009) find that the correlation between financial development and growth is weaker where income inequality is greater, even though they do not show that income inequality off-sets the

impact of financial development on growth and whether the human welfare implications are better or worse.

5.2.3. The Control variables

The purpose of this section is to discuss the possible signs and significance of some other variables which have been suggested in the literature (Chapter Two and Three) apart from financial sector development and income inequality to be important determinants of human welfare in developing countries, especially SSA countries. They include GDP per capita growth, the real exchange rate, inflation, the ratio of trade to GDP, government consumption expenditure, size or growth of population, overseas development assistance, remittances, exchange rates and the quality of institutions amongst others (Claessens and Feijen, 2006, 2007; Beck *et al.,* 2007, Go *et al.*, 2007; Rousseau and Wachtel, 2011) .

However, these suggested variables have not all been included in our model because that would have considerably affected the degrees of freedom and efficiency of the estimated parameters. In any case, we have used the Pearson pair-wise correlation and unit root tests discussed subsequently in this chapter to eliminate variables that are close correlates and not stationary at first difference. For example, income is part of the HDI index and as such GDP per capita could not be included as a variable. Also, some variables were selected specifically because they were used as control variables by Claessens and Feijen (2007) who study the effect of financial development on some measures of human welfare including under-five infant mortality, schooling and life expectancy.

The selected set of control variables have thus been grouped into four categories. They are: (i) macroeconomic policy variables, (ii) international openness, (iii) institutions, and (iv) demography. Results in Table 5.6 below which will also be discussed subsequently show that all of these variables are integrated to the first order except rural population which appears stationary at level (I(0)). These categories of control variables will be discussed in turn.

Macroeconomic policy

Whereas there are many macroeconomic policy variables which could have been considered for this analysis and included in our correlation and unit root tests in the appendix, we have selected the bilateral real exchange rate and government consumption expenditure to control for the effectiveness of government economic policy management as these have been frequently used by previous researchers in this area as discussed in Chapter Three. We thus discuss in turn the expected relationship between the index of human welfare and the bilateral real exchange rate (RER) and government consumption expenditure in the following paragraphs.

(i) Bilateral Real exchange rate (RER): In section 4.1.3 the construction of a bilateral real exchange rate index to be used as a control variable in this study was discussed. The real exchange rate has many definitions amongst which are that, it is the relative price of tradables to non-tradables in the economy. However, since it is difficult to know what prices, especially of non-tradables are, other measures that compare domestic prices with foreign prices are usually preferred (Rodrik, 2008). In our case, we compared domestic prices of the selected SSA countries with those of the United States consistent with Du, Wei and Xie (2013). The real exchange rate according to Rodrik (2008) captures more than macroeconomic stability because he found just like Levy-Yeyati and Sturzenegger (2007) that it plays a more fundamental role in the convergence of incomes of developing countries to those of developed countries.

Also, it captures the consequences of foreign exchange misalignment or overvaluation arising from poor macroeconomic policy management which have been reported to have undesirable effects on growth and welfare. As noted by Prasad *et al.*, (2006) and Elbadawi *et al.* (2011), an increase in the real exchange rate variable (overvaluation) causes Dutch disease in developing countries with a negative effect on the tradable goods sector upon which the poor depend. Again, most of these tradable goods are raw materials in the case of SSA; inability to enhance their production and exportation will have a negative effect on growth and welfare. This is so because it is the primary source of foreign currency, government revenue and foreign direct investment.

Contrastingly, Rodrik (2008) has found that real exchange rate undervaluation is good for growth in developing countries because undervaluation increases the rate of return on capital employed, in the production of tradable goods, by an amount that outweighs the multiplicity of institutional problems that tend to plague the tradable goods sector of these economies. However,

it is not clear if this growth would be welfare enhancing since undervaluation has both benefits and costs which may be harmful for overall human welfare. For example, undervaluation might lead to massive inflow of capital, raising reserves and inflation which have negative consequences on welfare if governments fail to adequately sterilize massive capital inflows (Levy-Yeyati and Sturzenegger (2007). Furthermore, we cannot assert *a priori* whether exchange rates for the selected countries have been undervalued or overvalued. We may therefore hypothesize that the effect of real exchange rate on human welfare could not be determined a priori. This means that the sign on the coefficient $\theta_{i,t-j}^{hdi}$ when X is RER in equation (7) may be greater than or less than zero. That is $\theta_{i,t-j}^{hdi}$ > or < 0 when X is RER.

(ii) Government consumption expenditure (GCY): This is a measure of total government consumption expenditure as a share of GDP. Its impact on the economy and welfare tends to indicate how effectively governments are putting to use taxpayers' money (Barro, 1997). Barro (1991, 1997) found that government consumption expenditure as a percentage of GDP is negatively correlated with economic growth and living standards therefrom because as he posits, the higher taxes needed to finance government consumption, lower the return on investment and reduce incentives to invest. Also, government expenditures could be skewed in favour of some ethnic groups even though where those resources are directed may not necessarily be optimal for economic growth (Easterly and Levine, 1997).

Furthermore, higher government expenditures may promote corruption and other ills that could undermine economic stability, productivity and consequently social welfare. Devarajan *et al.* (1996) reported that it is government capital expenditure in developing countries that is negatively correlated with growth, whereas, current expenditures tend to have a positive and statistically significant effect on growth. Also, Wu *et al.* (2010) find that government expenditure does not Granger cause growth in low-income countries but it does so in high income countries. However, Gomanee *et al.* (2005) have argued that government expenditures directed towards welfare programmes like free primary education, the provision of low cost health services and medication for the treatment of certain diseases have contributed to the enhancement of welfare in developing countries. Thus, we expect the outcome to be ambiguous because it all seems to depend on where governments are spending tax income and the level of development of the countries concerned. We expect $\theta_{i,t-j}^{hdi}$ ***> 0, or < 0*** when X is GCY in equation (7).

International Openness

We have selected two variables to control for international openness; trade as a percent of GDP to measure trade flows and foreign Aid (ODAY) to measure financial flows into SSA which have been said to be important factors recently for income growth in SSA (Ghazanchyan and Stotsky (2013).

(i) Trade as a percent of GDP: We measure international openness using data on trade as share of GDP (TRDY) obtained from the World Bank WDI (2011). It is the sum of imports and exports of a country divided by its GDP for the same year. It is suggested that openness measured by the volume of trade or exchange of goods and services between a country and foreign nations is an important factor for economic growth and development (Grossman and Helpman, 1990; Bhagwati and Srinivasan, 2003). In fact, Bhagwati and Srinivasan (2003) call it the engine of economic growth. Thus, by this conjecture, the more open a country is to foreign trade, the more likely it is to grow faster and enhance the welfare of its people.

This is thought to be so because trade is said to favour international division of labour and specialization which are efficiency enhancing and growth enabling. Then too, imports could increase the supply of goods and services in the economy, leading to a reduction in the rate of inflation and interest rates. To the extent that such lower prices are passed on to the poor and lower interest rates lead to an increase in credit extended to the poor, it will raise their standard of living. Moreover, an increase in the importation of capital goods and machinery will lead to an enhancement in productivity and volume of output.

However, openness to international trade could lower living standards if foreign imports displace domestic producers causing problems such as joblessness and civil strife. In Chapter Two, we noted that SSA was more open than most other developing continents in the 1990 – 2010 window but the outcome of trade on welfare here would entirely depend on whether the gains from exporting primary commodities outweighs the cost of importing manufactured goods. For example, the trade variable has been used in some studies on SSA including Rodrik (1997) and Bruckner and Lederman (2012) with controversial results. Rodrik (1997) finds a negative relationship between trade and growth in SSA and asserts that trade is rather an auxiliary for growth and trade policies tend to drain much needed resources away from much needed human

capital and infrastructural development. On the other hand, Bruckner and Lederman (2012) found trade to be good for growth and welfare since it increases the size of the pie. We expect an ambiguous relationship in this study. That is, $\theta_{i,t-j}^{hdi}$> or < 0 when X is TRDY in equation (7).

(ii) Foreign Aid (ODAY): Despite the controversies[5] about the effectiveness of Foreign Aid or Overseas Development Assistance as a percentage of GDP (ODAY) in promoting economic growth and reducing poverty in SSA during the last several decades, it must be remarked that few studies relating to human welfare conditions in SSA can candidly be conducted without including the role of foreign Aid. Particularly in our case, the selected period for our study (1990 – 2010) corresponds to a period during which the international community pledged to increase the quantity of foreign Aid to SSA through declarations like the United Nations Millennium Development Goals (MDGs), the Gleneagles G8 summit and other avenues as discussed in Chapter Two.

Gomanee *et al.* (2005) who have studied the direct relationship between foreign aid and human welfare using the human development index (HDI) suggests that though foreign aid might not have contributed to economic growth in the last two decades, it significantly enhanced living standards in SSA by its positive and significant effect on the other components of the HDI – health and education, and its enhancement of investments in capital goods. That is, even though SSA did not grow in the 1990s, the other facets of the HDI - education and healthcare, did considerably improve during this period as confirmed by our analyses in Chapter Two. Thus, while the contribution of foreign aid to economic growth might have been insignificant, and inconsequential to the quality of human welfare in SSA as some have suggested (Easterly, 2001, 2006; Collier, 2007; Deaton, 2013), it is very likely that it has contributed at least to improving education and healthcare outcomes which are sectors where foreign Aid usually targets (Deaton, 2013). Thus, like Gomanee *et al*. (2005) who find a positive relationship between Aid and the HDI this study expects a positive long run relationship between foreign aid and human welfare. That is $\theta_{i,t-j}^{hdi} > 0$ when X is ODAY in equation (7).

[5] Authors like Easterly (2001, 2006), Collier (1999, 2003, 2007) have argued against Aid effectiveness, suggesting that it has a negative effect on growth because it caused problems such as the Dutch disease or exchange rate misalignment and sustained capital flight, instability and conflict which are amongst some of the culprits identified by these authors to be responsible for the woes of SSA countries in the last three decades. However, some authors including Dollar and Kraay (2002) and Gomanee *et al.* (2005) suggest that Aid is good for growth and welfare as it contributes to enhance investments in both capital goods and human capital through education and healthcare.

Institutional quality (PCI2)

North (1990) defines institutions as "the rules or constraints on individual behaviour" which could be formal (political constitutions, democratic rules, executive power) or informal (societal norms, culture, religion). Greif (2006) extends this definition to include all forms of economic organizations as well as the set of beliefs that shapes the interactions between economic agents. The quality of institutions tends to play a very important role in the growth process and human welfare (Engerman and Sokoloff, 2000; Rodrik 2008).

Measured in terms of political instability (number of revolutions and coups), ethnic fractionalization (diversity in ethnic groupings), quality of government and number of conflicts, poor institutions tend to scare away investments and disrupt capital accumulation and production, all of which negatively affect growth and welfare (Barro, 1991; Easterly and Levine, 1997). Then too, Collier (2007) noted that conflicts have been responsible for dismal growth and acute poverty in many SSA countries in the last two decades since they lead to the destruction of human and social capital necessary to enhance productivity and consequently human welfare.

Even though this study does not use any databases containing variables such as conflicts, political instability and ethnic fractionalization since 1990, and which have been used by some of the authors cited above, we control for institutional quality and most especially for the level of democratization using a composite measure of the Freedom House indices of *civil liberties* and *political rights*. This composite measure was determined by principal Component Analysis (PCA) in section 4.1.3 of Chapter Four. The measures of *civil liberties* and *political rights* have also been used separately by Levy-Yeyati and Stuzenegger (2003) and Mulligan *et al.* (2004).

It measures the level of democratic freedom on a scale of 1 to 7; with 1 (most politically free) and 7 (least politically free). Most SSA countries usually fall above 4 as we saw in Chapter Two implying that they should be less politically free and prone to political instability which should have a negative effect on the welfare of their citizens. Mulligan *et al.* (*op. cit.*) use the measure of civil liberties and find that democracy does not affect growth since it is not correlated with measures such as education spending, pensions and welfare, whereas Levy-Yeyati and Stuzenegger (2003) find a negative correlation with growth since democratic and other societal weaknesses discourage investment. We therefore expect the sign on the parameter coefficient $\theta_{i,t-j}^{hdi}$ to be negative. That is: $\theta_{i,t-j}^{hdi} < 0$ when X is PCI2 in system equation (7)**.**

Demography

To take account of the demography, the variable rural population (RPOP) which is the share of the population that lives in rural areas in the countries considered for this study was used to capture the hardship of the poor. It was chosen because there is sufficient evidence in Pinkovskiy and Sala-i-Martin (2010), Chen and Ravallion (2010) that there is a rural-urban differential in poverty rates and infant mortality, with more poverty in the rural areas in SSA. It was used by Claessens and Feijen (2007) rather than the growth of population as used in Beck *et al.* (2007) or the total size of population as in Go *et al.* (2007), who used a mixed sample of developed and developing countries. Claessens and Feijen (2007) use this variable as a conditioning series in their analysis of the relationship between financial development and hunger.

We postulate that an increase in the share of population that lives in rural areas will be related to a fall in the living standards for the country as a whole. Rural areas in SSA lack the basic necessities of life like potable drinking water, schools, hospitals, electricity, and roads which all contribute to the quality of life. It is more difficult for populations in the rural areas to have access to appropriate medical care owing to absence of hospitals in villages and bad roads linking the villages and the towns where hospital facilities exist. Also, farm produce in the rural areas can hardly reach markets in the cities owing to bad roads as discussed in Chapter Two. Therefore, populations in rural areas suffer loss of income with the absence of facilities to conserve perishable foodstuffs. This means that the expected sign for the parameter coefficient $\theta_{i,t-j}^{hdi}$ should be negative. That is $\theta_{i,t-j}^{hdi} < 0$ when X is RPOP in equation (7).

All things being equal, we expect the signs hypothesized for the variables discussed above in our regression output. Nonetheless, because the relationship between financial development and measures of welfare may be driven by reverse causation as a wealthier population may demand more financial services, our parameters may be exaggerated. Also, since the error term may be correlated with the independent and control variables or with some other missing but important variables that have an impact on welfare, our model may be misspecified. These issues mean that this study may have to deal with the eternal problem of endogeneity. Hence, after discussing the usual tests related to performing a VECM analysis, the problem of endogeneity and other possible econometric biases shall be discussed subsequently and together with some corrective measures that have been taken in this study.

5.3. Tests related to performing VECM analysis

The objective of this section is to present the different tests necessary to perform an acceptable VECM analysis. However, in order to decide whether variables should enter our models as raw data or log-linear, and which of the different variables will be included as exogenous or endogenous, tests for non-nested models and a Hausman-type test for endogeneity shall be performed. In effect, this section shall deal with (i) non-nested models and Hausman test of exogeneity (ii) Stationarity and tests of unit roots (iii) Johansen Cointegration VAR methodology, (iv) Tests for causality and (v) Executing the VECM.

5.3.1 Non Nested Models and Hausman test of exogeneity

This section presents in turn, tests for non-nested models and the Hausman test of exogeneity. Samples of these tests are presented in Appendix III Table 5.1 and 5.2.

Non Nested models: In order to decide whether to use the variables in their raw form or to use them as log-linear variables, Green (2006, p.137) was followed by running non-nested models. This consisted firstly, in the running of a regression of the raw variables with HDI as the dependent variable. The predicted value for HDI was then saved and subsequently used as an additional variable in a log-linear specification with the log of HDI ($LNHDI_{it}$) as the dependent variable.

The model could be represented thus:

$$\mathrm{LNHDI}_{i,t} = C_i + LM2Y_{it} + \mathrm{INQLM2Y}_{it} + \mathrm{LRER}_{it} + \mathrm{LTRDY}_{it} + \mathrm{LGCY}_{it} + \mathrm{LODAY}_{it} + \mathrm{PCI2}_{it} + \mathrm{LRPOP}_{it} + \mathrm{DUMINQ}_{it} + \mathrm{HDI\_FIT}_{it} \quad (8)$$

It was found that the predicted HDI was not significant in the $LNHDI_{it}$ regression.

Secondly, we collected the predicted $LNHDI_{it}$ from a linear regression of all included variables and then ran a subsequent regression pitting the HDI against the raw variables plus the predicted $LNHDI_{it}$ as an independent variable. We found that the predicted $LNHDI_{it}$ was

significant in the regression where all the variables were raw. The decision is that the log-linear model is the most apposite for our analysis in addition to the other benefits like facilitating interpretation through proportional effects.

Hausman test of exogeneity: In order to determine which variables are likely to be endogenous, we performed a Hausman type test of exogeneity. Such requires running several regressions by interchanging and making each variable in the system a dependent variable against the other variables and internal instruments which were created by taking lags of the different variables. Also, the residuals for each of the dependent variables were collected to be used for subsequent analysis.

For example, the specification for the LM2Y regression is such that:

$$\begin{aligned}\mathrm{LM2Y}_{i,t} = C_i + LNDHI_{it} + \mathrm{LRER}_{it} + \mathrm{LTRDY}_{it} + \mathrm{LGCY}_{it} + \mathrm{LODAY}_{it} + \mathrm{PCI2}_{it} + \mathrm{LRPOP}_{it} \\ + \mathrm{DUMINQ}_{it} + \mathrm{LNHDI}(-1)_{it} + \mathrm{LRER}\,(-1)_{it} + \mathrm{LTRDY}\,(-1)_{it} + \mathrm{LGCY}\,(-1)_{it} \\ + \mathrm{LODAY}\,(-1)_{it} + \mathrm{PCI2}\,(-1)_{it} + LRPOP(-1)_{it}\end{aligned} \tag{9}$$

Subsequently, using LNHDI as the dependent variable, a new OLS regression in which the independent variables and their various residuals were included was performed. The model that was analysed is as follows:

$$\begin{aligned}\mathrm{LNHDI}_{i,t} = C_i + LM2Y_{it} + \mathrm{INQLM2Y}_{it} + \mathrm{LRER}_{it} + \mathrm{LTRDY}_{it} + \mathrm{LGCY}_{it} + \mathrm{LODAY}_{it} + \mathrm{PCI2}_{it} \\ + \mathrm{LRPOP}_{it} + \mathrm{DUMINQ}_{it} + \mathrm{RES\_LM2Y}_{it} + \mathrm{RES\_LRER}_{it} + \mathrm{RES\_LTRDY}_{it} \\ + \mathrm{RES\_LODAY}_{it} + \mathrm{RES\_LGCY}_{it} + \mathrm{RES\_PCI2}_{it} + \mathrm{RES\_LRPOP}_{it}\end{aligned} \tag{10}$$

The test for endogeneity is based on the p-values of the coefficients of the residuals in the new regression of $LNHDI_{it}$ as above. The decision is that any variable whose residual is significant in the $LNHDI_{it}$ regression is considered an endogenous variable for the Johansen cointegration analysis in Chapter Six. Except for the dummy variable which is usually classified as exogenous (Asteriou and Hall, 2011), we found that all the other selected variables can be considered as endogenous since their residuals were all significant at 5 percent. However, we suspect that the variable that measures institutional quality ($PCI2_{it}$) should be exogenous since

its components were simply created by ranking and it is unlikely that these variables would have been coherently related to the other variables in the model for analysis.

5.3.2. Stationarity and test of unit roots

Time series data $\{y_{it}\}_{t=1}^{T}$ is non-stationary if its autocorrelation coefficient (ρ, $y_{it} = \rho_i \cdot y_{i,t-1} + u_{it}$) is one, that is, this series explodes as time progresses and has no finite variance. If this is the case, we say that this series has a unit root ($\rho = 1$), or that y_{it} is integrated of order one, $y_{it} \sim I(1)$, which means that for the series y_{it} to be stationary it has to be differenced once.

To study the co-integrating relationship between the human development index and our financial sector development variables, adjusted for income inequality in a VAR specification, we need to show that our selected variables are nonstationary at level but that they are stationary at first difference.

Panel unit root tests: We perform unit root tests of the variables to be included in our subsequent models to find out if they are stationary in their levels, first or second difference values. According to Greene (2006, p.741) citing Granger and Newbold (1974), the importance of a unit root test emerges from the fact that three possible misspecification biases can arise in a regression model with non-stationary time series. *Firstly*, non-stationarity can influence the behaviour and properties of a series since shocks will tend to be persistent and infinite for a non-stationary series. *Secondly*, non-stationarity could lead to spurious regressions. That is, if two economic series are trending over time, a regression of one on the other could produce a high R^2 even if the variables concerned are in fact independent. *Thirdly*, if the series are non-stationary, it has been demonstrated that the standard assumptions of asymptotic normality implied in the linear regression model do not hold (Green, 2006). This means that, the estimated t-ratios will not follow a standard t-distribution and no valid inferences or hypothesis tests can be undertaken about the regression parameters.

Whereas the Dickey-Fuller tests for unit root dominate the testing for unit root in time series, other tests have been designed to test for unit roots in panel data. They include the Levin, Lin and Chu (2002) LLC test, the Im, Pesaran and Shin (2003) IPS tests, Fisher-type tests like the Augmented Dickey Fuller (ADF) and Philip Perron (PP) tests suggested by Maddala and Wu (1999). The basic autoregressive model can be specified as follows:

$$y_{it} = \rho_i y_{i,t-1} + \delta_i X_{it} + \varepsilon_{it} \qquad (11)$$

Where i=1, 2, …, M stands for countries observed over periods t=1, 2, …, T, X_{it} are exogenous variables in the model including any fixed effects or individual trend, ρ_i are the autoregressive coefficients, and $\varepsilon_{it}$is a stationary process. If ρ_i<1, y_i is said to be weakly trend-stationary, whereas if ρ_i =1, then y_i is said to have a unit root. LLC tests assume that the ε_{it} are IID (0, σ_ε^2) and ρ_i =ρ for all i. This implies that the individual processes are cross-section independent and that the coefficient of $y_{i,t-1}$ is homogeneous across all cross-section units of the panel.

We compute the Levin, Lin and Chu (2002) unit root test which assume a common unit root process for the selected cross section units. Then too, we test the robustness of our unit root test by employing the Augmented Dickey Fuller and Philip and Perron tests which assume different unit root processes for each of our 29 countries. For each method, we test for three cases. They involve testing the null hypothesis of the presence of a unit root against (i) a stationary AR(1) without intercept and trend, (ii) a stationary AR(1) with intercept and no trend and (iii) stationary AR(1) with intercept and trend. In addition to averaging our data to eliminate the effect of business cycles as in section 4.1, we have also log-transformed our variables to ensure that they are monotonic and that the distribution of the variables are similar. For the purposes of this thesis, we use EViews version 8 to test for unit root in our selected pooled panel series. In performing the unit root test, we bear in mind that most economic and financial series are integrated of order one (I(1)) (Asteriou and Hall, 2011; Juselius, 2006, 2012).

With the exception of the rural population variable (LRPOP) which is stationary at level, all the core series are stationary at first difference as shown in Table 5.1 below. Thus, we can proceed with cointegration VAR analysis for the variables of our system on the basis that they are I (1) variables.

Table 5.1: Panel unit root test results with variables at first difference

Series	Model	LLC	ADF	PP	Conclusion
DLNHDI	Intercept & trend	-30.30***	75.83**	135.3***	I(1)
	Intercept	-5.36***	69.33	81.03**	
	None	-5.08***	93.96***	93.82***	
DLM2Y	Intercept & Trend	-19.62***	59.99	113.9***	I(1)
	Intercept	-13.83***	97.57***	119.68***	
	None	-13.52***	185.74***	187.33***	
DLDCPSY	Intercept & Trend	-17.29***	62.81	108.96***	I(1)
	Intercept	-37.35***	114.36***	132.29***	
	None	-28.97***	191.94***	194.97***	
DLRER	Intercept & Trend	-21.44***	95.18***	175.04***	I(1)
	Intercept	-14***	120.58***	153.98***	
	None	-17.36***	259.02***	285.3***	
DLTRDY	Intercept & Trend	-26.35***	75.64**	124.61***	I(1)
	Intercept	-18.43***	125.19***	167.17***	
	None	-13.34***	198.7***	217.16***	
DLGCY	Intercept &Trend	-23.72****	92.94***	167.13***	I(1)
	Intercept	-15.46***	121.69***	155.37***	
	None	-15***	229.5***	167.13***	
LRPOP	Intercept &Trend	-9.5***	106.56***	186.3***	I(0)
	Intercept	4.8	82.45**	128.9***	
	None	-14.28***	417.64***	413.97***	
LIMRU5	Intercept & Trend	-10.85***	44.57	94.19***	I(1)
	Intercept	-2.03**	64.04	91.14***	

	None	-76.19***	269.28***	293.5***	
PCI2	Intercept and Trend	-29.27***	58.66	83.79**	I(1)
	Intercept	-2.92***	33.04	40.31	
	None	-4.87***	100.09***	149.55***	

****, **, * unit root is rejected at 1%, 5% and 10%. Agreement of LLC test significance with either ADF or PP test significance is the critical decision test.*

5.3.3. Executing the Johansen Cointegration test in EViews version 8.0

In order to analyse the VECM model, we perform cointegration testing using Johansen (1991) method in EViews 8.0. To carry out the Johansen cointegration test in EViews 8.0, five key steps were followed:

Step 1*: show that the time series to be used actually have unit roots and that they are integrated of same order.* This is crucial because the order of integration can play an important role in the estimation. For example, when performing cointegration analysis using I(0), I(1) and I(2) variables in the same system, it is suggested that the I(2) variables could dominate. However, because of the uncertainty about the unit root tests, Toda and Yamamoto (1995) have suggested that variables of different order can go into the same VAR model provided cointegration is strong. We have shown through the unit root tests whose results are presented above in Table 5.6 that most of the variables included in our models are I(1) except the RPOP variable for which there is disagreement for the different unit root tests.

Step 2*: Setting the appropriate (optimal) lag length of the model.*

This is also crucial because it is important to have Gaussian error terms (that is standard normal error terms that do not suffer from non-normality, heteroskedasticity and autocorrelation). Since omitted variables are picked up by the error term and leads to inconsistent parameter estimates, it is important to have the correct lag length so that no important variable is left out (Asteriou and Hall, 2011).

The optimal lag length was specified in EViews 8.0 and then an unrestricted VAR model including all our variables at level was estimated by trial and error. Starting with the largest lag

length of four, we reduced the lags sequentially by one and re-estimated until the appropriate lag was obtained. In each of the models we examined the Aikake information criterion (AIC) and Schwartz Bayesian criterion (SBC) and other possible test diagnostics of autocorrelation, heteroskedasticity and normality of the residuals. In general, the model that minimizes SBC is selected after the other diagnostic tests. In our case, the lag length that was retained was 1 as it gave the lowest SBC for all specifications of the model and also because one-lag kept a higher number of observations (78) than say two lags (58) which is crucial for degrees of freedom.

Step 3*: Choosing the appropriate model relative to the deterministic components in our multivariate system*

Another important aspect of the analysis is to determine whether an intercept and/or trend should be included in either the short-run or long-run model. The general case for the Vector Error Correction Model (VECM), including all the various options that can possibly arise have been extensively discussed by Asteriou and Hall (2011, p. 372-373). According to these authors, there are five possible cases of cointegration that can be studied.

They can be summarized as follows: (i) no intercept or trend in CE or test VAR, (ii) intercept (no trend) in cointegration (CE) and no intercept in VAR, (iii) Intercept (no trend) in cointegration (CE) and test VAR which allows for deterministic trend in data, (iv) Intercept and Trend in CE – no trend in VAR which also allows for deterministic trend in data and (v) Intercept and trend in CE – linear trend in VAR which allows for a quadratic deterministic trend in data. Of these five possible models which can be generated by EViews 8.0, only three are realistic for economic analysis as suggested by Asteriou and Hall (2011, p. 373). Also, we did some trial and error to see if all the possibilities in EViews could fit with our available data. We found that the model with quadratic deterministic trends could not run because it is over-demanding in data. Thus, we make reference only to the three that we effectively could execute in EViews 8.0 and which Asteriou and Hall (*op. cit.*) suggests are more appropriate for economic analysis.

They are models with (i) Intercept (no trend) in CE, no intercept or trend in VAR. This case is used when there are no trends in the data and therefore the first differenced series have a zero mean. In this case, the intercept is restricted to the long-run model. Since we had ironed out much of the variation in our series owing to the fact that the HDI data was only reported for 5-

year intervals, it is possible that a lot of the trends in the data were eliminated. However, this model was not selected in our case because it did not give the lowest SBC.

(ii) Intercept in co-integrating equations and VAR, no trends in CE and VAR. In this case, there are no linear trends in the levels of the data, but both specifications are allowed to drift around an intercept. In this case, it is assumed that the intercept in the CE is cancelled out by the intercept in the VAR, leaving just one intercept in the short run model. The results for this model were not reported because its fit for the data was not as good as that obtained with model 3 below based on the SBC criterion and the size and sign of the ECM coefficient used for selecting the best model.

(iii) Intercept in CE and VAR, linear trend in CE, no trend in VAR. In this case, a trend is included in the CE as a trend-stationary variable, to take into account exogenous growth. We also allow for intercepts in both specifications while there is no trend in the short-run relationship. This model appeared to offer the best fit for our data with the appropriate lag length as it had the lowest SBC and the largest ECM coefficient that was negative and significant. In fact, this is the model whose output is reported in Table 5.4 below and used for discussions in the subsequent chapter of this work.

Step 4: *Determining the rank of Π or the number of cointegrating vectors*

In Johansen (1991) and Johansen and Juselius (1990), there are two methods and corresponding tests statistics to determine the number of cointegrating relationships and both involve the estimation of the matrix Π. It is a *k x k* matrix with rank *r* and the selection procedures are based on *Eigen values* and *trace statistics which are reported by EViews 8.0.* Again we report that our exercise in EViews 8.0 led to the selection of the model with 1 cointegrating vector based on the *trace statistic* as criteria for selection as reported in Table 5.4 below.

Step 5*: Testing for weak exogeneity*

Once the number of cointegrating equations have been determined, we need to test which of the variables are weakly exogenous. The Johansen method allows tests with restrictions which simplifies the determination of weakly exogenous variables. For example, $LNHDI_{it}$ is weakly exogenous if it is only a function of lagged variables, and the parameters of the equation

generating $LNHDI_{it}$ are independent of the parameters generating the other variables in the system.

Table 5.2: Results of Johansen cointegration test

Series: LNHDI LM2Y INQLM2Y LODAY LRER LTRDY LRPOP LGCY
Exogenous series: DUMINQBI PCI2
Lags interval: 1 to 1
Selected (0.05 level*) Number of Cointegrating Relations by Model

Data Trend:	None	None	**Linear**	Linear	Quadratic
Test Type	No Intercept	Intercept	**Intercept**	Intercept	Intercept
	No Trend	No Trend	**No Trend**	Trend	Trend
Trace	2	2	**1**	0	0
Max-Eig	1	1	**1**	1	1

Series: LIMRU5 LM2Y INQLM2Y LODAY LRER LTRDY LRPOP LGCY
Exogenous series: DUMINQBI PCI2
Lags interval: 1 to 1
Selected (0.05 level*) Number of Cointegrating Relations by Model

Data Trend:	None	None	**Linear**	Linear	Quadratic
Test Type	No Intercept	Intercept	**Intercept**	Intercept	Intercept
	No Trend	No Trend	**No Trend**	Trend	Trend
Trace	2	2	**1**	1	1
Max-Eig	2	2	**2**	2	1

**Critical values based on MacKinnon-Haug-Michelis (1999)*

EViews offers the opportunity to specify some variables as exogenous if one can *a priori* determine that they are in effect exogenous. In the models explored, the dummy variable created for income inequality in Chapter Four is specified as an exogenous variable essentially because time invariant variables cannot run as endogenous variables in a cointegrating process (Asteriou and Hall, 2011, p. 376). Also, we specified the variable measuring institutional quality as an exogenous variable owing to the fact that it is created by ranking and therefore may not

necessarily be related to what is happening in the system. A Hausman test was also conducted as above to determine that most of our variables were actually endogenous.

We have presented above, the cointegration VAR model and the steps that were used in analyzing system equation (2) following the Johansen (1991) methodology adapted for panel data in EViews 8.0.

5.3.4. Testing for multivariate causality

Causality can be asserted by observing the significance of the coefficients of the independent and control variables in equation (7) as presented in Table 6.3 and 6.4. A significant coefficient of any of the independent variables in the ECM Table 6.3 and 6.4 suggests that there is short run causality whereas an insignificant coefficient suggests its absence. According to Asafu-Adjaye (2000), this kind of causality is weak Granger causality because the dependent variable responds only to short term shocks.

Subsequently, the presence of long-run causality can be reviewed by examining the significance of the speed of adjustment parameters $\beta_{i,j}^{hdi,fd}$ or the coefficients of the $ECT_{i,t-1}^{hdi,fd}$ which illustrate how fast deviations from the long-run equilibrium are eliminated following changes in each variable.

Furthermore, a standard Wald F-test of joint significance can be used to test the null hypothesis that there is no causality when the ECM(-1) coefficient is combined with each of the lagged independent variables of the VECM. Thus, a joint test is said to be a test for strong causality because two sources of causation are jointly checked (Oh and Lee, 2004). As Asafu-Adjaye (2000) has remarked, this kind of causation will reveal the variables in the system which tolerate the burden of short run adjustments, and which enable long run equilibrium to be re-established once the system is shocked.

5.3.5. Solving the Vector Error Correction Model

Whereas other methods can be used to analyse models (2) and (7) such as an Autoregressive Distributed Lag (ARDL) model or a vector autoregressive (VAR) model with augmented lag order as in Wolde-Rufael (2006), Lee (2006), and Zachariadis (2007), our study has adopted the panel VECM approach because in addition to being flexible, it allows for the use of heterogeneous panels and corrects for serial correlation and yields heteroskedastic consistent standard errors (Asteriou and Hall, 2011).

In practice, the number of cointegrating equations in the system will depend on the number of endogenous variables included. EViews 8.0 will perform a VECM analysis which will combine equations (2) and the system represented by equation (7) using Panel data following the style of Johansen (1991). This method also permits for more than two variables in the cointegrating relationship. In addition, it facilitates the estimation of systems where restrictions on cointegrating relations can be tested and the possibilities of short-run adjustments can be investigated concurrently (see, among others, Stern, 2000; Asafu-Adjaye, 2000; Oh and Lee, 2004).

In addition to the above tests there are some potential econometric biases that would affect the efficiency of parameter estimates in regression analysis such as the problem of endogeneity which need to be checked and controlled.

5.4. Potential Econometric Biases

The objective of this section is to discuss the potential biases such as endogeneity which plagues the efficiency of estimates in regression analysis. This will be achieved by discussing (i) defining endogeneity which is one of the most serious concerns in multivariate regression models and suggesting ways of overcoming it in our models, (ii) multicollinearity, and (iii) Autocorrelation and heteroskedasticity

5.4.1. Endogeneity

The *zero conditional mean assumption* ($E(\varepsilon_{it}=0)$) of the classical linear regression model whereby the average value of the error term ε_{it} does not depend on the value of explanatory variables usually fails to hold in many cases especially in panel data models where similar data series for different groups, persons or countries are pooled together. If the zero conditional mean assumption holds for a particular variable, it is usually said that it is *exogenous*, whereas when it does not hold, it is said to be *endogenous*. For example, in this SSA study of human welfare, some unobserved country specific characteristics like traditions and customs may be part of the error term or correlated with the financial sector development and income inequality variables. This is the *first* cause of endogeneity and is known as the *omitted variable bias*. Thus, in considering the effect of say financial development on human welfare, we may impute an additional effect of these omitted variables on human welfare. This study has also included some variables like institutions and trade which are known to affect financial development (see Huang (2010 for an extensive discussion). Such should exacerbate the problem of endogeneity. .

A *second* and plausible cause of endogeneity is the *reverse causality* problem. It simply means that the level of the dependent variable in this case, *human welfare*, may be affecting the level of some of the explanatory variables. For example, as the level of welfare of a country increases, its citizens may demand more and wide-ranging financial services which could drive the development of the financial sector (Shan, Morris and Sun, 2001; Levine, 1997, 2005). Therefore, the parameter measuring the impact of financial sector development on human welfare may be overestimated. The problem of reverse causality is quite pervasive in panel data studies. For instance, some unobservable characteristics of SSA countries such as traditions and customs might be responsible for their dismal level of welfare and this lower level of living standard might have contributed to their low level of financial development in the first place. Thus, in omitting such interdependence between variables we may not simply be measuring the impact of financial development (and the other included variables) on human welfare.

5.4.2. Dealing with endogeneity

In the literature, there are two key theoretical ways to deal with the endogeneity problem in multiple regression analysis. The *first* is of limited importance and involves the use of a class of models known as the *'fixed effects'* and the *'random effects'* models while the second and

more advanced approach involves the use of *instrumental variables (Aghion and Howitt (2009)*. Yet, other approaches not well developed in the econometrics literature could include as in Rajan and Zingales (1998) the introduction of an interaction term as a control variable in the regression that can extract the exogenous part of a specific independent variable.

Also, empirically, one of the suggested ways of dealing with reverse causality is to lag the right-hand side regressors relative to the dependent variable (Rodrik, 2008). We did perform this exercise in Chapter Four when constructing our control variables series. Furthermore, and as has been indicated by Christopoulos and Tsionas (2004), using cross-sectional and panel data with non-stationary variables and applying traditional techniques of analysis including the Generalized Method of Moments (GMM) could amount to estimating spurious correlations because of non-stationarity. They suggested that panel co-integration VAR analysis can permit consistent estimation and can adequately overcome the problems of autocorrelation, heteroskedasticity and simultaneity at the same time because of the lag structure of the independent variables. Unidirectional causality is established in Chapter Six suggesting the endogeneity has been adequately controlled.

5.4.3. Multicollinearity

As Juselius (2012) discusses, the idea of correlation in time series regressions had already been widely considered by Frisch (1939), Haavelmo (1944) and their contemporaries who thought that because of correlation amongst time series variables, any estimates of correlation or regression coefficients for trending data was bound to produce spurious correlation or regression coefficients. Juselius remarks that at the time that these studies were carried out, theory on unit roots had not been developed and so researchers held that time series trends were deterministic whereas we know today that patterns in economic variables are mostly stochastic. The problem of multicollinearity in multiple regression analysis is overcome in cointegration analysis by formulating a VAR in error correction form. Differencing and cointegration reduces multicollinearity to a minimum by removing both stochastic and deterministic trends in the data (Juselius, 2012).

To initiate our empirical analysis of the relationship between human welfare and financial sector development conditional on the level of income inequality, we carried out a simple pair-wise correlation analysis to determine how collinear our selected variables are likely to be. The

result of this analysis is shown in Table 5.5 below. But we focus largely on the correlations amongst our core variables of interest - human welfare and financial sector development – in this discussion.

Table 5.3: Cross-correlation of all included variables

	LNHDI	LIMRU5	LM2Y	LDCPSY	LODAY	LRER	LTRDY	LRPOP	LGCY	PCI2
LNHDI	1									
LIMRU5	-0.73***	1								
LM2Y	0.41***	-0.60***	1							
LDCPSY	0.37***	-0.53***	0.85***	1						
LODAY	-0.63***	0.69***	-0.28***	-0.27***	1					
LRER	0.18**	-0.42***	0.29***	0.27**	-0.33***	1				
LTRDY	0.58***	-0.53***	0.49***	0.46***	-0.37***	0.18**	1			
LRPOP	-0.52***	0.34***	-0.053***	-0.053***	0.56***	0.05***	-0.35***	1		
LGCY	0.36***	-0.27***	0.42***	0.45***	-0.06	0.31***	0.51***	0.11***	1	
PCI2	-0.47***	0.56***	-0.48***	-0.33***	0.26***	-0.19**	-0.38***	0.15*	-0.25***	1

****, **, * indicate significance at 1%, 5% and 10%*

This table indicates very strong and significant relationships between human welfare (measured by LNHDI) and the under-five infant mortality rate (LIMRU5)) and the two selected measures of financial development (DCPSY and M2Y). This is consistent with the findings of previous studies by Claessens and Feijen (2006, 2007) and Outreville (1999) who find a strong correlation between these variables.

Also, we find that the correlation between our indicators of human welfare is stronger with the broad money measure (M2Y) than with the domestic credit to the private sector (DCPSY) measure. In fact, the correlation coefficient is 0.41 for the association between M2Y and the HDI and 0.37 for DCPSY and the HDI. Correspondingly, a significantly negative correlation of -0.60 exists between M2Y and the under-five mortality rate (IMRU5) and -0.53 between this latter variable and DCPSY. Elsewhere, we find that the HDI is strongly negatively correlated with IMRU5 with a coefficient of -0.73. Also, DCPSY and M2Y are highly positively

correlated with a coefficient of 0.85. The strong correlations between M2Y and DCPSY and between the HDI and IMRU5 suggest that they should not be included together in a regression model to avoid the problem of multicollinearity. However, they could be used as substitutes.

With regards to our set of control variables, all correlation coefficients are less than 0.5 suggesting that multicollinearity may not be a problem in our model. However, Yule (1926) has argued that correlation amongst time series variables could absolutely be nonsense due to the trending nature of the variables. In addition to the problem of multicollinearity, the other sources of misspecification error in multiple regression analysis which are discussed in subsequent paragraphs include autocorrelation and heteroskedasticity.

5.4.4. Autocorrelation and Heteroskedasticity

We discuss in turn autocorrelation and heteroskedasticity in the following sub-sections. The outputs for the autocorrelation and heteroskedasticity tests in EViews 8.0 are presented in Tables 5.4 and 5.5 below.

Autocorrelation: This problem arises when the error terms are serially autocorrelated and this violates the Gauss-Markov assumption of mean independence of error terms. Autocorrelation is detected using several methods including the Durbin Watson d statistic. In an OLS regression, if Durbin-Watson statistic is close to 0 or 4, we may suspect that there is the first order autocorrelation problem. In time series cointegration analysis using a VAR structure with lagged dependent terms, it is suggested that autocorrelation is corrected with the right number of lags (Juselius, 2006). However, we have tested for autocorrelation using the EViews 8 Autocorrelation LM test with one-lag from our initial VECM output equation. The results presented in Table 5.4 below reveal that the hypothesis of no serial correlation is rejected at 5 percent. This problem could be solved by increasing the lag length (Greene, 2006; Juselius, 2006).

Panel Heteroskedasticity: An exceptional type of heteroskedasticity is usually present in the analysis of panel data. This is so because error variances may display time dependence for a given unit and such non-constant variances could likely violate the Gauss-Markov assumptions

of constant variance in panel data. To use an example in relation to our SSA sample, variance estimates for financial sector development in Cameroon are likely to differ significantly from those in Botswana, which, in turn, are likely to contribute to non-constant error variances. Similarly, if countries are the units of analysis, then having large countries and small countries in the same sample could cause a problem. In addition to auxiliary regressions, there are several other acceptable methods to check for the existence of heteroskedasticity in panel data analysis (Franzese, 2002). However, we test for heteroskedasticity using the White heteroskedasticity test with no cross terms in EViews 8.0 and find that the null hypothesis of no heteroskedasticity is rejected at the 5 percent level as shown in 5.5 below. Heteroskedasticity and autocorrelation have been corrected for the short run VECM output using GLS regression which creates a one step weighting matrix.

Table 5.6: VEC Residual LM Test for autocorrelation

VEC Residual Serial Correlation LM Tests
Null Hypothesis: no serial correlation at lag order h
Included observations: 78

Lags	LM-Stat	Probability	
1	93.43***	0.001	

***, **, * indicate significance at 1%, 5% and 10%*

Table 5.4: VEC residual Heteroskedasticity Tests

VEC Residual Heteroskedasticity Tests: No Cross Terms (only levels and squares)
Included observations: 78

Chi-sq	df	Probability
914.64***	756	0.00

***, **, * indicate significance at 1%, 5% and 10%*

5.5. Chapter summary

In this Chapter, the general parametric model specification was presented. Linkages between the independent and control variables on the one hand and human welfare on the other were presented. Also, some suggestions on the expected signs of these variables were provided. Some common tests such as the unit root test and the Hausman test were also discussed. It was found that most of the data series to be used in subsequent analysis of the vector error correction model (VECM) are integrated of order one (I(1)).The Johansen cointegration test was also performed and revealed that for the best model, there was only one long run cointegrating equation based on the *trace statistic*. Furthermore, modelling and testing the VECM were also discussed. In addition, various biases that usually plague econometric analysis especially that of endogeneity were explored. The problems of endogeneity are expected to have been solved both by data transformation as indicated in Chapter Four and through using the techniques of cointegration VAR and VECM in the analysis of the data. The outcome of this analysis will be discussed in the next chapter.

Therefore in the chapter that follows, the results of the VECM analysis using EViews 8.0 shall be presented and discussed.

CHAPTER SIX

EMPIRICAL RESULTS AND ANALYSIS

In the previous chapter, the model for analysis and some properties of the variables that would form part of the regression equation were amply discussed. Also, the key features of co-integration and vector error correction modelling (VECM) were discussed. Additionally, the some characteristics of the Johansen approach to cointegration which allows for the determination of the number of long run cointegrating vectors were introduced. Some pitfalls in regression analysis including endogeneity were also discussed. Cointegration and error correction modelling have the advantage that they provide short-run relationships as well as long-run relationships which are particularly interesting for economists and policy makers. Furthermore, co-integration and VECM can correct for endogeneity, autocorrelation and heteroskedasticity concurrently if the right lag length specification is achieved (Christopolous and Tsionas, 2006; Juselius, 2012).

The purpose of this chapter is to present and discuss the results obtained from the empirical analyses of the data using the error correction model. It has four main objectives. *First*, it describes the datasets for the two groups of countries included in the VECM analysis. *Secondly*, it presents the diagnostic statistics and discusses the fit and stability of the VECM. *Thirdly*, it discusses the relationships between the independent variables and human welfare based on the hypothesis developed in Chapter three on the one hand, and between the control variables and human welfare on the other hand. *Finally*, it presents and discusses panel multivariate causality between human welfare and the independent and control variables.

6.1: Descriptive statistics by income inequality classification

Using the income inequality dummy developed in Chapter Four as a classification variable, we examine the mean, median and variance of our included variables for the group of more equal (GINI <45 percent) and the group of highly unequal countries (GINI > 45 percent) for our SSA sample of 29 countries. These simple methods to determine differences between the

two groups of countries as per the selected variables have the advantage that they do not impose any functional form on the distribution of these variables.

Table 6.1 below which shows the results of our classification by level of income inequality (1 = highly unequal; 0 = more equal). The variables are presented in the first column and then the binomial dummy classification variable (duminqbi), mean, median and variance of the different variables in the second, third and fourth columns respectively. The symbols *, **, *** indicate whether there are differences in the calculated values for the two sub-groups at the 10, 5 and 1 percent conventional levels of significance. We use the t-test for the mean, the Kruskal-Wallis test for the median and the F-test for the standard deviation.

Table 6.1: Differences in mean, median and variance of included variables for sample of more equal and highly unequal countries classified by the income inequality dummy.

Variables	Duminqbi	Mean	Median	Standard deviation
HDI	More equal	0.35	0.33	0.13
	Highly unequal	0.40**	0.41***	0.12
M2Y	More equal	21.72	19.14	14.79***
	Highly unequal	25.4*	23.46***	10.63
TRDY	More equal	62.62	55.17	27.53
	Highly unequal	81.79***	72.07***	43.42***
GCY	More equal	13.65	12.96	4.64
	Highly unequal	17.5***	16.59***	7.48***
RPOP	More equal	69.02	68	16.03
	Highly unequal	68.44	68.47	13.87
ODAY	More equal	13.4***	12.7***	8.59
	Highly unequal	9.59	5.64	9.79
DCPSY	More equal	14	11.23	12.96***
	Highly unequal	18.12**	14.85***	11.24
PCI2	More equal	4.6	4.8	1.4
	Highly unequal	4.77	5	1.3
IMRU5	More equal	159.28***	159.33***	65.25***
	Highly unequal	124.16	115.33	41.22

, **, * measures the significance of the differences of the mean, median or variance between the equal and unequal societies at the conventional 10, 5, and 1 levels of significance; 0= low inequality, 1=high inequality, duminqbi = dummy variable separating equal from unequal countries in sample*

This table reports that the difference in the mean and median for the selected indicators of human welfare in the two sub-samples is significantly different from zero at the conventional 5 percent level. Thus, standards of living are higher in the more unequal sample of countries, whether such welfare is measured using the human development index (HDI) or the under-five infant mortality rate (IMRU5). This is consistent with the Kuznets 1955 hypothesis that in the early stages of development income inequality increases as income rises. Though volatility of the HDI for the two groups is similar, infant mortality is higher (159 babies dying per 1000 born compared to 124) and more variable for the sample of more equal countries. Such may suggest that more equal countries in SSA have larger deficiencies in healthcare planning and delivery, immunisation for the under-fives, nutrition and medicines for children. Similarity in variance of the HDI between the two groups supports the decision to model the mean rather than differences in volatility using the GARCH model.

Also, the financial sector measured by broad money (M2Y) or domestic credit to the private sector (DCPSY) is significantly more developed in the highly unequal countries than in those enjoying relatively more equality whether compared using the mean or the median of M2Y and DCPSY. This may suggest that the impact of finance on human welfare in the highly unequal sample of countries may be larger than for the sample of more equal countries as per our definition. However, M2Y is significantly more variable in the more equal sample of countries and such may suggest that there are significant differences in interest rate spreads and differences in policies that affect the development of the financial sector in these countries.

In addition, Governments (GCY) tend to spend more as a share of GDP in the highly unequal countries than in the more equal ones using the mean and median expenditures at the conventional 5 percent level as our barometer. This is likely due to the fact that governments in the highly unequal countries also tend to be richer. Thus, the impact of government expenditures on human welfare should be more significant for the sample of highly unequal countries. Nonetheless, GCY is more variable in the highly unequal countries and this may suggest that there are more disparities in government expenditures amongst these countries.

Then too, we find that trade (TRDY) has been more vigorous in the highly unequal sample of countries, the mean and median being significantly higher for these countries than for the more equal sample of countries at the conventional 5 percent level. Thus, trade as a share of GDP (TRDY) is likely to have a larger impact on welfare in the highly unequal countries since more trade will buy more growth (Bhagwati and Srinivasan, 2003). However, trade is more

variable amongst the group of highly unequal countries than for those that are more equal and this may suggest disparities in trade policies amongst the former countries.

Furthermore, the more equal countries received on average significantly more overseas development assistance as a share of GDP (ODAY) measured using the mean or median at the conventional 5 percent level. In fact, when using the median as a measure of central tendency, we find that the more equal countries (GINI < 45 percent) received more than twice in ODAY compared to the group of highly unequal societies. This is consistent with our analyses in Chapter Two which revealed that the more equal countries are mostly in the ECOWAS sub-region and that this region also receives higher Aid dollars than the other SSA trading blocs. Thus, the effect of Aid on human welfare in these countries should be higher than for the sample of highly unequal countries. Again, this larger size of ODAY for the sample of more equal countries in SSA is testament to the fact that these latter countries are poorer and have a lower level of human development as we saw above.

Suffice also to mention here that the average size of the rural population (RPOP) in our SSA sample does not depend on the level of income inequality whether measured by mean or median. This size is about 68 percent of the total population in our SSA sample for both sub-groups. The differential slope may be insignificant. Also, the quality of institutions (PCI2) across the 29 SSA countries chosen for this study is similar whether highly unequal or more equal. The differential slope may be insignificant.

From the above results, a positive differential slope could be expected for M2Y and DCPSY for the highly unequal countries. Then too, a positive differential slope could be expected for GCY and TRDY and a negative differential slope for ODAY which tends to be higher for the more equal countries. Also, it is worthy to note that our variables do not suffer from heterogeneity because the means and medians are all significantly different for the key variables. Any bias introduced in the study with respect to differences in variance for some attributes may well be corrected by the use of the co-integration VAR and vector error correction models (VECM) which were selected for this study, and upon which the results for the subsequent sections are based.

6.2. Cointegration, diagnostic statistics and VECM model fit

This section has three objectives. *First*, it discusses the existence of cointegration and the model selection process using EViews 8.0. *Secondly*, it presents the diagnostic tests that were performed to ascertain the fit of the model. *Finally*, it discusses the stability of the overall VECM model.

6.2.1. Cointegration and model selection

In the previous chapter we indicated some key features of cointegration which makes it apposite for our analysis. For example, a linear combination of the variables which were shown in Chapter Five to contain one unit root (i.e., I(1)) using the cointegration approach will yield a stationary error term (i.e., I(0)) if the regressors have any long-run equilibrium relationship binding them together. Unless we can establish that such an equilibrium relationship does exist between the variables in our regression, it will be unwise to base future policy reforms on any such results because the variables of interest (i.e., the indicators of welfare and financial sector development) could wander apart from each other without returning to the boundary which would be anticipated for a steady state equilibrium relationship.

The Johansen cointegration analysis was performed using EViews Econometric Software Version 8.0 and the associated vector error correction model (VECM) was generated again using the relevant function in EViews. The outcome of this is presented in Tables 6.2 and 6.3 below. Table 6.2 presents the long run output whereas table 6.3 presents the output from the error correction model (VECM). The tables have two columns each for the overall model. In column 1 we employed the log of M2Y (LM2Y) as the measure of financial intermediary development whereas domestic credit to the private sector (LDCPSY) is used in column 2 as a robustness check for our measure of financial development. In effect, one co-integrating relationship in both regressions using LM2Y and LDCPSY was found to be most apposite (see Table 5.4 of Chapter Five section 5.3.3). As such, the long and short run outputs of the VECM presented in Tables 6.2, 6.3 and 6.4 below were estimated using one cointegrating equation.

Also, in the model selection process, only one-period lag was included for the endogenous variables owing to the loss of observations when two lags were used. The latter was likely to have reduced the degrees of freedom. The best model was in effect obtained by trial and error and by inspecting the Schwartz Bayesian criterion (SBC), the adjusted R^2 and the stability of the long run cointegrating equation – that is, using the sign and significance of the lagged long-run cointegration term (ECM(-1)) in the VECM equation. It was found that model three in

EViews 8 VECM analysis with a linear time trend in data and an intercept with no trend in VAR was the most effective model in dealing with the potential biases in our dataset. It is worthy of note here that one lag represents five years in this study.

Table 6.2: Long run VECM regression output

Long run cointegrating equation (HDI)	**Coefficients**	**Long run cointegrating equation (HDI)**	**Coefficients**
LNHDI(-1)	1	LNHDI(-1)	1
LM2Y(-1)	**-0.018** **[-0.171]**	**LDCPSY(-1)**	**-0.09** **[-1.14]**
INQLM2Y(-1)	**0.86*** ** **[3.94]**	**INQLDCPSY(-1)**	**0.41** ** **[2.74]**
LODAY(-1)	0.21*** [3.50]	LODAY(-1)	0.29*** [4.32]
LRER(-1)	0.06*** [2.57]	LRER(-1)	0.12*** [5.24]
LTRDY(-1)	0.25* [1.91]	LTRDY(-1)	0.27* [1.83]
LRPOP(-1)	-0.64** [-2.16]	LRPOP(-1)	-0.77** [-2.45]
LGCY(-1)	-0.22 [-1.24]	LGCY(-1)	-0.3 [-1.53]
C	1.98	C	3.65
ECM(-1)	**-0.11*** ** **[-4.15]**	**ECM(-1)**	**-0.13*** ** **[-5.93]**

*Values in [ ] are t-statistics and ( ) are p-values, *, **, *** indicate significance at 1%, 5% and 10% respectively, LNHDI=log of human development index, LIMRU5=log of under-five infant mortality rate*

Table 6.3: Short run output from VECM

ECM (DLNHDI)		**ECM (DLNHDI)**	
	1		**2**
ECM(-1)	**-0.11*** [-4.51]**	**ECM(-1)**	**-0.13*** [-5.93]**
D(LNHDI(-1))	0.19* [1.89]	D(LNHDI(-1))	0.18* [1.79]
D(LM2Y(-1))	**-0.01 [-0.38]**	**D(LDCPSY(-1))**	**0.02 [0.69]**
D(INQLM2Y(-1))	**0.14*** [2.85]**	**D(INQLDCPSY(-1))**	**-0.01 [-0.19]**
D(LODAY(-1))	0.02 [1.45]	D(LODAY(-1))	0.02* [1.78]
D(LRER(-1))	0.09*** [3.63]	D(LRER(-1))	0.05** [2.17]
D(LTRDY(-1))	0.05 [1.09]	D(LTRDY(-1))	0.09* [1.92]
D(LRPOP(-1))	-0.36* [-1.84]	D(LRPOP(-1))	-0.5** [-2.61]
D(LGCY(-1))	-0.06 [-1.46]	D(LGCY(-1))	-0.08* [-2.13]
C	-0.1*** [-2.59]	C	-0.04* [-1.95]
DUMINQBI	0.31*** [4.29]	DUMINQBI	0.15*** [4.62]
PCI2	-0.02** [-2.40]	PCI2	-0.017*** [-2.77]
Test statistics			
R-squared	0.54	R-squared	0.56
Adj. R-squared	0.46	Adj. R-squared	0.49
F-statistic	7.05	F-statistic	7.63
Schwarz SC	-2.16	Schwarz SC	-2.19
Residual tests			
Autocorrelation	YES	Autocorrelation	YES
Heteroskedasticity	YES	Heteroskedasticity	YES

*Values in [ ] are t-statistics and *, **, *** indicate significance at 1%, 5% and 10% respectively, LNHDI=log of human development index, LIMRU5=log of under-five infant mortality rate*

Table 6.4: Short run VECM output corrected for heteroskedasticity using GLS regression

ECM (DLNHDI)			ECM (DLNHDI)	
	1			2
ECM(-1)	**C(1)**	**-0.08*** (0.00)**		**-0.09*** (0.00)**
D(LNHDI(-1))	C(2)	0.18*** (0.00)	D(LNHDI(-1))	0.27*** (0.00)
D(LM2Y(-1))	**C(3)**	**-0.02 (0.23)**	**D(LDCPSY(-1))**	**-0.01 (0.89)**
D(INQLM2Y(-1))	**C(4)**	**0.13*** (0.04)**	**D(INQLDCPSY (-1))**	**-0.00 (0.99)**
D(ODAY(-1))	C(5)	0.01 (0.13)		0.01 (0.17)
D(LRER(-1))	C(6)	0.08*** (0.00)		0.02 (0.41)
D(LTRDY(-1))	C(7)	0.06*** (0.00)		0.07** (0.02)
D(LRPOP(-1))	C(8)	-0.25** (0.02)		-0.28** (0.01)
LGCY(-1)	C(9)	-0.05*** (0.00)		0.05** (0.03)
C	C(10)	-0.05*** (0.00)		-0.02 (0.11)
DUMINQBI	C(11)	0.22*** (0.00)		0.10** (0.00)
D(PCI2(-1))	C(12)	-0.01** (0.00)		-0.01*** (0.00)
Test Statistics				
Adj-R2		0.83		0.66
SBC		-2.16		-2.19
DW		2.13		1.86
F-Stat		34.34 (0.00)		14.86 (0.00)
Residual tests				
Normality Jarque-Bera		1.06 (0.58)		1.33 (0.51)
Autocorrelation		NO		NO
Heteroskedasticity		NO		NO

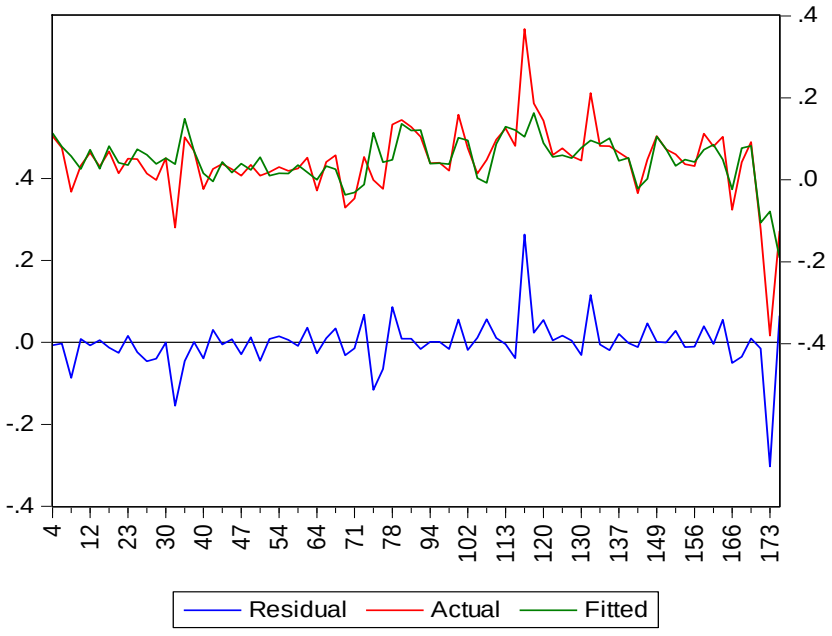
*Values in ( ) are p-values, *, **, *** indicate significance at 1%, 5% and 10% respectively, LNHDI=log of human development index*

6.2.2. Diagnostic statistics

A number of diagnostic tests were carried out on the residuals to ascertain the degree to which non-normality, autocorrelation and heteroskedasticity have influenced our results. The Autocorrelation LM test and the White Heteroskedasticity test with no cross terms were carried out in EViews 8.0 and the output shown in Tables 5.6 and 5.7 of Chapter Five reveals that there was some heteroskedasticity. Thus, the one-lag in our variables possibly did not solve all the usual econometric problems. To correct for this, we used the cross-section weighting function in Eviews 8.0 which is equivalent to running a generalized least square (GLS) regression for the lagged difference terms including the lagged ECM term from the output of the VECM.

The GLS expectedly corrects for heteroskedasticity because it creates a one-step weighting matrix which corrects for error variance. A Durbin Watson (DW) statistic of 2.13 obtained for the system with LM2Y from this procedure suggests that there is probably no autocorrelation too after correcting with the weighting matrix. Furthermore, the Jarque-Bera test of residual normality (Table 6.4 above) and figure 6.1 below reveal that we cannot reject the null hypothesis that our residuals are normally distributed.

Figure 6.1: ECM residual plot



Source: Author's plot of residuals using EViews 8.0

6.2.3. Test of VECM stability

In addition to these diagnostic tests, we checked for the stability of the model using the lagged ECM term. Column one of Table 6.3 shows that the lagged error correction term (ECM(-1)) for the model with LM2Y is significant and negative at 1 percent. This means that it is a stable model. Also, an adjusted R^2 of 0.83 together with a significant F-statistic of 34.34 suggests that the regression model in Column 1 is an adequate and superior model to the one in Column 2 with credit to the private sector (LDCPSY), for analysing the determinants of human welfare in SSA. In fact, the inclusion of a lagged HDI term helps to correct for errors arising from initial country welfare conditions and other omitted variables (Worrall and Pratt, 2004; Juselius, 2006).

In effect, Column 1 reveals that the system with LNHDI as the dependent variable and LM2Y as the measure of financial development reverts back to equilibrium because ECM(-1) is negative and significant at 1 percent. As such, we may infer from the coefficient on the ECM(-1) that in the long run, a 1% change in the endogenous variables in the system yields 0.08 percent adjustment to the long-run equilibrium. This suggests that with five-year averaged data, it takes about 62 years (5/0.08) for the system (column 1) to fully correct itself if shocked from equilibrium, *ceteris paribus*. Thus, it is a very slow system suggesting that the long run change in the parameters actually have very little influence in the short run adjustment dynamics of the system.

Also, we find in column (2) where LDCPSY is the measure of financial sector development, that the system also reverts to equilibrium and the time to adjustment is very similar to that for LM2Y. Overall, the model with credit to the private sector is also a good fit model with an R^2 of 0.66 and an F-statistic of 14.86 which is significant at 1 percent and a DW statistic of 1.86. All in all, there is a significant long run relationship between the selected independent variables and the measure of human welfare as exhibited by the negative and significant ECM(-1) values at the conventional five percent level for the two regression outputs. However, we have preferred the model (column 1) with LM2Y because it has a better fit.

Upon the foregoing, the following subsections will discuss the results presented in tables 6.2 and 6.3 above, starting with the independent variables which are the main variables of interest and then the control variables.

6.3. Results based on Cointegration and estimation of the Error Correction Model for the main independent variables

The five hypotheses developed in Chapter Three and further specified in section 5.2.1 of Chapter Five shall be tested in this section using the VECM model. First, the hypothesis depicting the long and short run relationships between financial development and human welfare shall be discussed. Then the relationship between human welfare and the income inequality dummy shall be presented. Finally, the long and short run hypotheses for the relationship between human welfare and the interaction between financial development and income inequality shall be discussed.

6.3.1. Results from estimating the cointegrating equation: The long run relationship between financial development and living standards

The output of table 6.2 is based on estimating system equation (2) in Chapter Five. However, only the results of the first equation of the system are presented in the table since there is only one cointegrating equation and the HDI was normalised in that specification:

$$HDI_{i,t} = \alpha_i + \beta_i FD_{it} + \gamma_i FD_{it}*INQ + \omega_i INQ + \lambda_i X_{it} + \varepsilon_{it} \qquad (2)$$

Table 6.2 shows that the long run relationship between financial development and human welfare for the entire sample is negative but insignificant both using broad money(LM2Y) and credit to the private sector (LDCPSY) as measures of financial sector development. That is, β_i is insignificant in the long run cointegrating equation. As such, hypothesis (1) specified in Chapter three is rejected; there is no positive long run relationship between financial development and human welfare for the sample of 29 SSA countries.

6.3.2. Effects of level of income inequality on living standards

Results here are based on the VECM model equation (7) here below. Readers need to be reminded that the income inequality dummy was specified as an exogenous variable in the technical estimation using EViews 8.0.

$$\Delta HDI_{i,t} = \alpha_i^{hdi} + \beta_i^{hdi} ECT_{i,t-1}^{hdi} + \sum_{j=1}^{m} \delta_{i,j}^{hdi} \Delta HDI_{i,t-j} + \sum_{j=1}^{m} \gamma_{i,j}^{hdi} \Delta FD_{i,t-j} + \sum_{j=1}^{m} \lambda_{i,j}^{hdi} \Delta (FD * INQ)_{i,t-j} + \psi^{hdi} INQ_i + \sum_{j=1}^{m} \theta_{i,t-j}^{hdi} \Delta X_{i,t-j} + u_{i,t}$$

According to results in Column (1) of Table 6.3, countries with higher income inequality (GINI > 45 percent) enjoy a higher level of human welfare. This relationship is significant at the 5 percent level and it is consistent from regression (1) with M2Y to regression (2) with DCPSY as the measures of financial intermediary development, hence the null hypothesis is accepted. This finding that higher income inequality is positively and significantly correlated with higher human welfare confirms suspicions expressed in Chapter Four. The question therefore arises as to why a higher level of income inequality should have a positive and significant association with human welfare even after controlling for a host of policy variables and the quality of institutions in SSA.

Some researchers including Barro (2000) and Easterly (2005) have argued that high income inequality is a cause of underdevelopment and poverty because of the usual political instability associated with wider distribution of incomes and also because income inequality creates credit market imperfections which are detrimental to living standards (Banerjee and Newman, 1993). In this view, the above relationship should have been negative and significant. However, it is plausible that this finding is nothing but a justification of the *left-arm* of the Kuznets 1955 hypothesis stated in Chapter Three. It says that at the early stages of economic development, income inequality tends to be high where human welfare is also high. This could also be because as some have suggested, income inequality is a motivator of success (Deaton, 2013). As such, it could rather encourage economic transformation rather than discourage it. Furthermore, in unreported results in Table 6.1, it was observed that the highly unequal countries experienced higher median growth during the period 1990-2010 than the more equal countries, suggesting again that income inequality grows with income growth in the early stages of development, consistent again with Kuznets (1955).

It seems that per capita income growth for the poorest populations in the highly unequal countries in SSA is sufficient to counteract potential adverse effects of living in a highly unequal society. As such, the poor in the highly unequal societies tend to have higher average per capita incomes than their counterparts in the more equal countries. Though return to capital is concentrated in the hands of the relatively few wealthy individuals, it fuels investment with related growth in economic output, but up to a cut-off point. This cut-off point arises due to the effect of a rise in progressive income taxes, social unrest, and scarcity of labour supply with associated rise in wages. This last encroaches on the return to capital, China being a good case in point. However, during this Century, returns to capital have grown at the expense of wages and salaries. Such has created a rise in inequality of income even in the advanced nations (Piketty *et al.*, 2013; Piketty, 2014).

Nonetheless, the key focus of this study is the effect on human welfare of a possible interaction between income inequality and financial sector development, to which we now turn.

6.3.3. Results based on cointegration: The long run relationship between living standards and the interaction term (financial sector development and income inequality)

The result discussed here is found in Table 6.2 based on estimating the cointegrating system equation (2) in Chapter Five. That equation is presented here below to keep the reader in focus:

$$HDI_{i,t} = \alpha_i + \beta_i FD_{it} + \gamma_i FD_{it} * INQ + \omega_i INQ + \lambda_i X_{it} + \varepsilon_{it} \quad (2)$$

The output of the cointegrating equation presented in Table 6.2 shows that the size of the financial sector (LM2Y) is crucial for human welfare in the long run for the group of SSA countries with a higher level of income inequality (GINI greater than 0.45). That is, $\gamma_i > 0$, consistent with hypothesis 5 in Chapter Three. In effect, in the long run, financial development measured by size – broad money as percentage of GDP (LM2Y) has a positive and significant

relationship at 5 percent with the human development index (LNHDI) for the group of highly unequal SSA countries. Hence, the null hypothesis is accepted.

A similar positive impact is also observed when the indicator of financial development is the depth measure or credit to the private sector as a percentage of GDP (LDCPSY). This finding is consistent with studies in Chapter Three which suggest that M2Y or credit to the private sector is crucial for long run economic development and human welfare for samples of developed and developing countries even though they do not consider an interaction with income inequality (King and Levine, 1993a; Levine and Zervos, 1998; Beck et *al.*, 2007; Loayza and Ranciere, 2006; Claessens and Feijen, 2006, 2007).

This long run relationship is thought to be so because better financial intermediation sustains and enhances income growth as financial markets deepen and provide adequate liquidity, better risk diversification services and more effective channelling of savings to productive investments (Loayza and Ranciere, 2006). However, it is inconsistent with studies which suggest that the long run relationship is insignificant for low income countries especially those in SSA where the financial sector is not large enough to produce increasing returns to scale (Rioja and Valev, 2004a; Go et *al.*, 2007).

Therefore, we may surmise that as the financial system enlarges, especially in those developing countries of SSA where income distribution is relatively highly unequal, persons or organisations with a higher ability to borrow and invest at a time when physical capital accumulation is more important than the quantity and quality of human capital, are having a better impact on living standards than in those countries which are more equal (GINI < 0.45) consistent with Galor (2011). The long run relationship is quite strongly positive and may suggest that finance is crucial for improvements in living standards, at least, for countries in SSA with higher income inequality.

Though the average size of the financial sector (M2Y) in the more equal sample of SSA countries is lower than the ratio for the highly unequal countries at 10 percent level (see Table 6.1 above), it should be remarked that the highly unequal countries also tend to issue more credit to the private sector. In fact, these latter countries had an average M2Y of 25 percent and an average credit to the private sector of 18 percent of GDP during the period 1990 to 2010. These averages are not based on the VECM but as calculated and presented on Table 6.1 as simple averages for the highly unequal and more equal countries.

However, it is not clear if a significant long run effect of broad money for the more equal group of countries with average M2Y of 21.7 percent and average credit to the private sector of 14 percent of GDP (see Table 6.1) is sufficient to produce a significant effect on living standards in these countries. As such, we may suggest that an M2Y threshold of about 25 percent and a credit to the private sector threshold of about 18% may be crucial levels from which the functions of finance such as liquidity and ease of transaction, allocational efficiency and risk diversification would be effective to spur long run productivity and consequent improvements in living conditions for those more equal countries in SSA. However, note that these thresholds are not estimated from the VECM but are simply averages for the highly unequal and more equal countries from 1990 to 2010 presented in Table 6.1.

This suggestion is consistent with the theory in Chapter Three that suggests that with the development of the financial sector at the early stages of development, there is likely to set in increasing returns to scale. That is, as the size of the financial sector increases, businesses are able to borrow more and take on more risky investment projects which yield higher returns in the long run (Saint-Paul, 1992; Bencivenga and Smith, 1991). Furthermore, and as has been found by Flug *et al.* (1998), financial deepening enhances school attendance as it keeps children in school since parents can borrow to pay for school requirements while they await seasonal incomes in many cases. This is highly probable as the HDI measure used has schooling as one of its components, making a multidimensional measure of welfare a welcomed indicator for empirical research.

However, we suspect that financial development would equally be effective in enhancing long run human welfare in those SSA countries which have higher levels of financial development than these suggested threshold values, even though they may also have on average, lower income inequality. This is so because finance equally tends to reduce income inequality as the financial sector enlarges and widens access to the poor, irrespective of where they may be (Beck *et al.,* 2007). This should be the case for SSA countries like Mauritius with lower income inequality, higher quality of human welfare and a larger financial sector.

6.3.4. Short Run Results based on the ECM for financial development

The results here are based on the estimation of the following VECM equation (7) as presented in Chapter Five:

$$\Delta HDI_{i,t} = \alpha_i^{hdi} + \beta_i^{hdi} ECT_{i,t-1}^{hdi} + \sum_{j=1}^{m} \delta_{i,j}^{hdi} \Delta HDI_{i,t-j} + \sum_{j=1}^{m} \gamma_{i,j}^{hdi} \Delta FD_{i,t-j} + \sum_{j=1}^{m} \lambda_{i,j}^{hdi} \Delta (FD * INQ)_{i,t-j} + \psi^{hdi} INQ_i + \sum_{j=1}^{m} \theta_{i,t-j}^{hdi} \Delta X_{i,t-j} + u_{i,t} \quad (7)$$

Results based on the ECM: The Short run relationship between human welfare and financial sector development:

The results for this test are found in Table 6.3 and 6.4 and are based on estimating the ECM represented by equation (7).

As with the long run output, we do not find any significant negative relationship between financial development and human welfare in the short run (Table 6.3 and 6.4). That is $\gamma_{i,t-j}^{hdi}$ is insignificant at 10 percent in the short run. Therefore, hypothesis (2) in Chapter Three is rejected just like hypothesis (1) was rejected in the case of the long run relationship consistent with Rioja and Valev (2004a) who found that finance is not important for income growth in low income countries where financial development is low. As such, for the entire sample of 29 SSA countries, the average level of financial development is neutral for the quality of living standards. This may suggest that the average size of the financial sector in SSA is not large enough to generate increasing returns which is what buys growth and consequent improvement in human welfare (Saint-Paul, 1992, Acemoglu and Zilibotti, 1997)).

Results based on the ECM: The short-run relationship between human welfare and the interaction term of financial development and income inequality

The results for this test are found in Table 6.3 and 6.4 and are based on estimating the ECM represented by equation (7).

Based on Table 6.3 column (1), this study finds that in the short-run, financial development measured by the size of the financial sector (M2Y) yields an additional significant impact for countries with higher average income inequality (GINI > 45) during the 1990 to 2010 period. That is $\gamma_{i,t-j}^{hdi} > 0$ suggesting that the null should be rejected and the alternative hypothesis accepted. This finding is inconsistent with hypothesis (5) in Chapter Three which conjectured that the relationship would be negative in the short run because of two main reasons. *First*, credit market imperfections and barriers to entry set up by insiders who disproportionately benefit from any improvements in financial development would increase income inequality with

dire social consequences (Claessens and Perotti, 2007). *Secondly*, as countries grow and develop, and as financial markets deepen, crises tenets suggest that they could suffer from short run volatilities and general financial instability which are disruptive to economic activity and have dire social costs (Kaminsky and Reinhart, 1999; Loayza and Ranciere, 2006; Oscar *et al.*, 2011). This has been observed in practice in Mexico and other Latin American countries during the 1994-95 financial crises, South East Asia during the 1997-1998 Asian financial crises, Russia in 1998 and Argentina 2000-2001 with currency crises and more recently the 2007-2008 financial crises that impaired growth and welfare in most European countries and the United States.

The finding that the relationship is positive may suggest that, in the short run, the development of the financial sector is more important for enhancing living standards in countries where income inequality is higher and for which M2Y has reached the threshold of about 25 percent of GDP (this average is not based on the VECM but as calculated and presented on Table 6.1 as simple averages for the highly unequal and more equal countries). This is consistent with theories which suggest that at the early stages of economic development when income inequality is high, financial development that improves access for the rich who have a higher capacity to save and invest would be beneficial for social welfare (Galor and Moav, 2004; Galor, 2011). This is also consistent with the finance theory of allocational efficiency in which financial institutions channel savings to those with the best possibilities of undertaking above average return projects (Levine, 1997).

Even though the poor may have limited access to the formal financial sector at the early stages of economic development when human capital is still very low and investment capital is the more important factor driving economic development, the liquidity and transactions functions of money are also crucial for the poor. Moreover, at the early stages of economic development it is more beneficial that more savings in the financial system be channelled to the rich who have a higher capacity to invest in higher return projects and to save (Galor, 2011). This latter suggestion has the corollary that it would widen income inequality but it could also enhance human welfare by promoting income growth and job creation. In which case, the poor are likely to have access to better paying jobs to build assets whereas governments could collect more tax revenues to support social services both of which are welfare enhancing.

However, contrary to the short run outcome for M2Y, the interaction between domestic credit to the private sector and income inequality does not show a significant short run relationship with the human welfare variable at the 5 percent level. In fact, the output in column

2 of Table 6.4 shows that the short run relationship with private credit is negative and insignificant consistent with Loayza and Ranciere, 2006) who do not find a significant relationship for the short run. This outcome may signify that the measure of financial development used for an SSA sample to study the effect of this latter variable on living standards in the short-run matters. In fact, it would appear that, in the short run, domestic credit to the private sector is not the most appropriate indicator of the development of the financial sector in SSA, at least not at the current level of financial depth. Furthermore, we suspect that because credit to the private sector does not take into account loans that banks issue to the government sector or public enterprises, it fails to pick up the short run impact on human welfare of these important agents of production. This could also be the reason why Fowowe and Abidoye (2012) do not find a significant relationship between private credit and poverty in SSA. However, Singh and Huang (2015) suggest that the relationship with private credit in SSA may require that private credit be interacted with a measure of property rights.

The foregoing suggests that credit to the private sector (DCPSY) as opposed to M2Y does not have a significant additional short run impact on human welfare, either in the highly unequal countries, or in the more equal group of SSA countries. Therefore, M2Y appears to be more apposite as an indicator in measuring financial sector development in SSA. This is so because it takes into consideration the liquidity and transactions function of money (bank deposits in SSA are mostly short term) and credit issued to government enterprises which tend to occupy a significant fraction of the formal productive sector.

In fact, for the highly unequal SSA countries where M2Y has attained 25% of GDP, this study finds that it has a positive and significant additional long run and short run effect on human welfare than for the average country in the more equal group of SSA countries. Since M2Y also includes credit issued to public companies (Rousseau and Wachtel, 2011), the idea that government enterprises are inefficient may not apply here owing to the composition of the productive sector in most SSA countries. There, government companies control the most profitable sectors like Telecoms, Agro-industry, Breweries, Banks and Oil and gas. However, private credit shows a disproportionate positive and significant long run effect on human welfare in those countries with higher income inequality and for which average long run credit to the private sector has attained about 18 percent of GDP (average for the highly unequally countries in Table 6.1).

6.3.5. Results based on the ECM: Short run relationship between lagged and current level of human welfare in SSA

Again, we find from Table 6.4 that lagged levels of human welfare (DLNHDI(-1) tend to explain a large share of the variation in current levels of human welfare (DLNHDI). That is $\delta_{i,t-j}^{hdi} > 0$ in equation (7). As such, if welfare were high in the last period, it tends also to be higher in the subsequent period. The implication here is that welfare levels between the poorer countries and the richer ones in SSA are diverging. This is consistent with our finding in Chapter Two that incomes in SSA are diverging between the richer and the poorer countries and is also consistent with Pritchet (1997) who has suggested that incomes between the rich and poor countries have been diverging since 1870 contrary to the Solow (1956) model and the idea of catch-up or convergence.

In all, this study finds that financial development has a larger impact both in the short and long run on living standards in highly unequal countries in SSA at the early stages of economic development, and that this also depends more on the size rather than depth of the financial sector. It also finds that on average, higher levels of income inequality in SSA (GINI>45) are positively and significantly correlated with higher levels of human welfare, regardless of macroeconomic and institutional factors. Nonetheless, the level of human welfare in SSA also depends on other factors as discussed in Chapter Five section 5.2.3, to which we now turn.

6.4. Results based on the VECM: Long and short run relationships between the control variables and human welfare

Results here are discussed based on Tables 6.2 and 6.4 which are the output for estimating the VECM equations represented by equations (2) and (7). For brevity, discussions are limited to those variables which have been found to be statistically significant at the conventional 5 percent level. These control variables are grouped under four broad categories (i) macroeconomic policy, (ii) International openness, (iii) institutional quality, and (iv) demographic characteristics.

6.4.1. Macroeconomic Policy and human welfare

In this section, the estimated relationships between the real exchange rate (LRER) and human welfare on the one hand, and government consumption expenditure (LGCY) and human welfare on the other, shall be explored.

(i) Bilateral real exchange rate and living standards in SSA: As can be observed in Tables 6.2 and 6.4, there is a positive and significant long run relationship between the bilateral exchange rate ($\boldsymbol{LRER}_{it}(-1)$) and human welfare measured using the human development index. That is $\boldsymbol{\lambda_i} > 0$ in equation (2). This relationship is similar to the short run outcome because the coefficient of the first lag ($\boldsymbol{\theta}_{i,t-j}^{\boldsymbol{hdi}} > 0$) of the bilateral exchange rate index ($\boldsymbol{DLRER}_{it}(-1)$ in the ECM is also positive and significant at 5 percent. According to our RER index created in Chapter Four, an increase in the index implies that there has been an appreciation in the local currency. Therefore, these results suggest that long and short run appreciations of the relative value of local currencies relative to the US dollar have been beneficial for the welfare of an average person in these countries during the period 1990-2010. This finding is counter-intuitive to the theoretical argument that appreciation of exchange rates gives rise to the Dutch disease syndrome, especially for countries whose major exports are primary commodities (Sachs and Warner, 1997; Sala-i-Martin and Subramanian, 2003; Collier and Hoeffler, 2004; Isham et al., 2005; Collier, 2006; Busse, 2010).

In this conjecture, if exchange rates are high relative to trading partners, countries lose in competitiveness since it becomes very expensive for such foreign partners to buy from them. For example, it is held that the combination of weak exchange rate management ability of Monetary Authorities of developing SSA countries and massive inflows of foreign Aid (a culprit of artificial exchange rate appreciation) could have caused an artificial appreciation of local currencies. Such an appreciation of the bilateral real exchange rate is expected to translate into a depression in economic growth and consequently living standards (Prasad *et al*, 2006; Rodrik, 2008; Elbadawi *et al.*, 2011). Thus, Rodrik (2008) suggests that it is undervaluation that is good for growth and welfare in developing countries because the rate of return on capital employed increases for the tradable goods sector. Ironically, Levy-Yeyati and Sturzenegger (2007) have suggested that undervaluation has both benefits and costs. For example, undervaluation might lead to massive inflow of capital, raising reserves and inflation which have negative consequences on welfare if governments fail to adequately sterilize massive capital inflows.

Nonetheless, if we compare the case of the Netherlands where the idea of the Dutch disease originated with the currency appreciation in SSA, we find a contrast. Contrary to the Netherlands which had a strong manufacturing industry that suffered because of appreciation of exchange rates due to massive inflows of foreign reserves from sales of oil discovered in the North Sea, SSA has a manufacturing sector that accounts for just about 10 percent of GDP for the period of this study (see Chapter Two Section 2.1.3). As such, very little of what constitutes its GDP was manufactured and maybe exported, whereas, what was imported both for consumption and as inputs for production were cheaper owing to the strength of the currencies.

Therefore, the rise in the real currency values enabled the sample SSA countries to purchase both consumption and investment goods at cheaper rates from their foreign partners. Thus, agricultural inputs and most consumption products including medicines and baby food which are mostly imported should have benefited from this real appreciation of the local currencies. Such increases in imports have been beneficial to the population in that it has contributed to increased output which tends to have a deflationary effect on prices and consequently enhances human welfare. Furthermore, in spite of relative appreciation of exchange rates, SSA countries did not lose competitiveness in the primary industry during this time because World demand for primary products has been vigorous until oil prices started tumbling in 2014. Hence exports in the tradable goods sector has remained sustainable and welfare enhancing contrary to Elbadawi *et al.* (2011) who have found that overvaluation has been bad for export diversification and detrimental to SSA's growth.

(ii) Government expenditure and human welfare: The long run relationship between government expenditure ($\boldsymbol{LGCY}_{it}(-\mathbf{1})$) and human welfare is negative, though insignificant at five percent level, as seen in Table 6.2. However, short run increases in government expenditures ($\boldsymbol{DLGCY}_{it}(-\mathbf{1})$) have a negative and significant relationship with human welfare at 5 percent. That is $\theta_{i,t-j}^{hdi} < 0$ for government consumption expenditure. This finding is counter-intuitive as one would have expected that government expenditures in welfare programmes like free primary education (as we discussed in Chapter Two section 2.1.2) and better healthcare facilities should be beneficial for human wellbeing. Also, if governments spend money to provide security which makes the environment conducive for economic activities, then it should be beneficial for human welfare as well (Gomanee et *al.*, 2005). However, it appears that governments in SSA are spending their tax incomes in ways that are not beneficial to the general population. Such may

include repayment of interest and principal on foreign debt, especially since the majority of the countries in our sample were classified as heavily indebted poor countries by the World Bank (Serieux, 2011).

Past studies such as Barro (1997, 2000) have found that government consumption expenditure is damaging to the prospect for economic growth because governments are inefficient, wasteful and corrupt. For example, government officials in developing countries have been noted to be involved in capital flight which drains these countries of necessary resources for social development (Boyce and Ndikumana, 2001; Serieux, 2011). Also, governments in SSA spend more on defence and other pet projects while very little of what is earmarked for healthcare and education actually gets spent on improving the provision of these services especially for populations living in the rural areas (Easterly, 2006). For example, Chunling *et al.* (2010) find that for every $1 given to SSA governments as development assistance for healthcare, Ministries of finance reduce healthcare funding by between $0.43 and $1.14. This suggests that governments are not spending tax revenue on what matters for welfare in these countries hence justifying perhaps in part what this study has found.

6.4.2. International openness and wellbeing

Discussions here are based on the relationship between openness to trade (LTRDY) and human welfare and between this latter variable and overseas development assistance (LODAY). We discuss these relationships in turn.

(i) Openness to trade and human welfare in SSA: Column 1 of Table 6.2 shows that past levels of trade as a percent of GDP ($\boldsymbol{LTRDY}_{it}(\boldsymbol{-1})$) have a positive and significant long run relationship with future levels of human welfare with a t-statistic of 1.91. That is $\lambda_i > 0$ when X is LTRDY in equation (2). Also, there is positive and significant relationship at 5 percent between past short run increases in trade (DLTRDY(-1)) and current human welfare (DLNHDI) as seen in Table 6.4. Therefore, building trade capacity in order to improve wellbeing should be seen in SSA as a crucial policy matter. In effect, openness to trade has been an important engine for the improvement of human welfare in SSA during the period 1990-2010 consistent with the suggestions of Bhagwati and Srinivasan (2003) and the findings of Bruckner and Lederman

(2012) who also found that trade has been beneficial for SSA. As we saw in Chapter Two, trade as a share of GDP massively improved during the 1990-2010 period in SSA to reach 75 percent of GDP.

Though it was suggested above that there has been an appreciation of local currencies during this period, buoyant World demand for primary commodities also helped trade overall in SSA. It is reasonable to presume that any improvements in the trade in non-oil primary commodities have had a significant impact on the average incomes of people in the selected SSA countries. Such improved average incomes have also likely contributed to improvements in health and education outcomes, on average. In fact, Pinkovskiy and Sala-i-Martin (2010) and Chen and Ravallion (2010) have found that poverty is falling in SSA faster than expected since 1995 when SSA rebounded from an economic slump. Thus, trade openness has not been bad for human welfare over the two decades considered for this study, contrary to what Rodrik (1997) had suggested.

(ii) Foreign aid and human welfare: Regressions 1 and 2 in Table 6.2 show that past levels of official aid as a share of GDP ($\boldsymbol{LODAY}_{it}(\boldsymbol{-1})$ have a positive and significant long run relationship with human welfare with a t-statistic of 3.6. That is $\lambda_i > 0$ when X is LODAY in equation (2). However, past short run changes in Aid ($\boldsymbol{DLODAY}_{it}(\boldsymbol{-1})$ appear not to have had any significant effect on current improvements in human welfare at the 5 percent level as seen in the ECM results with GLS in Table 6.4 column 1. However, the short run relationship is positive and significant at 5 percent in column 2 of Table 6.4 with credit to the private sector (DCPSY) as the measure of financial sector development. As such, overseas development assistance has been beneficial for improvements in human welfare in SSA probably feeding through the banking system as credit. This is consistent with Elbadawi *et al.* (2011) who find that the negative effect of Aid through currency overvaluation is attenuated by financial development. In any case, Aid that was directed to improving education and healthcare outcomes in SSA during the period 1990-2010 is likely to have been beneficial for human welfare like we saw in Chapter Two Sections 2.1.1 and 2.1.2.

In effect, Gomanee *et al.* (2005) who studied the direct relationship between foreign aid and welfare using the human development index (HDI) suggests that though foreign Aid might not have contributed to economic growth in the last two decades, it significantly enhanced living standards in SSA by its positive and significant effect on the other components of the HDI –

health and education - and its enhancement of investments in capital goods. That is, even though SSA did not grow on average in the 1990s, the other facets of the HDI - education and healthcare - did considerably improve during that period, as confirmed by our analyses in Chapter Two sections 2.1.1 and 2.1.2. Unfortunately, the positive effect of Aid on human welfare has been denied by several researchers who claim that massive inflows of foreign Aid dollars causes exchange rate misalignment considered to be bad for growth (Collier and Goderis, 2007; Rajan and Subramanian, 2006; Easterly, 2003, 2006). However, our finding above that the real exchange rate has been favourable in the long run for this group of SSA countries, and the finding by Elbadawi *et al.* (2011) that foreign Aid is not a significant contributor to exchange rate overvaluation in SSA, should cast some doubts on this assertion.

Another argument suggesting that Aid is not good for economic growth is that Aid leads to civil wars and ethnic fractionalization because factions or militias are created in order to take control of Aid money from incumbents (Collier, 2007). These crises do not only destroy physical capital but also social and human capitals which are needed for production and improvement in living standards. Then too, Aid is said to promote a culture of corruption and capital flight in the famous 'revolving door' conjecture, thus fails to contribute to ameliorate the conditions of the poor in SSA. In fact, Collier *et al.* (2001) found that compared to other developing countries, SSA has a larger share of private assets held abroad while Boyce and Ndikumana (2001) found that SSA is a 'net creditor' as its stock of private wealth held abroad is higher than its stock of debts.

Furthermore, Serieux (2011) reinforces the argument that foreign aid to SSA finances 'reverse flows' such as debt service, capital flight and reserve accumulation with reverse flows accounting for 50 percent of all Aid to SSA for the period 1980-2006. Thus, according to these researchers, Aid displaces domestic savings and consequently investments necessary for economic growth. In these ways, it is suggested that Aid fails to provide the needed social safety nets that it is destined for. However, it appears that Aid has been directed to improving welfare by enhancing capacities in education and healthcare as well as in building necessary infrastructure. As such, though SSA suffered from some civil wars during this period, Aid might not have been the underlying cause. We suggest therefore that most Aid to SSA has been directed towards improving the quality of life rather than growth enhancing projects for which these researchers find that Aid has not been effective.

6.4.3. Quality of institutions and human welfare in SSA

This study has also uncovered that the quality of institutions ($\boldsymbol{PCI2}_{it}$) in SSA have been bad for current improvements in human welfare at the 5 percent level of significance. In fact, as can be seen in column 1of Table 6.4, the quality of institutions has been detrimental to living standards in SSA. This is intuitive as the literature discussed extensively in Chapter Two suggests that SSA's predicaments are strongly tied to its poor quality of institutions. For example, frequent civil wars and unrests, ethnic fractionalization, absence of freedom and political rights have all been found to create and reinforce deplorable institutions which are bad for investment and growth in SSA (Easterly, 2003; Collier, 2007; Go *et al*, 2007).

In addition, restraints to political rights and civil liberties have helped to fuel public unrest which has likely contributed to an increase in the risks of crime. Such has also promoted the destruction of business and property, with a consequent augmentation in the costs of doing business and a decline in the attractiveness of these countries to foreign investors. Then too, we can suggest that the usual problems attributed to Aid might just be a problem of the quality of existing institutions. For example, it is claimed that Aid leads to corruption and capital flight thus fails to contribute to ameliorate the conditions of the poor in SSA (Collier *et al.*, 2001; Boyce and Ndikumana, 2001). So in effect, it is corruption as an institution that hinders growth and not Aid *per se.* Therefore, we think that the quality of institutions has remained a binding constraint against growth and the enhancement of human wellbeing in SSA.

6.3.4. The Size of Rural Population and human welfare in SSA

The size of the rural population ($\boldsymbol{LRPOP}_{it}$) has a significant negative relationship with the human development index ($\boldsymbol{LNHDI}_{it}$) whether in the long run or in the short run. That is $\lambda_i < 0$ in equation (2) and $\theta_{i,t-j}^{hdi} < 0$ in equation (7) as seen respectively in Tables 6.2 and 6.4. Thus, it can be suggested that the size of the rural population in SSA is amongst the greatest constraints to the improvement of the quality of life there. This is quite appealing because rural districts and villages in SSA lack the basic necessities of life such as potable drinking water, schools, hospitals, electricity, and roads, which all contribute to the quality of life.

Also, it is more difficult for populations in the rural areas to have access to appropriate medical care owing to absence of hospitals in villages and bad roads linking the villages and the towns where hospital facilities exist. Then too, farm produce in the rural areas can hardly reach markets in the cities owing to bad roads. Therefore, populations in rural areas suffer loss of income with the absence of facilities to preserve perishable foodstuffs, consequently suffer more poverty and hunger. In fact, Pinkovskiy and Sala-i-Martin (2010), Chen and Ravallion (2010) have demonstrated that there is a rural-urban differential in poverty rates and infant mortality, with more poverty in the rural areas in SSA.

6.5. Multivariate Causality Analysis

Causality can be asserted by observing the significance of the coefficients of the independent and control variables in equation (7) as presented in Table6.4 as well as the significance of the error correction term in tables 6.2, 6.3 and 6.4.

A significant coefficient of any of the independent variables in the adjusted ECM in Table 6.4 suggests that there is short run causality whereas an insignificant coefficient suggests its absence. According to Asafu-Adjaye (2000), this kind of causality is weak Granger causality because the dependent variable responds only to short term shocks.

Subsequently, the presence (or absence) of long-run causality can be reviewed by examining the significance of the speed of adjustment parameters $\beta_{i,j}^{hdi,fd}$ or the coefficients of the $ECT_{i,t-1}^{hdi,fd}$which illustrate how fast deviations from the long-run equilibrium are eliminated following changes in each variable.

Furthermore, a standard Wald F-test of joint significance can be used to test the null hypothesis that there is no causality when the ECM(-1) coefficient is combined with each of the lagged independent variables of the VECM. This joint test is said to be a test for strong causality (Oh and Lee, 2004) because two sources of causation are jointly checked. As Asafu-Adjaye (2000) has remarked, this kind of causation will reveal the variables in the system which tolerate

the burden of short run adjustments, and which enable long run equilibrium to be re-established once the system is shocked.

Table 6.4: Evaluation of weak and strong causality from the VECM

Variables		**Weak Causality**	Wald F-test Joint significance	F-statistic	**Strong causality**
ECM(-1)	C(1)				
D(INQLM2Y(-1))	(C4)	YES	C(1)=C(4)=0	1.53 (0.22)	YES
D(LODAY(-1))	(C5)	NO	C(1)=C(5)=0	43.93*** (0.00)	NO
D(LRER(-1))	C(6)	YES	C(1)=C(6)=0	0.19 (0.66)	YES
D(LTRDY(-1))	C(7)	YES	C(1)=C(7)=0	1.33 (0.25)	YES
D(LRPOP(-1))	C(8)	YES	C(1)=C(8)=0	9.66*** (0.00)	NO
D(LGCY(-1))	C(9)	YES	C(1)=C(9)=0	118.90*** (0.00)	NO

*Values in parenthesis are p-values and *, **, *** represent respectively significance at 10, 5 and 1 percent.*

A joint analysis of Tables 6.2 and 6.4 reveals that there is weak causality from the following variables to human welfare based on the ECM: *the interaction between financial development and income inequality, the bilateral real exchange rate, trade as a percentage of GDP, rural population and government consumption expenditure*.

However, when it comes to strong causality, *only the interaction term between financial development and income inequality, the real bilateral exchange rate and trade as a share of GDP* are strongly causal in SSA. Therefore, these are the variables which strongly lead human development in SSA.

Contrastingly, lagged differenced terms of the human Development Index variable (DLHDI) does not cause any of the financial sector development variables at the 5 percent level suggesting that the development of the financial sector leads human development both in the short and long run. (See Appendix IV Table 6.9 for the VECM with LM2Y as dependent variable)

Furthermore, a robustness check for the weak causality conclusions above were done by performing a *VEC Granger Causality/Block Exogeneity Wald test* in EViews version 8.0 to directly detect short run causality of the differenced terms of the independent variables. The results presented in Appendix IV Table 6.10 reveal as above that, short-run causality runs uniquely from the broad money (LM2Y) measure of financial sector development to the HDI at the conventional five per cent level, at least, for the highly unequal countries.

In all, what really matters for human welfare in SSA seem to be financial sector development, effective management of real bilateral exchange rates and openness to trade.

6.6. Summary of findings

From the foregoing analysis, five broad findings have been reached. *Firstly*, financial sector development disproportionately enhances human welfare in the long and short run in the highly unequal group of countries in SSA (GINI>45) for which average long run M2Y on GDP is about 25 percent, consistent with our main hypothesis that finance works better for living standards where income inequality is higher. Such an outcome could be expected because there is increasing returns to scale as the financial sector develops from a lower level (Saint-Paul, 1992). That is, as the financial sector enlarges, it can mobilize more resources to support the development of the economy with a possible impact on living standards.

Even though the poor may have limited access to the formal financial sector at the early stages of economic development when human capital is still very low and investment capital is the more important factor driving economic development, the liquidity and transactions functions of money are also crucial for the poor. Also, it is more beneficial that more savings in the financial system be channelled to the rich who have a higher capacity to invest in higher return projects and to save. This latter suggestion has the corollary that it would widen income inequality but it could also enhance human welfare by promoting income growth and job

creation. In which case, the poor are likely to have access to better paying jobs to build assets whereas governments could collect more tax revenues to support social services.

Interestingly, the short run result disagrees with the findings of Loayza and Ranciere (2006) that finance hurts income growth in the short run because as financial systems develop there are bound to be periods of instability like banking crises and boom-bust cycles which are hurtful to growth and consequent social wellbeing. This assertion is arguable in the case of SSA for two reasons. One reason may be that the results of Loayza and Ranciere (2006) were influenced by the economically and financially developed countries in their sample. In effect, Arcand *et al.* (2015) and Aizenman *et al.* (2015) have reported that short run volatility and financial fragility occurring in countries with high private credit to GDP ratios where some have reached above 80 percent tend to negatively affect short run development outcomes. This has been observed in practice in Mexico and other Latin American countries during the 1994-95 financial crises, South East Asia during the 1997-1998 Asian financial crises, Russia in 1998 and more recently the 2007-2008 financial crises that impaired growth and welfare in most European countries and the United States. Another reason is that most of the SSA countries in our sample have not suffered from any major financial crises during the period 1990-2010 and most have returned to growth since about 1995, following costly economic crises in the 1980s and the structural adjustment programmes that ensued;

Secondly, the findings of this study also tend to suggest that broad money (M2) is the most apposite measure of financial development in SSA because its interaction with income inequality has a positive and significant relationship with human welfare both in the short and long runs as opposed to private credit whose relationship with human welfare is only positive and significant in the long run. This may be so because private credit does not take into account credit to government enterprises which represent a large segment of the productive sector in SSA (see Singh and Huang, 2015). Moreover, because a large fraction of private credit in SSA is short term credit and that most transactions are cash-based, M2 might be telling a better story about financial development in SSA at its current level of financial and economic development. This could also be the reason why Fowowe and Abidoye (2012) do not find a significant relationship between private credit and poverty in SSA. However, Singh and Huang (2015) suggest that the relationship with private credit may require that private credit be interacted with a measure of property rights. Then too, we find that welfare levels in SSA between the richer and the poorer countries have been diverging because high welfare in the past period tends to be associated with higher welfare in the subsequent period.

Thirdly, income inequality does not necessarily depress human welfare. In effect, on average, countries with larger income inequality tend to also have higher living standards and better developed financial systems in SSA, both in terms of size and depth. Thus, we may surmise that countries in the early stages of economic development which fail to show significant impact of the financial system on living standards either lack skills to undertake higher return projects or return to scale is yet to set in because the size of the financial sector in such countries is still small (Saint-Paul, 1992);

Fourthly, improvements in openness to trade, appreciation in real exchange rates and official Aid did contribute positively and significantly to the higher living standards enjoyed by countries in SSA in the period 1990-2010 whereas government expenditure, the quality of institutions and the size of the rural population in these countries are serious binding constraints for living standards improvements.

Finally, Strong causality in SSA runs uniquely from financial sector development (M2Y), the real bilateral exchange rate and openness to trade to human welfare. Therefore, policy wise, these are the most crucial variables which policy makers can use to accelerate social welfare in SSA. Consequently, enlarging the size of the financial sector especially in the more equal countries should provide greater gains to the quality of living standards.

In the next sections, robustness checks of our findings shall be performed by comparing the results of changing the dependent variable; from the multidimensional human development index to the under-five infant mortality rate (a one dimensional measure) frequently used by previous authors to capture the quality of human welfare.

6.7. Robustness of findings

6.7.1. Introduction

The main objective of this chapter is to test the robustness of the human development index as a measure of human welfare. This shall be achieved by checking the sensitivity of the results obtained and summarized in section 6.5 above to an alternative definition of human welfare. For the purposes of this study, this shall be done by replacing the multi-dimensional measure of human welfare (HDI) with the one-dimensional measure – under-five infant

mortality rate (LIMRU5) previously used by some authors including Claessens and Feijen (2007) and Go *et al.* (2007), on the grounds that this measure can easily be interpreted. The discussions in this section shall be based on Tables 6.6 and 6.7 below. As in the previous chapter, this current one starts with the examination of the fitness of the model for our purpose and then the suggested effects of the included independent and control variables and *finally* a multivariate causality analysis.

6.7.2. Diagnostic statistics and LIMRU5 model fit

In what follows, the results of Table 6.2 and 6.4 of this chapter shall be compared with those obtained using the under-five infant mortality rate as dependent variable. In effect, we have placed the results obtained in tables 6.2 and 6.4 with those obtained for the under-five infant mortality rate VECM side by side in Tables 6.6 and 6.7 below for ease of comparison. The focus for our discussions shall be columns 1 and 3.

However, results for column (3) and (4) shall also be compared from time to time in order to highlight the sensitivity of our estimated coefficients to an alternative definition of the financial intermediation variable. It can be observed from Table 6.6 below that the adjusted R^2 of 0.58, and an SBC of (-1.24) for the IMRU5 regression 3, is not as fit as the LNHDI regression 1 with an adjusted-R^2 of 0.83 and an SBC of (-2.16). Regression 1 also has a better F-statistic and Durbin Watson Statistic. Taken together, these results suggest that the multidimensional HDI variable is a better measure of welfare in models that evaluate the overall impact of financial intermediation on human welfare.

Table 6.5: Robustness of long-run model to change of dependent variable (HDI to IMRU5)

LR Cointegrating Equation:	1	LR Cointegrating Equation	2	LR Cointegrating Equation	3	LR Cointegrating Equation	4
LNHDI(-1)	**1**	**LNHDI(-1)**	**1**	**LIMRU5(-1)**	**1**	**LIMRU5(-1)**	**1**
LM2Y(-1)	**-0.018 [-0.171]**	**LDCPSY(-1)**	**-0.09 [-1.14]**	**LM2Y(-1)**	**-0.06 [-0.59]**	**LDCPSY(-1)**	**0.13** ** **[2.09]**
INQLM2Y(-1)	**0.86*** [3.94]**	**INQLDCPS(-1)**	**0.41*** [2.74]**	**INQLM2Y(-1)**	**-0.67*** [-2.93]**	**INQLDCPS(-1)**	**-0.31*** [-2.55]**
LODAY(-1)	0.21*** [3.50]	LODAY(-1)	0.29*** [4.32]	LODAY(-1)	-0.5*** [-7.55]	LODAY(-1)	-0.47*** [-8.26]
LRER(-1)	0.06** [2.57]	LRER(-1)	0.12*** [5.24]	LRER(-1)	0.02 [0.70]	LRER(-1)	0.01 [0.34]
LTRDY(-1)	0.25* [1.91]	LTRDY(-1)	0.27* [1.83]	LTRDY(-1)	-0.21 [-1.52]	LTRDY(-1)	-0.23** [-2.00]
LRPOP(-1)	-0.64** [-2.16]	LRPOP(-1)	-0.77** [-2.45]	LRPOP(-1)	-0.55* [-1.84]	LRPOP(-1)	-0.42* [-1.69]
LGCY(-1)	-0.22 [-1.24]	LGCY(-1)	-0.3 [-1.53]	LGCY(-1)	0.64*** [3.24]	LGCY(-1)	0.49*** [3.00]
C	1.98	C	3,65	C	-1,22	C	-2,38
	-0.08***		-0.09***		-0.07***		-0.10***

*Values in [ ] are t-statistics, *, **, *** indicate significance at 1%, 5% and 10% respectively, LNHDI=log of human development index, LIMRU5=log of under-five infant mortality rate*

Note: First two columns of this table correspond to results from Section 6.2 Table 6.2.

Table 6.6: Sensitivity of short run ECM to change in dependent variable from LNHDI to LIMRU5

ECM (DLNHDI)			ECM (DLNHDI)		ECM (DLIMRU5)			ECM (DLIMRU5)	
		1		2			3		4
ECM(-1)	C(1)	-0.08*** (0.00)		-0.09*** (0.00)	ECM(-1)	C(1)	-0.07*** (0.00)		-0.10*** (0.00)
D(LNHDI(-1))	C(2)	0.18*** (0.00)	D(LNHDI(-1))	0.27*** (0.00)	D(LIMRU5(-1))	C(2)	0.53*** (0.00)		0.48*** (0.00)
D(LM2Y(-1))	**C(3)**	**-0.02 (0.23)**	**D(LDCPSY(-1))**	**-0.01 (0.89)**	**D(LM2Y(-1))**	**C(3)**	**-0.04** (0.05)**	**D(LDCPSY(-1))**	**-0.02 (0.14)**
D(INQLM2Y(-1))	**C(4)**	**0.13*** (0.04)**	**D(INQLDCPS (-1))**	**-0.00 (0.99)**	**D(INQLM2Y(-1))**	**C(4)**	**-0.09 (0.12)**	**D(INQLDCPS (-1))**	**-0.03 (0.39)**
D(ODAY(-1))	C(5)	0.01 (0.13)		0.01 (0.17)	D(ODAY(-1))	C(5)	0.01 (0.21)		0.00 (0.65)
D(LRER(-1))	C(6)	0.08*** (0.00)		0.02 (0.41)	D(LRER(-1))	C(6)	0.00 (0.82)		0.01 (0.78)
D(LTRDY(-1))	C(7)	0.06*** (0.00)		0.07** (0.02)	D(LTRDY(-1))	C(7)	-0.01 (0.82)		-0.02 (0.36)
D(LRPOP(-1))	C(8)	-0.25** (0.02)		(0.28)** (0.01)	D(LRPOP(-1))	C(8)	-0.64*** (0.00)		-0.68*** (0.00)
LGCY(-1)	C(9)	-0.05*** (0.00)		-0.05** (0.03)	LGCY(-1)	C(9)	0.07** (0.04)		0.07** (0.02)
C	C(10)	-0.05*** (0.00)		-0.02 (0.11)	C	C(10)	-0.02 (0.35)		-0.06*** (0.00)
DUMINQBI	C(11)	0.22*** (0.00)		0.10** (0.00)	DUMINQBI	C(11)	0.14*** (0.00)		0.06*** (0.00)
D(PCI2(-1))	C(12)	-0.01** (0.00)		-0.01*** (0.00)	D(PCI2(-1))	C(12)	0.02*** (0.00)		0.02*** (0.00)
Test Statistics					***Test Statistics***				
Adj-R2		0.83		0.66	Adj-R2		0.58		0.62
SBC		(2.16)		(2.19)	SBC		-1,24		-1,21
DW		2.13		1.86	DW		1,73		1,76
F-Stat		34.34 (0.00)		14.86 (0.00)	F-Stat		10.88 (0.00)		12.43 (0.00)
Residual tests					***Residual tests***				
Normality Jarque Bera		1.06 (0.58)		1.33 (0.51)	Normality Jarque Bera		3.87 (0.14)		3.27 (0.19)
Autocorrelation		NO		NO	Autocorrelation		NO		NO

*Values in ( ) are t-statistics, *, **, *** indicate significance at 1%, 5% and 10% respectively, LNHDI=log of human development index, LIMRU5=log of under-five infant mortality rate*

Note: First two columns of this table correspond to results from Section 6.2 Table 6.4.

Also, both regressions 1 and 3 are stable as the co-integrating vector of the $\mathrm{IMRU5}_{it}$ and $\mathrm{LNHDI}_{it}(-\mathbf{1})$ - ECM (-1) have the required negative coefficient that is significant at the 5 percent level with LM2Y as the measure of financial sector development. The negative sign on the ECM suggests that there is a long-run relationship amongst the variables in both systems at the conventional five percent. These findings tend to suggest that though a model with LNHDI_{it} has a better fit, both multidimensional measures and one-dimensional measures of welfare such as the under-five infant mortality rate employed by Go et *al.* (2007), Claessens and Feijen (2007) are sufficient to capture long term dynamics in human welfare.

It would seem that the idea that a one-dimensional measure of poverty or welfare does not sufficiently capture the plight of the poor suggested by Sen (1999) is a long run fallacy. Also, regression 3 shows that lower initial level of infant mortality rates ($\mathrm{DLIMRU5}_{it}(-1)$) are associated with lower infant mortality rates in subsequent periods. This outcome is comparable to the results observed for the effect of initial human development index ($\mathrm{DLNHDI}_{it}(-1)$) in regression 1. This could be construed as evidence of divergence in living standards between the wealthy and the poor countries in SSA. Thus, the poorer countries may not be catching up with the richer ones as far as living standards are concerned as has been found in Chapter Two and lately Chapter Six.

In the sections that follow, we discuss the sensitivities of the signs, significance and impact of our variables of interest (financial sector development, income inequality and their interaction term) to a switch in the human welfare measure from HDI to the under-five infant mortality rate (i.e., regressions 1 and 3). Then we analyze the robustness of the marginal effects of the other variables included in our conditioning set. For there to be consistency between the two models, a variable with a positive relationship to the HDI should have a negative relationship with the under-five infant mortality rate since they both capture improvements or regress in human welfare in opposite directions. That is, a fall in the infant mortality rate would signify an improvement in human welfare whereas a fall in the HDI would mean a deterioration of human wellbeing.

6.8. Sensitivity of included variables to change in dependent variable in VECM

The first purpose of this section is to explore the robustness of the long run relationship between the independent variables – financial sector development and income inequality and their interaction – with human welfare measured using the one dimensional indicator under-five infant mortality rate. Then in a second section, the short run sensitivities of the same variables will be explored.

6.8.1. The long run relationship between INQ*LM2Y and under-five infant mortality

The long run relationship between financial sector development (whether measured using M2Y or credit to the private sector as percent of GDP) and human welfare measured by the under-five infant mortality rate is negative and significant at 5 percent for the highly unequal countries in our SSA sample as seen for cointegrating equation 3 in Table 6.6 above. This relationship is consistent with our finding in the previous chapter for the HDI cointegrating equation where the long run relationship is positive and significant at the 5 percent level (regression 1 above). Thus, LM2Y has a disproportionately higher and robust long run impact on human welfare in the highly unequal countries, whether welfare is measured using a one-dimensional or multidimensional indicator.

Interestingly, credit to the private sector $\text{LDCPSY}_{it}(-\mathbf{1})$ has a consistent long run negative and significant sign in both regressions 2 and 4 for the highly unequal countries. As such, the size and depth of the financial sector have been crucial for the disproportionate long run improvement in one and multi-dimensional measures of human welfare for countries with average GINI coefficient greater than 45 percent. However, cointegrating equation 4 with credit to the private sector (LDCPSY) shows that there is a significantly positive long run relationship between financial sector development and infant mortality in the more equal countries in SSA, which is inconsistent with regression 2.

In effect, regression 4 suggests that credit to the private sector has had a negative long run effect on human welfare measured by under-five infant mortality rate in the more equal SSA countries contrary to the size of the financial sector (LM2Y) (cointegrating equation 3). Therefore, according to the infant mortality measure, credit to the private sector has been

detrimental to long run living standards at least for the countries with GINI<45 percent. This finding is contrary to Loayza and Ranciere (2006) who suggested that credit to the private sector is good for long run income growth in low income countries even though they did not consider the level of persistent income inequality in some of these countries.

6.8.2. The short run relationship between the interaction term INQ*LM2Y and the under-five infant mortality

In the short run, lagged changes in the size of the financial sector in the highly unequal countries (DINQLM2Y(-1)) as seen in Table 6.7 equation 3 of the VECM does not have a significant additional effect on human welfare measured by the under-five infant mortality indicator, contrary to its effect on the HDI in regression 1. In fact, the interaction term of broad money and income inequality (INQLM2Y) is negative but significant only at 12 percent. This short fall may be due to the one-dimensional nature of the human welfare measure, under-five infant mortality rate. Interestingly, short run changes in the size of the financial sector (DLM2Y(-1)) are significantly negatively related to under-five infant mortality irrespective of the level of income inequality in SSA, contrary to the findings for HDI (regressions 1 and 2 above). Thus, improving on the size of the financial sector in the short run, we may reduce under-five infant mortality to similar proportions irrespective of whether this occurs in the highly unequal or more equal countries. However, that relationship is insignificant for the credit variable in regression 4, contrary to Claessens and Feijen (2007) who found that credit reduces under-five infant mortality using a sample of developing and developed countries to test the same relationship.

In sum, the size of financial sector measured by broad money (M2/GDP) is a crucial tool for long and short run enhancements of aggregate living standards in SSA especially for countries that tend to have higher income inequality (GINI > 45). However, this study has uncovered that only a limited short run additional effect of financial development on human welfare is present for the highly unequal countries in SSA when human wellbeing is measured using a one-dimensional measure like infant mortality. Interestingly, this study also finds that short-run changes in the size of the financial sector (M2/GDP) have been crucial for reducing the rate of infant mortality (to similar proportions irrespective of the level of income inequality considered).

6.8.3. Sensitivity of the income inequality - human welfare relationship

The dummy variable (DUMINQBI) which separates countries with higher income inequality from those with more equal income distributions is very robust across all model specifications. In fact, this variable is significantly positively associated to the human development index (LNHDI and also significantly negatively related to the under-five infant mortality rate (LIMRU5). Therefore, on average, countries with higher levels of income inequality enjoy better living standards than those with more equal income distributions in SSA, consistent with our findings in Chapter Four. Thus, both the one-dimensional measure of human welfare and the multidimensional measure are telling the same story with regards to this indicator.

In conclusion, the foregoing robustness tests tend to suggest three outcomes. *First*, a one-dimensional measure is not a very apposite indicator of living standards because it cannot capture the wider and additional impact of improvements in the financial sector on wellbeing especially for the highly unequal countries. *Second*, finance is equally important for enhancing welfare when measured in a narrow sense using a one-dimensional measure like infant mortality in both the highly unequal and more equal countries in SSA. However, finance shows an additional impact in the long and short run for a broader measure of human welfare in those SSA countries where average GINI coefficient is more than 45 percent. This is consistent with theories which suggest that in the early stages of economic development, financial imperfections which disproportionately channel capital to those individuals with the ability to invest in long-term higher return projects may be more effective in raising living standards (Galor, 2011; Demirguc-Kunt and Levine, 2009). *Third*, whether measured using the one-dimensional measure of livings standards (under-five infant mortality) or the multidimensional measure of human welfare (human development index), human wellbeing is better when financial sector development occurs in countries with wider income distributions at the early stages of development.

6.9. Impact of control variables on infant mortality

The sensitivity of the included control variables will be tested to a change in the dependent variable for the human development index to the infant mortality rate. For brevity, discussions here are based on those variables which are found to be statistically significant at the conventional five-percent level. These control variables are grouped under four broad categories (i) macroeconomic policy and (ii) international openness, (iii) institutional quality and demography, as in the previous chapter.

6.9.1. The Sensitivity of Macroeconomic Policy Variables

The variables considered here include the bilateral real exchange rate (LRER) and government consumption expenditure (LGCY).

(i) The bilateral real exchange rate (RER) index: Past levels of the bilateral exchange rate variable (LRER(-1)) have no significant relationship with the under-five infant mortality rate whether in the long or short run as regressions 3 and 4 of Tables 6.6 and 6.7 show. This is inconsistent with our findings using the lag of LHDI as our measure of human welfare (regression 1). Thus, the bilateral real exchange rate is not robust to a switch in the measure for human welfare from multidimensional to a one dimensional indicator such as the under-five infant mortality rate. Hence, the real exchange rate might have an income effect rather than a health effect which the HDI might have captured.

(ii) The Government Expenditure (GCY) Ratio: Consistent to our findings in regression 1, regression 3 shows that government consumption expenditure as a percentage of GDP has been counterproductive to early childhood survival in SSA, and this is significant at the conventional five percent level. The robustness of this variable in both specifications 1 and 3 may suggest that the negative effect of government consumption expenditure (LGCY) on human welfare in SSA is mostly through its direct effect on the healthcare component of the HDI. In fact, Chunling et al. (2010) found that during the period 1995 – 2006, whereas government expenditures on healthcare increased in other developing regions, it decreased in sub-Sahara Africa. For every US$1 of overseas development assistance to healthcare, governments decreased their expenditures to healthcare from local sources by US$0.43 to US$1.14.

Moreover, many of these SSA governments were under structural adjustment programmes during most of the time for this study. As such, they tended to prioritise debt repayments by cutting down on their budgets for priority sectors like agriculture and healthcare, as well as concurrently slashing the wages of public sector workers. The effect of these policies was a significant reduction in overall disposable incomes with consequent deleterious impact on living standards. Also, high corruption in SSA, cited by previous authors like Easterly (2006) and Collier (2007) means that very little of the funds earmarked for healthcare initiatives such as immunisation, training and recruitment of doctors and nurses actually gets to the intended departments.

6.9.2. International Openness

(i) The trade (TRDY) Openness variable: Openness to trade is not robust as it is both insignificant in the long and short run in the under-five infant mortality regression 3 compared to regression 1 where it is positive and significantly related to the human development index both in the long and short run. Thus, the infant mortality measure may not be adequately capturing the direct effect of trade on overall human welfare. We recall that income is part of the human development index and Bhagwati and Srinivassan (2003) have suggested that trade is an engine of income growth which is likely not captured by the infant mortality indicator of human wellbeing.

(ii) The Overseas Development Assistance (ODAY) Variable: The sign and significance for overseas development assistance (LODAY_{it}) is consistent between regressions 1 and 3 in Tables 6.6 and 6.7, suggesting that Aid is not sensitive to a change in the measure for human welfare. In effect, these outputs show that LODAY has a significant and beneficial long run effect on human welfare whether the concept of living standard is measured by a one-dimensional or multidimensional index of welfare. Also, it has no significant effect in the short run on both measures of human welfare. Thus, it would seem that official Aid has been important only in the long run for both education and healthcare. Again, the fact that changes in official Aid have been insignificant in the short run on the outcome of living standards suggest that either the amount of Aid has been insufficient or that it takes a long time for Aid interventions to yield results.

6.9.3. The Institutional quality (PCI2)) variable

Institutional quality (PCI2) is a robust determinant of living standards in SSA. As we saw in regression 1 and in regression 3 in Table 6.7 above, the quality of institutions ($PCI2_{it}(-\mathbf{1})$) in SSA is a binding constraint against the improvement of human welfare whether human welfare is measured using a one-dimensional or multi-dimensional index. This is consistent with theories which suggest that bad institutions promote civil unrests, which are bad for investments, economic growth and consequently human welfare (Easterly, 2003; Collier, 2007; Go *et al*, 2007).

6.9.4. Demography

The measure of demography, rural population variable (LRPOP) is sensitive to an alternative measure of the human welfare indicator. Whereas human welfare measured by the human development index (LNHDI) responds adversely to increases in the rural population variable LRPOP in regression 1), we find that rising rural population share is significantly negatively related to the under-five infant mortality rate (regression 3 in Table 6.7). This inconsistency in the relationship between human wellbeing and the percentage of population in rural areas is probably an indication that the under-five infant mortality variable is not an adequate measure of living standards.

After exploring the sensitivity of the control variables to a change in the dependent variable, the following sections shall explore the sensitivity of the causal effect of all the included independent and control variables.

6.10. Sensitivity of Multivariate Causality Analysis

Comparing the output of regression 3 Table 6.7 above with the output for the VECM analysis in Appendix IV Table 6.9 where LM2Y is the dependent variable, we see again as in our analysis section 6.4 that causality is unidirectional from financial sector development to human welfare, at least for the group of highly unequal countries. In fact, the ECM(-1) of the VECM with LM2Y as the dependent variable is positive and insignificant while the coefficient of the lagged under-five infant mortality term (DLIMRU5) is also insignificant.

Table 6.7: Sensitivity of the panel Causality test to change in dependent variable to IMRU5

Variables		Weak Causality	Wald –Test Joint significance	Strong causality
ECM(-1)	C(1)			
D(LM2Y(-1))	C(3)	YES	C(1)=C(3)=0	NO
D(INQLM2Y(-1))	(C4)	NO	C(1)=C(4)=0	YES
D(LODAY(-1))	(C5)	NO	C(1)=C(5)=0	YES
D(LRER(-1))	C(6)	NO	C(1)=C(6)=0	YES
D(LTRDY(-1))	C(7)	NO	C(1)=C(7)=0	NO
D(LRPOP(-1))	C(8)	YES	C(1)=C(8)=0	NO
D(LGCY(-1))	C(9)	YES	C(1)=C(9)=0	NO

Causality is estimated at 5 percent level of significance, Wald F-statistic

As can rightly be observed from table 6.6, whereas the short-run interaction term of financial development and income inequality in the under-five infant mortality ECM was insignificant at 10 percent, a joint Wald test of this variable and the ECM(-1) reveals that overall, financial development exhibits strong unidirectional causality on human welfare at least for the countries which are highly unequal and this is independent of whether a one-dimensional or multi-dimensional index is used to measure human welfare (See Table 6.5 and 6.8)

Then too though the real exchange rate does not exhibit weak causality as in shown in Table 6.7, the joint significance test reveals that it is strongly causal for human welfare in SSA. Only trade openness fails this causality test. However, foreign Aid which did not also show weak causality, turned out to be a strongly causal variable for a restricted definition of human welfare.

6.11. Summary of findings from robustness tests

This chapter sought to examine the sensitivity of the VECM model to a change in the dependent variable from a multidimensional indicator of human welfare to a one-dimensional measure. In effect, the human development index of the United Nations was replaced with the

under-five infant mortality rate from the World Bank. As such, our findings with HDI as dependent variable have been subjected to robustness checks to know if they remain consistent to the change in dependent variable. In sum, the sensitivity analyses have pointed out six key issues that have dominated most of the empirical work of this thesis.

Firstly, a change of the dependent variable did not affect the fitness and stability of the estimated VECM. In effect, the change did not affect the number of cointegrating equations used for the VECM. Also, the stability of the model was unaltered as ECM(-1) continued to be significant and negative at 5 percent with about the same magnitude as before. *Secondly*, this chapter also sorted to check the robustness of the long and short run relationships between the interaction term of financial development and income inequality to a change in the measure of living standards. In this connection, it was found that financial sector development measured by both the size (broad money) and depth (credit to the private sector) is a robust determinant of long run improvements in human welfare, at least in the highly unequal countries. Also, it was found that the effect of the size of the financial sector is robust in the short run, even though its positive impact on the infant mortality rate ECM is only disproportionately higher for the highly unequal countries in SSA at about 12 percent. As such, the results seem to suggest that a multidimensional measure of human welfare like the human development index may be a better variable than a one-dimensional measure such as the under-five infant mortality rate, in capturing the full impact of changes in financial sector policies on human welfare.

Thirdly, the robustness of the income inequality dummy was checked to ascertain that what was observed was not simply because the human development index was used. In effect, it was found that countries with higher income inequality continued to enjoy higher levels of human welfare measured by the under-five infant mortality rate. As such, irrespective of the human welfare measure used, the left arm of the Kuznets (1955) inverted U-shape hypothesis continues to be strong, at least for the highly unequal countries in SSA.

Then too, we sort to ascertain the robustness of the lagged dependent variable. In this wise, the robustness test revealed that welfare levels in SSA are diverging between the richer and poorer countries. This is so because the lagged terms of the dependent variables measuring the level of human welfare were both positively and significantly associated at five percent to their current levels. That is, if levels of infant mortality were low in a previous period, they also tended to be lower in the subsequent period.

Fifthly, this chapter also purposed to ascertain the robustness of the other included control variables to a change in the dependent variable. It was found that of all the control variables, only government consumption expenditure and the quality of institutions have negatively significant robust short run relationships with human welfare, irrespective of whether welfare is measured using a one-dimensional or a multi-dimensional indicator.

Finally, we sort to know if the variables which had been strongly causal in the previous chapter continued to be causal with a change in the measure of living standards. It was found that, whereas most of the variables which had revealed strong causality in section 6.5 were not even weakly causal in the ECM with under-five infant mortality at 5 percent, financial development and the real exchange rate are strongly causal for human welfare, at least in the highly unequal countries, irrespective of whether welfare is measured by a one-dimensional or multidimensional indicator. Additionally, foreign Aid is also strongly causal when human welfare is measured by an indicator of healthcare, the under-five infant mortality rate.

The next chapter will provide the conclusions of this thesis. In effect, it will give a summary of the results, policy implications of the study, limitations and recommendations for potential future studies.

CHAPTER SEVEN

GENERAL CONCLUSIONS

Introduction

The objectives of this chapter are fourfold. It aims firstly to provide a summary of the findings of this thesis. Secondly, it discusses some policy implications from the study. Thirdly, it presents the limitations of the study and finally provides some potential avenues for future research. These items will be discussed in turn in the following paragraphs.

7.1. Summary of Findings

This study set out to examine the relationship between human welfare and financial sector development conditional on the average level of income inequality in SSA. It is divided into six chapters. This present section shall endeavour to provide a summary of what was found in those respective chapters. However, it shall specifically insist on the results obtained in the empirical analysis chapter Six. The discussions shall begin with findings from Chapter Two and then progress sequentially to Chapter six which contains the results and sensitivity analysis of our findings before summarizing.

7.1.1. Findings from Chapter Two

To achieve its objectives, this thesis started off by trying to establish whether all trading blocs in SSA were similar in terms of their level of socio-economic development. This is important because SSA countries included in cross-country regressions have in the past been treated as a dummy in global datasets used to enquire on the determinants of living standards usually measured by income per capita growth. Thus in Chapter two, SSA was divided into three trading blocs (Economic Community of West African States (ECOWAS), Common Market for Southern African States (COMESA) and Central African Monetary and Economic Union

(CEMAC)) and these trading blocs were compared amongst themselves and with the group of Low and Middle Income Countries (LMICs) as per World Bank classification. This was achieved by performing an ANOVA analysis using simple t-tests to test the significance of the differences of the averages of the selected variables for the different trading blocs in SSA, SSA in general and the group of LMICs. From this analysis, five major issues emerged.

First, in terms of human welfare, it was found that SSA fell far behind the group of LMICs even though there was no overall pan-African malaise. That is, all SSA regions do not have the same average levels of socio-economic problems. In effect, within SSA, COMESA enjoyed the highest level of welfare in terms of health (measured by life expectancy and under-five infant mortality) and education (measured by adult literacy rate and gross enrolments in primary and secondary schools). Nonetheless, there was a pan-African malaise in terms of tertiary enrolment because all three trading blocs only recorded an average of 3 percent in gross tertiary enrolment compared to 17 percent in the group of LMICs for the period 1990-2010.

Also, whereas SSA as a whole tended to underperform the group of LMICs in average per capita income and in income growth for the period 1990 to 2010, there were significant differences between trading blocs in SSA. In effect, average income and income growth were higher in CEMAC followed by COMESA and lowest in the ECOWAS trading bloc. However, it appears that higher income growth in the CEMAC was largely driven by the petroleum boom in Equatorial Guinea that pushed average growth rates higher in the CEMAC bloc. In addition, within SSA, income inequality was highest on average in the CEMAC bloc followed by COMESA during the same period. Nonetheless, overall income inequality has been declining albeit slowly across the sub-continent and downside inequality measured by the poverty gap has also largely declined across SSA with greatest gains recorded in the CEMAC bloc which started with the largest poverty gap in 1990.

Secondly, with regards to macroeconomic policy, this study has found that savings as a share of GDP was very low in SSA compared to the group of LMICs. Indeed, a differential of about 17 percent separated the two groups over the period 1990-2010 and may be suggestive of a savings trap à la Sachs *et al.* (2004). However, savings, like investments, was highest in the CEMAC Area than in all the other trading blocs including the group of LMICs. This was mainly because savings in countries like Gabon and Equatorial Guinea have been about 50 percent of GDP since year 2000 (World Bank, WDI, 2011). Also, international trade-wise, SSA countries exported on average more than the group of LMICs during the period 1990-2010, but they also

imported more than they exported over the same period. Apart from the CEMAC bloc, COMESA and ECOWAS experienced a negative trade balance over the selected period. Thus, there is no pan-African malaise as per this measure of economic development.

Thirdly, with respect to financial sector development, SSA was underdeveloped financially whether measured by institutional or market development compared to the group of LMICs during the period 1990 – 2010. However, whereas there was a common malaise in stock market development measured by stock market liquidity, the COMESA bloc was the most developed when financial development is measured by institutional development in terms of size (M2/GDP) and depth (domestic credit to the private sector on GDP). Such was most likely due to the latter blocs' colonial origins, with higher white settler populations and better property rights (Acemoglu *et al.*, 2001).

Fourthly, in terms of international capital inflows, whereas SSA received more ODA as a share of GDP than the group of LMICs during the period 1990 – 2010, it was also more indebted than the group of LMICs. However, ECOWAS which received the most Aid over the period was also the most indebted trading bloc of the three selected for this study. Thus, while SSA is viewed as too over-dependent on Aid, it is precisely the ECOWAS bloc that is the chief culprit. Furthermore and consistent with neoclassical theory on international capital flows, SSA outpaced the group of LMICs by attracting more FDI as a share of GDP with the CEMAC bloc being the most attractive due to the discovery and exploitation of new oil fields in Equatorial Guinea in the 1990s and Chad more recently. In addition, whereas SSA and its sub-groups were laggards compared to the group of LMICs in attracting portfolio equity and bonds, they received more remittances as a share of GDP than the LMICs. However, the inflow of remittances was mainly to the ECOWAS trading bloc which happens to be the poorest amongst the selected SSA trading blocs. Therefore, this study could not find a pan-African malaise with respect to international capital inflows into SSA.

Finally, this study did not find that SSA countries have the same quality of institutions. In fact, it found that even though the ECOWAS sub-region is the poorest in SSA, it tends to have better institutions which promote political rights and civil liberties than the rest of SSA. This casts doubts on the unconditional proposition that better institutions promote better economic development. Again, the very poor performance of SSA taken as a group with regards to its quality of institutions is most likely greatly influenced by the gridlock that has stalled democratic processes, accountability and freedom of association in the oil and mineral-rich countries of the

CEMAC sub-region and elsewhere. In effect, incumbent Heads of States have remained in power for over three decades in most of the oil producing States. Surprisingly though, these oil rich states have enjoyed higher economic growth during the same period than those that had better institutions.

In general therefore, any socioeconomic study on SSA must treat countries as different and model them as such rather than use SSA countries in global datasets and treating them as similar through the use of a dummy variable. Thus, this study is justified to proceed with constructing a panel of just SSA countries to test whether financial development has been crucial for human welfare in a continent that has remained plagued with very high income inequality. To do this, it first explored literature linking financial sector development, income inequality and human welfare.

7.1.2. Findings from Chapter Three

In Chapter Three, both the theoretical and empirical literatures linking financial sector development, income inequality and human welfare were explored. Though, there is no existing framework to explore the joint and endogenous evolution of these three variables, this study has made use of studies which have linked these variables in pairs in order to draw five competing hypothesis which were subsequently tested in Chapter Six. The review of that literature led to six broad conclusions.

Firstly, financial sector development measured by depth (credit to the private sector percent GDP) and size (M2/GDP) indicators are on average, crucial factors for the improvement of living standards. This is so because it enhances economic growth and other one-dimensional measures of living standards such as poverty, schooling, under-five infant mortality, undernourishment and life expectancy in samples of developed and developing countries (King and Levine, 1993a,b; Levine, 2005; Beck *et al.*, 2007; Claessens and Feijen, 2006, 2007).

Secondly, low levels of financial development may not be relevant for welfare improvements in low income countries because financial markets are still limited and cannot provide the needed scale to undertake large above average risk projects which offer higher returns (Bencivenga and Smith, 1991; Saint-Paul, 1992). In this vein, there is a suggestion that the relationship between financial development and income growth cum human welfare could be non-monotone with some researchers holding that there could be a threshold from about 80-100

percent of GDP above which credit market expansion becomes detrimental to income growth and associated human welfare (Rioja and Valev, 2004a, b; Arcand *et al*., 2015; Aizemann *et al.*, 2015).

Thirdly, the long run and short run effects of finance are likely to be different with finance being relevant for income growth and welfare in the long run because it offers allocational efficiency, risk diversification, eases transactions and lowers transactions cost. However and according to the crisis tenet, financial development is most likely detrimental in the short run because of volatility and overall financial fragility that is common in the short run and which provokes economic crises with dire social consequences (Loayza and Ranciere, 2006; Kaminsky and Reinhart, 1999).

Fourthly, there is a suggestion that at the early stages of economic development when human capital is very low and income inequality high, financial development could lead to improvement in human welfare if the rich who have the capacity to borrow and invest in high rewarding projects benefit more from financial development due to credit constraints (Galor, 2011). Such projects are likely to provide opportunities even for the poor thereby improving overall average living standards. However, political economy proponents hold that because insiders block access into the formal financial sector when the financial sector develops, this latter rather widens income distributions and worsens living standards especially in poor developing countries (Rajan and Zingales, 2003; Claessens and Perotti, 2007).

Fifthly, financial development tends to reduce income inequality and enhance welfare approximated by the rate of change of absolute poverty in global cross-country samples (Honohan, 2004a; Beck *et al.*, 2007, Canavire-Baccareza and Rioja, 2008). *Finally*, in the long-run, income inequality is lower in countries where financial development is higher, even if the relationship between income inequality and income growth in highly developed financial systems is ambiguous and the relationship seems to be negative for developing countries including SSA.

To test these theoretical and empirical suggestions, data was used for 29 SSA countries that had continued data for the HDI from 1990 to 2010. The processing and description of these datasets was the focus of Chapter Four.

7.1.3. Findings from Chapter Four

The purpose of Chapter Four was to provide the sources, process and describe the data that would be used for subsequent analysis. The dataset was for 29 SSA countries from 1990-2010 and this was set up in five-year average panels except for the income inequality variable that was constructed as a dummy using GINI>0.45 as the cut-off point between low and high income inequality. In Chapter Two, it was revealed that average GINI for all SSA countries as a group was 0.45 on a scale from 0 to 1. Inspection of the constructed data revealed four key tendencies.

Firstly, for the 29 SSA countries selected, on average, the financial sector declined from 1990 until year 2000 before rebounding to higher levels comparable with those that had been achieved in 1990. Average broad money as a percentage of GDP and credit to the private sector percentage GDP were respectively, 23.6 and 15.6 percent during the period 1990-2010. *Secondly*, on average, human welfare whether measured using the UN Human Development Index or the under-five infant mortality rate has been steadily improving since 1990 for the 29 selected SSA countries. The average HDI on a scale of 0 to 1 and under-five infant mortality rate per 1000 babies born were respectively, 0.38 and 138.7 during the reference period.

Thirdly, average income inequality in SSA for the period of the study was quite high for the selected 29 countries. In fact, it was found that thirteen of the 29 countries considered had an average GINI coefficient in excess of 0.45 on a scale of 0 to 1. The income inequality dummy that was created then separated highly unequal countries from more equal countries based on the 0.45 threshold. *Finally*, on average, it was found that when income inequality is higher, financial sector development and human welfare also tended to be higher and vice versa for the selected SSA sample during the reference period.

Having processed and examined the characteristics of the data, this study proceeded in Chapter Five to specify and discuss the selected model, variables and other technicalities associated with analysing the model.

7.1.4. Findings from Chapter Five

The purpose of Chapter Five was to set up the selected vector error correction model (VECM), discuss the variables and potential biases that could affect the analysis of data. Unit root tests and Johansen cointegration tests were also conducted to ascertain nonstationarity and to know the number of cointegrating equations present in the system that would be used for subsequent error correction modelling. These tests revealed that most of our panel series had unit roots and were integrated of order one (I(1)).

These findings meant therefore that the panel series were adequate for cointegration analysis. Using EViews 8.0, the Johansen cointegration test was performed and revealed that there existed only one long run cointegrating equation for the selected model. These two findings taken together suggested that vector error correction modelling could be performed to establish both long and short run relationships between the independent variables and the dependent variable. The results of the VECM analysis are presented and discussed in Chapter Six, whose findings we summarize subsequently.

7.1.5. Findings from Chapter Six

The objective of Chapter Six was to present and discuss the results obtained from executing Johansen cointegration and the Vector Error Correction Model (VECM) using EViews 8.0. The analysis and discussions of the results revealed five broad findings. *Firstly*, financial sector development disproportionately enhances human welfare in the long and short run in the highly unequal group of countries in SSA (GINI>45) for which average long run M2Y on GDP is about 25 percent, consistent with our main hypothesis that finance works better for living standards where income inequality is higher. Such an outcome could be expected because there is increasing returns to scale as the financial sector develops from a lower level (Saint-Paul, 1992). That is, as the financial sector enlarges, it can mobilize more resources to support the development of the economy with a possible impact on living standards.

Even though the poor may have limited access to the formal financial sector at the early stages of economic development when human capital is still very low and investment capital is the more important factor driving economic development, the liquidity and transactions functions of money are also crucial for the poor. Also, it is more beneficial that more savings in

the financial system be channelled to the rich who have a higher capacity to invest in higher return projects and to save. This latter suggestion has the corollary that it would widen income inequality but it could also enhance human welfare by promoting income growth and job creation. In which case, the poor are likely to have access to better paying jobs to build assets whereas governments could collect more tax revenues to support social services.

Interestingly, the short run result disagrees with the findings of Loayza and Ranciere (2006) that finance hurts income growth in the short run because as financial systems develop there are bound to be periods of instability like banking crises and boom-bust cycles. These latter phenomena are hurtful to growth and consequently social wellbeing. This assertion is arguable in the case of SSA for two reasons. One reason may be that the results of Loayza and Ranciere (2006) were influenced by the economically and financially developed countries in their sample. In effect, Arcand *et al.* (2015) and Aizenman *et al.* (2015) have reported that short run volatility and financial fragility occurring in countries with high private credit to GDP ratios where some have reached above 80 percent tend to negatively affect short run development outcomes. This has been observed in practice in Mexico and other Latin American countries during the 1994-95 financial crises, South East Asia during the 1997-1998 Asian financial crises, Russia in 1998 and Argentina 2000-2001 with currency crises and more recently the 2007-2008 financial crises that impaired growth and welfare in most European countries and the United States. Another reason is that most of the SSA countries in our sample have not suffered from any major financial crises during the period 1990-2010 and most have returned to growth since about 1995, following costly economic crises in the 1980s and the structural adjustment programmes that ensued;

Secondly, the findings of this study also tend to suggest that broad money (M2) is the most apposite measure of financial development in SSA because its interaction with income inequality has a positive and significant relationship with human welfare both in the short and long runs as opposed to private credit whose relationship with human welfare is only positive and significant in the long run. This may be so because private credit does not take into account credit to government enterprises which represent a large segment of the productive sector in SSA. Moreover, because a large fraction of private credit in SSA is short term credit and that most transactions are cash-based, M2 might be telling a better story about financial development in SSA at its current level of financial and economic development. Then too, we find that welfare levels in SSA between the richer and the poorer countries have been diverging because high welfare in the past period tends to be associated with higher welfare in the subsequent period.

Thirdly, income inequality does not necessarily depress human welfare. In effect, on average, countries with larger income inequality tend to also have higher living standards and better developed financial systems in SSA, both in terms of size and depth. Thus, we may surmise that countries in the early stages of economic development which fail to show significant impact of the financial system on living standards either lack skills to undertake higher return projects or return to scale is yet to set in because the size of the financial sector in such countries is still small (Saint-Paul, 1992);

Fourthly, improvements in openness to trade, appreciation in real exchange rates and official Aid did contribute positively and significantly to the higher living standards enjoyed by countries in SSA in the period 1990-2010 whereas government expenditure, the quality of institutions and the size of the rural population in these countries are serious binding constraints for living standards improvements.

Finally, Strong causality in SSA runs uniquely from financial sector development (M2Y), the real bilateral exchange rate and openness to trade to human welfare. Therefore, policy wise, these are the most crucial variables which policy makers can use to accelerate social welfare in SSA. Consequently, enlarging the size of the financial sector especially in the more equal countries should provide greater gains to the quality of living standards.

7.1.6. Findings from Robustness check of results in Chapter Six

The essence of this section was to verify whether the results obtained in Chapter Six would be sensitive to a change in the depend variable. That is, from a multidimensional measure (HDI) of living standards to a one-dimensional measure (under-five infant mortality rate). This was important because several researchers including Sen (1999), Deaton (2013) have suggested that wellbeing is better measured by a multidimensional measure even though some authors including Cahill (2005) and Klugman *et al.* (2011) have suggested that because the HDI is a close correlate of income it may just be an unnecessary addition to the measures of human welfare. Then too, previous authors who have investigated the effect of financial development on living standards such as Claessens and Feijen (2006, 2007) have used one-dimensional measures such as the under-five infant mortality rate, life expectancy and even under-nourishment. The

sensitivity analyses revealed six key issues that have dominated most of the empirical work of this thesis.

Firstly, a change of the dependent variable did not affect the fitness and stability of the estimated VECM. In effect, the change did not affect the number of cointegrating equations used for the VECM. Also, the stability of the model was unaltered as ECM(-1) continued to be significant and negative at 5 percent with about the same magnitude as before. *Secondly*, this chapter also sorted to check the robustness of the long and short run relationships between the interaction term of financial development and income inequality to a change in the measure of living standards. In this connection, it was found that financial sector development measured by both the size (liquid liabilities) and depth (credit to the private sector) is a robust determinant of long run improvements in human welfare, at least in the highly unequal countries.

Also, it was found that the effect of the size of the financial sector is robust in the short run even though the positive impact on the infant mortality rate ECM is only disproportionately higher for the highly unequal countries in SSA at about 12 percent. As such, the results seem to suggest that a multidimensional measure of human welfare like the human development index may be a better variable than a one-dimensional measure such as the under-five infant mortality rate, in capturing the full impact of changes in financial sector policies on human welfare. This is important because households which receive a larger share of credit from the financial sector (see Buyukkarabacak and Valev, 2010, p. 1249) are likely to spend such money on health and education which would enhance welfare without necessarily increasing short run income.

Thirdly, the robustness of the income inequality dummy was checked to ascertain that what was observed in our findings in Chapter Six was not just dependent on the use of the human development index. In effect, it was found that countries with higher income inequality continued to enjoy higher levels of human welfare measured by the under-five infant mortality rate. As such, irrespective of the human welfare measure used, the left arm of the Kuznets (1955) hypothesis continues to be verified, at least for the highly unequal countries in SSA.

Then too, we sort to ascertain the robustness of the lagged dependent variable. In this wise, the robustness test revealed that welfare levels in SSA are diverging between the richer and poorer countries. This is so because the lagged terms of the dependent variables measuring the level of human welfare were both positively and significantly associated at five percent to their current levels. That is, if levels of infant mortality were low in a previous period, they also tended to be lower in the subsequent period.

Fifthly, this chapter also purposed to ascertain the robustness of the other included control variables to a change in the dependent variable. It was found that of all the control variables, only government consumption expenditure and the quality of institutions have negatively significant robust short run relationships with human welfare, irrespective of whether welfare is measured using a one-dimensional or a multi-dimensional indicator.

Finally, we sort to know if the variables which had been strongly causal in our results with the HDI continued to be causal with a change in the measure of living standards. It was found that, whereas most of the variables which had revealed strong causality were not even weakly causal in the ECM with under-five infant mortality at 5 percent, financial development and the real exchange rate are strongly causal for human welfare, at least in the highly unequal countries, irrespective of whether welfare is measured by a one-dimensional or multidimensional indicator. Additionally, foreign Aid is also strongly causal when human welfare is measured by an indicator of healthcare, the under-five infant mortality rate.

7.2. Policy implications of the findings and recommendations

The policy implications are based on the key findings of the primary regression models in Chapter Six and the sensitivity analysis of the same chapter using the Vector error correction model discussed in Chapter Five. In this regard, five policy implications and recommendations have been established.

Firstly, the finding from the VECM model has revealed that financial development measured using broad money (M2) disproportionately improves human welfare on average in a group of highly unequal SSA countries (GINI > 0.45) both in the long and short runs. Therefore, in striving to implement financial sector policies in SSA, the focus should not be entirely on whether it would reduce income inequality but rather on whether it would improve economic development that could subsequently put a dent on income inequality either in the short or long run. This is crucial because if SSA countries are still on the left arm of the Kuznets (1955) inverted U-shaped curve, an increase in financial development that increases wellbeing would likely have a negative effect on the distribution of incomes especially if credit market imperfections mean that the poor are locked out of credit markets. However, it is also important to know where the threshold for income inequality lies before it becomes a cause for social

unrest and political tensions that could erode economic gains and plunge the country into even further poverty and larger inequalities.

Secondly, since this study finds that M2Y has been strongly causal for human welfare in the highly unequal countries, causality that is unidirectional, and that these countries also happen to have higher average levels of financial development (broad money percentage GDP (M2Y) of 25 percent; private credit percentage GDP of 18 percent), it appears that higher levels of financial development will be relevant even for the more equal SSA countries (broad money percentage GDP (M2Y) of 21.7 percent; private credit percentage GDP of 14 percent). In which case, financial development would have to attain at least, the levels of the highly unequal countries. Yet it is not clear if increasing financial development in the more equal countries to the level of the highly unequal ones would produce the same effect. This is so because if what this study has found is due to the interaction with higher levels of income inequality and not just because of higher financial development, then higher financial development may not have the same effect in the more equal countries.

However, it is possible that if the more equal countries decide to speed up financial development, income inequality may also rise especially if insiders erect barriers to expropriate any gains of financial development (Rajan and Zingales, 2003). Yet also, it is possible to develop a financial system that would work both to increase the impact of finance and favour a tightening of the distribution of incomes. Such a system will not only lead to an increase in size and depth but would also widen access for the poor. This is crucial because the very reason why people are poor (lack of assets) is what locks them out from the financial system, perpetuating income inequality across generations. In order words, those who are able to benefit from the banking system are also those who have the assets either 'earned' or 'bequeathed' to them. But if those who receive additional bank credit have the capacity and ability to invest in rewarding projects or in expanding their existing ventures at the time when the poor lack the necessary assets to join the formal credit markets, their activities could enhance welfare by supporting income growth, providing taxes to governments and also better job opportunities for the poor. Such job opportunities would not only enhance average living standards but will also provide fodder to the poor to build assets that would open the way into credit markets.

In effect, it could be suggested that a sound financial sector policy to promote human welfare in SSA would be one that has the following six characteristics; (i) It must ensure soundness in order to enhance the capacity of such institutions to mobilize more resources that

should be channelled to those who have the capacity to undertake better rewarding investment activities that create jobs and pay taxes. Such a system would work well where there are good institutions and trade openness which are important for financial development (Huang, 2010); ii) improve on competition in the financial sector and deepen instruments for the transformation of short term deposits into long term loans such as developing the local currency bond markets. Several of these markets already exist in SSA but there is need to strengthen them to make financial development work better for SSA; (iii) SSA countries must work towards attaining at least 18 percent of GDP in private credit and over 25 percent of GDP in M2 and keep the financial sector at least at this level for long periods to ensure faster and sustainable growth over the long term. This can be achieved by ensuring that interest rates on loanable funds are kept low and that real deposit interest rates are positive which should reduce informal savings and hoarding;

iv) Avoid policies and behaviours that create volatility in the financial sector which would hamper growth and damage welfare in the short run by ensuring that there is no massive and rapid development of the financial sector than the real needs of the economy; (vi) Build robust financial systems that would enhance access of the poor into the formal credit markets. There is a need to recreate platforms that link banks to village cooperative societies in order to finance the activities of the poor who are mostly into agriculture. Unfortunately, volatility in the agricultural sector has also made it very difficult for agricultural banks to remain sustainable. But agriculture is also where a huge part of the poorer segments of population are concentrated. At least 68% of SSA populations live in the rural areas where the main activity is agriculture. Without adequate financing which targets specifically this group of persons, SSA may be far from building a financial sector that helps the poor also build assets. Regrettably, as we have seen over the years, microfinance which was touted as the financing instrument for the poor has sufficient outcomes in SSA which is why the World continues to talk about poverty and inequality in SSA over three decades since the advent of modern microfinance. Therefore, in addition to microfinance institutions, there is need for governments that are developmental to create platforms to link formal banks to agricultural financing. But Government should not create institutions of their own since government officials are not usually benevolent.

Thirdly, we have found that the UN HDI is an adequate measure of human welfare and that an empirical relationship with financial development has emerged. However, the new UN income inequality adjusted HDI (see UN HDR, 2010) may be problematic in the sense that this study has found, on average, for SSA that the HDI is higher when income inequality is also

higher. The UN premise for constructing this new index is that income inequality is bad for welfare and therefore welfare levels should be lower with higher income inequality. However, the more equal countries in SSA have not benefited for example from financial development which should have raised HDI levels. Yet, if they focus on trying to get some kind of equality of incomes, welfare levels may stagnate or regress because policies like financial development in early stage countries require a higher level of income inequality for there to be some form of allocational efficiency that drives both growth and welfare (Galor, 2011). This UN approach is therefore subjective and may deter countries from pursuing policies that enhance growth and welfare at the early stages of economic development because such policies may also increase income inequality.

Fourthly, whereas studies using income growth and other one dimensional measures of welfare such an infant mortality tend to yield ambiguous results on the relationship between human welfare and financial development, this study has found that the HDI is robust measure of human welfare. This is so because the HDI embodies three components that are important to measure economic development. If finance does not impact directly on income, it may improve health and education outcomes which are important to assess human welfare. As such we may find that whereas finance does not have an effect on income in SSA, it actually improves on average overall human welfare which is really the end of development. Hence, there is need to develop a better multidimensional measure of human welfare perhaps by using Principal Components Analysis (PCA) which the World will use in order to appropriately gauge human progress and ensure that policy options for the future are targeted at human wellbeing rather than only on ensuring income growth. The HDI is a good start towards achieving that purpose even though the aggregation problem of giving equal weights to income per capita, health and schooling still remains daunting. In any case, PCA could help the UN move away from the aggregation problem and provide a neutral and better index for the future.

Finally, this study has also found strong causality from the real exchange rate, trade openness and official Aid to human welfare. Therefore to accelerate development in SSA, countries need to focus on making these three crucial policy instruments work better for them. Adequate management of exchange rates will increase economic efficiency; trade is an engine for economic growth (Bhagwati and Srinivassan, 2003); official Aid works well for the health sector (strong causality when under-five mortality was used as measure of living standards) especially in very poor countries (Deaton, 2013). What we have found here is that financial development has been instrumental for the achievement of a two-third reduction in under-five

infant mortality rates in some SSA countries, consistent with the requirements of the MDG goals by 2015.

7.3. Research Contribution

As has been discussed in Chapter three, earlier studies which look at the relationship between financial development and some measures of human welfare have done so mostly using cross country datasets in which developed and developing countries are pooled together (Beck *et al*., 2007, Claessens and Feijen, 2006, 2007; Go *et al.*, 2007). Also, the estimation methods have been limited to OLS and its variants including GMM which do not provide a distinction between long run and short run relationships. Only Loayza and Rancière (2006) use the ARDL and the pooled mean group (PMG) estimator to study the long and short run relationships between financial development and income growth for countries with low, medium and higher levels of income. This study has therefore contributed in five key ways.

Firstly, by simple ANOVA analysis, it has shown contrary to those researchers who have usually considered SSA countries as one bad case without any sort of empirical proof, that SSA trading blocs are in fact different from each other and that a panel study can be done for SSA without necessarily running to a global sample. In so doing, this study has contributed to the debate on the African-dummy by exploring over sixty socio-economic variables which compare economic and social development amongst regional trading blocs in SSA. In effect, this study is suggesting that there is no pan-African malaise as far as socio-economic development of African countries are involved except perhaps when it comes to tertiary education and the liquidity of stock markets.

Secondly, this study has used for the first time the human development index to study the impact of financial sector development on living standards using an exclusive dataset of 29 SSA countries with consistent HDI data from 1990. This is the largest sample that has thus far been used for a study of this nature for the SSA region since the setting of the millennium development goals of halving poverty and reducing infant mortality by one-third from 1990 levels, the 2002 Monterrey conference on financing development and the 2005 G8 Glen Eagles summit to expand official Aid to SSA.

Thirdly, this study has added new evidence to the literature on the nature of the relationship between financial sector deepening and economic development by taking into consideration the role of income inequality in that relationship. That is, it has ventured into understanding the joint and endogenous movement of the three latter variables. Prior studies such as Beck *et al.* (2007) and Canavire-Baccareza and Rioja (2008) rather study the effects of financial development on growth, income poverty and income inequality in separate frameworks. However, this study has included an interaction term of financial development and income inequality and shown that financial development works better for human welfare in SSA where income inequalities are higher (GINI > 0.45) both in the long and short run.

Fourthly, this study has provided new evidence which challenges the view that the HDI is not an adequate measure of human welfare for empirical analysis by checking the consistency of results for the HDI with the under-five infant mortality measure. In fact, this study has found that as a multidimensional measure, it is a more apposite measure than the one dimensional measure (under-five infant mortality) when testing the effect of financial development on human welfare. Since finance can either contribute to income growth or improve health and education outcomes directly, the HDI can allow researchers capture the overall impact of finance on living standards rather than relying only on its indirect effects on human welfare through income growth. This finding is quite important because as suggested by Go *et al.* (2007), the aggregation methodology of the HDI has largely been criticized and it has sparingly been used in empirical works investigating the sources of human welfare.

Finally, this thesis has introduced co-integration and vector error correction modelling for the first time into research that uses panel data to study the effects of financial development on human welfare. The beauty of this approach is that, this study has obtained in a single framework the long and short run relationships between financial development and human welfare while at the same time controlling for potential endogeneity problems. It has also established for the first time that there is strong unidirectional causality from financial development to human welfare in highly unequal countries in SSA (GINI > 0.45) and for which financial development measured by broad money (M2) has attained 25 percent of GDP. Also, it has shown for the first time that there is strong causality from exchange rates, trade openness and official Aid to human welfare in SSA and that these could be crucial policy variables that if nurtured are likely to accelerate wellbeing in SSA.

7.4. Research Limitations

While the research findings of this thesis are important, there are some limitations to these findings that need to be pointed out. *First*, as was mentioned in Chapter Four section 4.1.5, data for the HDI was only available from 1990 and the corrected HDI series using the geometric mean aggregation formula provides data consistently only for 5 year intervals from 1990. Hence this study averaged the other panel series over five year periods consistent with Beck *et al.* (2007) and Singh and Huang (2015). Hence instead of having 21 time periods from 1990 to 2010 per country, this study ended up with 5 time periods. This shorter time series could have influenced the findings because cointegration works better for very long time series. However, panel aggregation of 29 countries helped increase the number of data time points to over 144 and this is thought to be the power of using panel data to test for unit roots and cointegration (Rapach and Wohar, 2004), even though panel data usually suffers from unobserved heterogeneity which could render its parameter estimates inefficient (Breitung and Pesaran, 2005).

Secondly, whereas this study set out to study the joint endogenous evolution of financial development, income inequality and human welfare, it was limited in that purpose by a lack in data for the income inequality variable. In fact, most SSA countries have fewer than three data points for the period of the analysis. To overcome this difficulty as discussed in Chapter Four section 4.2.3, this study had to use the available data points to calculate an average value for income inequality between 1990 and 2010. Based on this a dummy variable was created to separate countries using a GINI coefficient threshold of 0.45 which happens to be the average GINI for SSA as found in Chapter Two section 2.1.4. As such, this income inequality dummy might have simply separated countries with higher financial development from those with lower financial development. In which case, the findings of Chapter Six may not actually be related to the level of income inequality.

Thirdly, this study focused exclusively on the VECM as method of analysis which is said to have some weaknesses. According to Anderson *et al.* (2006) panel cointegration tests and estimation generally assumes that the number of cross-sectional units is large and does not allow for (i) the interaction of short run dynamics between cross-sections, (ii) the possibility that long-run equilibrium relationships exist between different cross-sections, (iii) cross-sectional dependence in the error terms, (iv) the difference in cointegration ranks across cross sections.

Nonetheless, it is suggested that if any of these possibilities holds then the results from them will likely be erroneous. This suggests that other methods of analysis like the ARDL and the PMG estimator used by Loayza and Ranciere (2006) could have been used to ascertain the robustness of the estimation method.

7.5. Areas for future research

Owing to the weaknesses identified above with regards to the results obtained in Chapter Six, five primary areas for further research can be recommended.

The *first* avenue for further studies could be to re-examine this SSA study using income inequality as a dynamic variable if and when such series become available. This is important because it is likely that some of the countries might have crossed the GINI = 45 threshold during the period 1990-2010. Thus, a dynamic variable of income inequality will be interacted with financial sector development to see whether our results with the static dummy variable are robust to using a dynamic variable. This could point out whether truly the interaction of financial development and income inequality matters for the finance - welfare nexus.

Secondly and as we have noted, this study is a departure for future researchers who may want to study the joint and endogenous movement of finance, human welfare and income inequality in one framework. As such, this same study can be done for individual countries with long enough time series to find out if the interaction of finance and income inequality has a greater impact on living standards in a country with higher income inequality compared to another with lower income inequality, both countries being at the same level of economic development.

Thirdly, other methods of estimation that can yield long and short run relationships can be used with similar datasets to estimate the robustness of the method of analysis used - Johansen cointegration and VECM. In this wise, an ARDL specification can be analyzed using the Pooled Mean Group Estimator (PMG) to estimate long and short run relationships as a check to the findings of the VECM method. Furthermore, this research can also be extended using other estimation techniques such as instrumental variables methods (2-stage least squares, 3-stage least squares) or the Generalized Method of Moments to verify the validity of the present findings and to extend our understanding of the causal forces at work in the relationship between financial

development, income inequality and human welfare. Fixed effect regressions can also be undertake to find out which countries might be driving the relationships that were observed in the VECM analysis but in such a case, a continuous variable for income inequality would have to be used.

Fourthly, a study that seeks to understand whether there are any off-setting effects between financial development and income inequality on growth could be undertaken. This would clarify whether the impact of financial development on welfare is not weaker because it off-sets the likely negative effect of income inequality on social welfare.

Finally, it may be interesting to undertake a study to find out the threshold from which the level of income inequality and financial development start becoming bad for the development process and human welfare in developing countries especially those in SSA. This is important because we do not expect continuously higher levels of income inequality to continue to be sustainable. Rather, it could generate civil and political unrests which may become disruptive for economic activities with dire social consequences.

7.6. Chapter Summary

This chapter has sought to provide a summary of the different aspects of this work. Specifically it intended to achieve five objectives. *Firstly*, it provided the findings of the thesis. In this vein, it revealed that there is no pan-African malaise in socio-economic development, casting doubts on the so called 'African dummy'. The too, it has found that financial development measured by broad money (M2) works well for human welfare in highly unequal countries in SSA but that this could also be due to the fact that M2 has reached 25 percent of GDP compared to 21.7 percent for the more equal countries (GINI < 45). In addition, this study has found that strong causality goes from financial development to human welfare in SSA. Moreover, it has found that where income inequality is high in SSA, human welfare is also high, consistent with the left arm of the Kuznets (1955) hypothesis.

Secondly, it has presented the policy implications of the findings of this study. In this regard, the finding that financial development works better for those countries with higher income inequality is important. It may suggest that in striving to implement financial sector policies in SSA, the focus should not be entirely on whether it would reduce income inequality but rather on whether it would improve economic development that could subsequently put a

dent on income inequality. Also, the finding that the average level of M2 in the highly unequal countries is 25 percent of GDP may imply that SSA countries need to grow the size of their financial sectors to about this level in order to expect a significant impact on living standards. In addition, the fact that the HDI has performed better than the under-five infant mortality rate as a measure of human welfare may suggest that a multidimensional measure is more apposite to gauge socio-economic development. Hence, a better constructed multidimensional measure than the HDI, perhaps using Principal Components Analysis, could be the way to go.

Thirdly, this chapter has also summarized the contributions of this study. In effect, it has contributed new evidence to the literature on the nature of the relationship between financial sector deepening and economic development by taking into consideration the role of income inequality in that relationship. By including an interaction term of financial development and income inequality, it has been revealed that financial development works better for human welfare in SSA where income inequalities are higher (GINI > 0.45) both in the long and short run. Then too, this study has introduced and demonstrated that the HDI is an adequate measure of human welfare that can be used in empirical analysis pitting financial development against human welfare. Also, because this study finds that the Kuznets hypothesis is still at work in SSA, its contribution to understanding and implementing financial sector policies in SSA is crucial. Moreover, it has introduced panel cointegration and error correction modelling and provided long and short run relationships between financial development and human welfare in SSA.

Fourthly, it has presented the limitations of the findings of this thesis which stem from the fact that the country time series were very short because of the 5-yearly nature of the HDI variable. Then too, it could not fully assess the joint movements of the three variables, financial sector development, income inequality and human welfare in SSA because the income inequality variable is a dummy owing to paucity in data.

Finally, this study has suggested some areas for future research. They include amongst others using longer time series for the country living standards index and a continuous income inequality data series when ever data will be available to conduct a similar study for individual countries. Then too, other methods could be used to explore the joint and endogenous movement of financial sector development, income inequality and human welfare with continuous income inequality series in other continents going forward.

APPENDICES

APPENDIX I: TABLES FOR CHAPTER TWO

Table 2.1: Countries used in the Chapter two study

SSA without South Africa (48 countries)

Angola	Congo, Dem	Ghana	Mali	Sao Tome and Principe	Uganda
Benin	Congo, Rep	Guinea-Bissau	Mauritania	Senegal	Zambia
Burkina Faso	Cote d'Ivoire	Guinea	Mauritius	Sierra Leone	Zimbabwe
Botswana	Equatorial Guinea	Kenya	Mozambique	Somalia	Cape Verde
Burundi	Eritrea	Lesotho	Namibia	South Sudan	Seychelles
Cameroon	Ethiopia	Liberia	Nigeria	Sudan	Swaziland
Central African Republic	Gabon	Madagascar	Niger	Tanzania	Comoros
Chad	Gambia	Malawi	Rwanda	Togo	Djibouti

CEMAC Countries

Cameroon	Central African Republic	Chad
Congo, Rep.	Gabon	Equatorial Guinea

ECOWAS Countries

Benin	Gambia	Liberia	Niger
Burkina Faso	Ghana	Mali	Senegal
Cape Verde	Guinea Bissau	Mauritania	Sierra Leone
Cote d'Ivoire	Guinea Conakry	Nigeria	Togo

COMESA Countries

Angola	Djibouti	Madagascar	Rwanda	Tanzania
Burundi	Eritrea	Malawi	Seychelles	Uganda
Comoros	Ethiopia	Mauritius	Sudan	Zambia
Congo, Dem.	Kenya	Namibia	Swaziland	Zimbabwe

Table 2.2: *Human welfare and income inequality*

		1990-2010	1990-1999	2000-2009	percent change
1	***Life expectancy at birth, total (years)***				
a	SSA excluding South Africa	52,71	51,58	53,82	**4,3**
b	COMESA	52,73	51,17	54,24	**6,0**
c	ECOWAS	51,75***	49,95	53,55	**7,2**
d	CEMAC	51,63***	52,02	51,24	**-1,5**
e	Low and Middle income countries	65,05***	63,92	66,18	**3,5**
2	***Mortality of children under five (per 1000 live births)***				
a	SSA excluding South Africa	134,53	148,92	123	**-17,4**
b	COMESA	118,47***	133,29	106,69	**-20,0**
c	ECOWAS	155***	174,93	138,98	**-20,6**
d	CEMAC	141***	148,19	135,4	**-8,6**
e	Low and Middle income countries	81,27***	91,36	72,98	**-20,1**
3	***Literacy rate, adult (as share of population 15+)***				
a	SSA excluding South Africa	58,77	51,51	60,59	**17,6**
b	COMESA	69,68***	63,86	71,41	**11,8**
c	ECOWAS	42,92***	33,76	45,07	**33,5**
d	CEMAC	58,88	41,56	62,03	**49,3**
e	Low and Middle income countries	75,86**	69,5	79,05	**13,7**
4	***Gross enrolment ratio, primary, total (percent of relevant age)***				
a	SSA excluding South Africa	86,83	77,56	94,9	**22,4**
b	COMESA	90,52***	81,27	98,86	**21,6**
c	ECOWAS	75,47***	64,19	85,73	**33,6**
d	CEMAC	94,27***	92,51	95,92	**3,7**
e	Low and Middle income countries	102,66***	98,98	103,57	**4,6**
5	***Gross enrolment ratio, secondary, total (percent of relevant age)***				
a	SSA excluding South Africa	30,29	24,56	34,5	**40,5**
b	COMESA	33,33***	28,18	37,16	**31,9**
c	ECOWAS	24,95***	15,57	31,01	**99,2**
d	CEMAC	26,67***	27,3	26,53	**-2,8**
e	Low and Middle income countries	57,75***	48,51	59,6	**22,9**
6	***Gross enrolment ratio, tertiary, total (percent of relevant age)***				
a	SSA excluding South Africa	3,26	2,23	4,14	**85,7**
b	COMESA	3,13	2,15	4	**86,0**
c	ECOWAS	3,38	2,1	4,49	**113,8**
d	CEMAC	3,45	3,02	3,71	**22,8**
e	Low and Middle income countries	17,18***	12,27	17,67	**44,0**
7	***Gini coefficient***				
a	SSA excluding South Africa	45,03	46,5	43,77	**-5,9**
b	COMESA	45,63	46,16	45,15	**-2,2**
c	ECOWAS	42,51***	44,08	41,01	**-7,0**
d	CEMAC	46,67**	54,08	44,56	**-17,6**
e	Low and Middle income countries				

8	***Income share held by highest 20percent***				
a	SSA excluding South Africa	51,47			
b	COMESA	52			
c	ECOWAS	49,51***			
d	CEMAC	52,57			
e	Low and Middle income countries				
9	***Poverty gap $ 1.25 (PPP) a day***				
a	SSA excluding South Africa	23,28	27,21	19,94	**-26,7**
b	COMESA	25,41	28,13	23,2	**-17,5**
c	ECOWAS	21,43	25,51	17,14	**-32,8**
d	CEMAC	21,84	38,14	17,18	**-55,0**
e	Low and Middle income countries	10,96***	12,19	8,51	**-30,2**

Table 2.3: Macroeconomic Performance

			1990-2010	**1990-1999**	**2000-2009**	**change (percent)**
1	***GDP per capita (Constant 2000 US dollars)***					
a	SSA excluding South Africa		888,49	760,81	988,71	**30,0**
b	COMESA		995,67***	903,29	1063,35	**17,7**
c	ECOWAS		369,65***	337,06	394,51	**17,0**
d	CEMAC		1715,7***	1279,33	2068,56	**61,7**
e	Low and Middle income countries		1250,49***	1022,74	1419,34	**38,8**
2	***GDP per worker employed (constant 1990 $)***					
a	SSA excluding South Africa		2166,908	2030,46	2318,52	**14,2**
b	COMESA		1733,3***	1673,9	1799,3	**7,5**
c	ECOWAS		2626,41***	2452,01	2820,19	**15,0**
d	CEMAC		2741,05***	2632,7	2861,44	**8,7**
e	Low and Middle income countries		7047,25***	5910,25	8184,26	**38,5**
3	***GDP average annual percentage growth***					
a	SSA excluding South Africa		3,87	3,02	4,58	**51,7**
b	COMESA		3,39	2,43	4,16	**71,2**
c	ECOWAS		3,6	2,78	4,27	**53,6**
d	CEMAC		5,41***	4,57	6,37	**39,4**
e	Low and Middle income countries		4,76*	3,45	5,8	**68,1**
4	***GDP per capita ; average annual percent growth***					
a	SSA excluding South Africa		1,34	0,42	2,11	**402,4**
b	COMESA		0,99	0,01	1,76	**17500,0**
c	ECOWAS		0,88*	0,05	1,56	**3020,0**
d	CEMAC		2,66***	1,64	3,76	**129,3**
e	Low and Middle income countries		3,26***	1,77	4,44	**150,8**

Table 2.4: Macroeconomic Structure

			1990-2010	1990-1999	2000-2009	percent change
1	***Agriculture; value added percent GDP***					
	a	SSA excluding South Africa	28,14	30,99	25,67	**-17,2**
	b	COMESA	26,74*	29,12	24,78	**-14,9**
	c	ECOWAS	34,69***	36,65	32,9	**-10,2**
	d	CEMAC	23,51***	28,18	19,27	**-31,6**
	e	Low and Middle income countries	12,98***	15,25	11,01	**-27,8**
2	***Agriculture, value added per worker (constant 2000 $)***					
	a	SSA excluding South Africa	555,57	501,51	612,85	**22,2**
	b	COMESA	580,41	525,48	637,4	**21,3**
	c	ECOWAS	510	469,59	557,93	**18,8**
	d	CEMAC	727,56*	590	861	**45,9**
	e	Low and Middle income countries	569,41	506,63	632,19	**24,8**
3	***Industry, value added percent GDP***					
	a	SSA excluding South Africa	26,99	24,67	29,09	**17,9**
	b	COMESA	24,53***	23,41	25,33	**8,2**
	c	ECOWAS	21,97***	20,42	23,5	**15,1**
	d	CEMAC	42,16***	32,73	51,21	**56,5**
	e	Low and Middle income countries	35,45***	35,22	35,82	**1,7**
4	***Manufacturing, value added percent GDP***					
	a	SSA excluding South Africa	10,54	10,94	10,13	**-7,4**
	b	COMESA	11,86***	12,36	11,32	**-8,4**
	c	ECOWAS	9,05***	9,39	8,68	**-7,6**
	d	CEMAC	8,95***	10,1	8,01	**-20,7**
	e	Low and Middle income countries	21,63***	22,32	20,98	**-6,0**
5	***Mineral rents (percent GDP)***					
	a	SSA excluding South Africa	1,01	0,81	1,21	**49,4**
	b	COMESA	0,84	0,62	1,06	**71,0**
	c	ECOWAS	1,68***	1,45	1,91	**31,7**
	d	CEMAC	0,03***	0,05	0,01	**-80,0**
	e	Low and Middle income countries	0,58***	0,36	0,79	**119,4**
6	***Services, etc., value added percent GDP***					
	a	SSA excluding South Africa	44,92	44,41	45,27	**1,9**
	b	COMESA	48,73***	47,46	49,89	**5,1**
	c	ECOWAS	43,34***	42,92	43,62	**1,6**
	d	CEMAC	34,33***	39,08	29,52	**-24,5**
	e	Low and Middle income countries	51,55***	49,54	53,13	**7,2**
7	***Oil rents percent GDP***					
	a	SSA excluding South Africa	5,8	4,37	7,21	**65,0**
	b	COMESA	3,05***	2,21	3,89	**76,0**
	c	ECOWAS	2,2***	2,25	2,17	**-3,6**
	d	CEMAC	27,92***	36,41	19,42	**-46,7**
	e	Low and Middle income countries	4,68***	3,58	5,77	**61,2**

Table 2.5: Infrastructure development

		1990-2010	1990-1999	2000-2009	percent change
1	***Electric power consumption per capita (KWh)***				
a	SSA excluding South Africa	370,91	318,77	424,36	**33,1**
b	COMESA	502,65***	419,69	592,85	**41,3**
c	ECOWAS	139,62***	122,98	157,08	**27,7**
d	CEMAC	362,66	373,28	353,21	**-5,4**
e	Low and Middle income countries	1044,81***	891,15	1215,54	**36,4**
2	***Internet users (per 100 people)***				
a	SSA excluding South Africa	2,04	0,12	3,12	**2500,0**
b	COMESA	2,56***	0,19	3,97	**1989,5**
c	ECOWAS	1,57***	0,07	2,42	**3357,1**
d	CEMAC	1,07***	0,04	1,53	**3725,0**
e	Low and Middle income countries	4,73*	0,2	7,9	**3850,0**
3	***Roads paved, percentage of total***				
a	SSA excluding South Africa	26,37	24,64	31,27	**26,9**
b	COMESA	37***	33,87	43,92	**29,7**
c	ECOWAS	21,67***	21,73	21,52	**-1,0**
d	CEMAC	7,23***	7,2	7,4	**2,8**
e	Low and Middle income countries	29,14**	29	29,28	**1,0**

Table 2.6: Population

		1990-2010	1990-1999	2000-2009	percent change
1	***Population, total (billions)***				
a	SSA excluding South Africa		0,54	0,7	**29,6**
b	COMESA		0,281	0,367	**30,6**
c	ECOWAS		0,205	0,265	**29,3**
d	CEMAC		0,028	0,036	**28,6**
e	Low and Middle income countries		4,63	5,34	**15,3**
2	***Population density (people per square kilometre)***				
a	SSA excluding South Africa	82,92	72,27	91,54	**26,7**
b	COMESA	115,22***	101,96	125,95	**23,5**
c	ECOWAS	59,24***	51,12	65,79	**28,7**
d	CEMAC	13,12***	11,25	14,62	**30,0**
e	Low and Middle income countries	52,4***	48,33	55,76	**15,4**
3	***Population, total (annual percentage growth)***				
a	SSA excluding South Africa	2,45	2,52	2,4	**-4,8**
b	COMESA	2,32***	2,36	2,32	**-1,7**
c	ECOWAS	2,61***	2,61	2,2	**-15,7**
d	CEMAC	2,63***	2,84	2,46	**-13,4**
e	Low and Middle income countries	1,46***	1,64	1,3	**-20,7**
4	***Urban population, percent of total population***				
a	SSA excluding South Africa	35,62	33,18	37,61	**13,4**

	b COMESA	29,9***	27,99	31,45	**12,4**
	c ECOWAS	37,47***	34,89	39,58	**13,4**
	d CEMAC	47,82***	45,34	49,86	**10,0**
	e Low and Middle income countries	40,91***	38,33	43,02	**12,2**
5	***Age dependency ratio, dependants to working-age pop.***				
	a SSA excluding South Africa	87,94	91,55	84,98	**-7,2**
	b COMESA	88,19	91,99	85,11	**-7,5**
	c ECOWAS	89,17***	92,35	86,55	**-6,3**
	d CEMAC	85,64***	88,94	83,07	**-6,6**
	e Low and Middle income countries	62,2***	66,54	58,61	**-11,9**

Table 2.7: Domestic Savings, investment and Trade

		1990-2010	**1990-1999**	**2000-2009**	**percent change**
1	***Gross capital formation percent GDP***				
a	SSA excluding South Africa	20,54	20,11	20,8	**3,4**
b	COMESA	18,38***	17,8	18,86	**6,0**
c	ECOWAS	19,02***	17,72	20,22	**14,1**
d	CEMAC	25,13***	24,52	25,53	**4,1**
e	Low and Middle income countries	26,19***	25,9	26,32	**1,6**
2	***Gross domestic savings percent GDP***				
a	SSA excluding South Africa	8,84	7,24	10,18	**40,6**
b	COMESA	6,96***	6	7,6	**26,7**
c	ECOWAS	5,03***	6,23	3,33	**-46,5**
d	CEMAC	27,38***	18,04	36,29	**101,2**
e	Low and Middle income countries	26,62***	25,19	27,92	**10,8**
3	***Gross domestic savings percent gross capital formation***				
a	SSA excluding South Africa	35,31	38,28	38,88	**1,6**
b	COMESA	19,94***	29,84	25,07	**-16,0**
c	ECOWAS	30,95***	41,03	18,55	**-54,8**
d	CEMAC	105,08***	71,14	137,43	**93,2**
e	Low and Middle income countries		97,35	99,81	**2,5**
4	***Export of goods and services percent GDP***				
a	SSA excluding South Africa	32,41	29,1	35,65	**22,5**
b	COMESA	31,88	29,63	33,99	**14,7**
c	ECOWAS	27,8***	25,59	30,04	**17,4**
d	CEMAC	44,02***	36,44	50,97	**39,9**
e	Low and Middle income countries	25,8***	21,87	29,68	**35,7**
5	***Imports of goods and services percent GDP***				
a	SSA excluding South Africa	43,75	41,77	45,79	**9,6**
b	COMESA	43,3	41,42	45,32	**9,4**
c	ECOWAS	40,53***	36,6	44,87	**22,6**
d	CEMAC	41,92**	42,92	40,69	**-5,2**
e	Low and Middle income countries	25,32***	22,56	28	**24,1**

Table 2.8: Financial sector development

			1990-2010	1990-1999	2000-2009	percent change
1	**Money and quasi money (M2) percent GDP**					
	a	SSA excluding South Africa	27,79	23,8	30,9	**29,8**
	b	COMESA	34,43***	28,63	39,39	**37,6**
	c	ECOWAS	24,51***	20,98	26,98	**28,6**
	d	CEMAC	14,31***	14,6	13,68	**-6,3**
	e	Low and Middle income countries	58,45***	44,3	69,32	**56,5**
2	***Domestic credit to private sector percent GDP***					
	a	SSA excluding South Africa	15,61	14,3	16,39	**14,6**
	b	COMESA	19,4***	17,46	20,86	**19,5**
	c	ECOWAS	13,99***	12,4	14,91	**20,2**
	d	CEMAC	7,4***	8,76	5,99	**-31,6**
	e	Low and Middle income countries	52,05***	45,87	55,98	**22,0**
3	***Interest rate spread (percent)***					
	a	SSA excluding South Africa	13,42	10,84	16,17	**49,2**
	b	COMESA	15,99***	11,21	20,04	**78,8**
	c	ECOWAS	10,88***	10,51	11,49	**9,3**
	d	CEMAC	13,07	12,9	13,27	**2,9**
	e	Low and Middle income countries	7,88***	7,94	7,81	**-1,6**
4	***Market capitalisation percent GDP***					
	a	SSA excluding South Africa	22,25	14,27	27,26	**91,0**
	b	COMESA	26,21	17,35	30,94	**78,3**
	c	ECOWAS	14,35***	9,84	14,42	**46,5**
	d	CEMAC				
	e	Low and Middle income countries	43,54***	29,8	53	**77,9**
5	***Stocks value traded, turnover ratio (percent)***					
	a	SSA excluding South Africa	5,11	4,39	5,66	**28,9**
	b	COMESA	5,23	4,72	5,62	**19,1**
	c	ECOWAS	4,74	2,6	6,55	**151,9**
	d	CEMAC				
	e	Low and Middle income countries	66,2***	48,99	79,94	**63,2**

Table 2.9: Foreign capital inflows

		1990-2010	1990-1999	2000-2009	percent change
1	***Official development assistance percent GNI***				
a	SSA excluding South Africa	13,72	14,9	12,57	**-15,6**
b	COMESA	12,74**	13,14	12,34	**-6,1**
c	ECOWAS	16,32***	17,09	15,59	**-8,8**
d	CEMAC	8,77***	12,34	5,2	**-57,9**
e	Low and Middle income countries	1,06***	1,21	0,91	**-24,8**
2	***Official development assistance per capita (constant 2000 $)***				
a	SSA excluding South Africa	88,64	86,57	90,7	**4,8**
b	COMESA	57,52***	61,93	53,16	**-14,2**
c	ECOWAS	67,84***	68,11	67,57	**-0,8**
d	CEMAC	54,52***	64,99	44,06	**-32,2**
e	Low and Middle income countries	14,08***	11,69	16,46	**40,8**
3	***ODA received percent of Central government expense***				
a	SSA excluding South Africa	628,49	46,07	982,35	**2032,3**
b	COMESA	51,16**	49,05	53,18	**8,4**
c	ECOWAS	1828,62***	90,73	1940	**2038,2**
d	CEMAC	37,37**	35,44	41,78	**17,9**
e	Low and Middle income countries				
4	***Private capital flows percent GDP***				
a	SSA excluding South Africa	3,44	2,71	4,1	**51,3**
b	COMESA	2,89	2,14	3,47	**62,1**
c	ECOWAS	2,83**	1,31	4,27	**226,0**
d	CEMAC	5,79***	6,5	4,62	**-28,9**
e	Low and Middle income countries				
5	***Foreign direct investment percent GDP***				
a	SSA excluding South Africa	4,21	3,16	5,04	**59,5**
b	COMESA	3,22***	2,17	3,9	**79,7**
c	ECOWAS	3,74	2,21	5,14	**132,6**
d	CEMAC	7,34***	7,22	7,46	**3,3**
e	Low and Middle income countries	2,43***	1,93	2,91	**50,8**
6	***Portfolio investment percent Gross capital formation***				
a	SSA excluding South Africa	-1,02	-0,06	-2,12	**3433,3**
b	COMESA	-2	0,2	-4,49	**-2345,0**
c	ECOWAS	0,11***	-0,39	0,62	**-259,0**
d	CEMAC	0,01***	-0,003	0,04	**-1433,3**
e	Low and Middle income countries	2,16***	4,12	0,21	**-94,9**
7	***Workers' remittances received percent GDP***				
a	SSA excluding South Africa	4,03	3,69	4,35	**17,9**
b	COMESA	1,99***	1,82	2,14	**17,6**
c	ECOWAS	3,94	3,09	4,66	**50,8**
d	CEMAC	0,24***	0,17	0,33	**94,1**
e	Low and Middle income countries	1,53***	1,21	1,84	**52,1**

8	***Total external debt stocks (percent GNI)***				
a	SSA excluding South Africa	108,32	119,91	96,98	**-19,1**
b	COMESA	89,33***	104,96	73,61	**-29,9**
c	ECOWAS	137,25***	138,06	136,47	**-1,2**
d	CEMAC	101,93	124,5	79,35	**-36,3**
e	Low -Middle income countries	33,83***	38,05	29,6	**-22,2**

APPENDIX II: CHAPTER FOUR TABLES

Table 4.1: Definition of variables and sources of data

Variable	Definitions	Source of data
LNHDI	Logarithm of Human development index ; geometric mean of average life expectancy, average schooling and average income calculated every five years from 1990 to 2010	Human Development Report (2010) United Nations Development Program
LM2Y	Logarithm of total broad moneyrecorded in the balance sheets of banks and other financial institutions in a year divided by GDP for same year. Data was averaged over 5-year	Esds International, World Bank WDI (April 2011); www.esds.ac.uk/international
LGCY	Logarithm of government consumption expenditure for a particular year divided by GDP for same year. Data was averaged over 5-year periods.	Esds International, World Bank WDI (April 2011); www.esds.ac.uk/international
LIMRU5	Logarithm of infant mortality rate calculated as number of deaths of infants per 1000 who die before their fifth birthday; averaged over 5-year periods.	Esds International, World Bank WDI (April 2011); www.esds.ac.uk/international
LDCPSY	Logarithm of the stock of credit issued by commercial and deposit-taking banks and non-bank financial institutions to the private sector divided by GDP.	Esds International, World Bank WDI (April 2011); www.esds.ac.uk/international
LRER	Logarithm of the bilateral exchange rate calculated as: Bilateral exchange rate = (GDP deflator/US GDP deflator*official exchange rate)*100	Esds International, World Bank WDI (April 2011); www.esds.ac.uk/international
LTRDY	Logarithm of Exports plus imports divided by GDP for a particular year and averaged over 5-year periods.	Esds International, World Bank WDI (April 2011); www.esds.ac.uk/international
LODAY	Logarithm of foreign direct investment divided by GDP averaged over 5-year periods	Esds International, World Bank WDI (April 2011); www.esds.ac.uk/international
PCI2	PCA of civil liberties and political rights (measured on a 1 to 7 scale, with 1 corresponding to highest degree of freedom)	Freedom in the world – Annual survey of freedom country ratings, Freedom House.

LGINI	According to Barro (2000) Gini coefficient = 0.8*(-1 + 2Q5 + 1.5Q4 + Q3 + 0.5Q2) = 0.8*(1 -2Q1 – 1.5Q2 – Q3 – 0.5Q4), where Qi is the share of income accruing to the ith quintile, with group 1 the poorest and group 5 the richest. The first form says that the Gini coefficient gives positive weights to each of the quintile shares from 2 to 5, where the largest weight (2) applies to the fifth quintile and the smallest weight (0.5) attaches to the second quintile. The second form says that the Gini coefficient can be viewed alternatively as giving negative weights to the quintile shares from 1 to 4, where the largest negative weight (2) applies to the first quintile and the smallest weight (0.5) attaches to the fourth quintile.	www.wider.unu.edu/research/Database/en_GB/wiid/

Table 4.2: List of countries used in empirical analysis

High income inequality	**Low income inequality**
Botswana	Benin
Cameroon	Burundi
Central African Republic	Congo, Dem. Rep.
Congo, Rep.	Cote d'Ivoire
Kenya	Gabon
Lesotho	Ghana
Malawi	Mauritania
Mali	Mauritius
Namibia	Mozambique
Rwanda	Niger
Sierra Leone	Senegal
Zambia	Sudan
Swaziland	Tanzania
Zimbabwe	Togo
	Uganda

Table 4.3: Principal component analysis – political rights and civil liberties

Principal Components Analysis
Included observations: 145
Computed using: Ordinary correlations
Extracting 2 of 2 possible components

Eigenvalues: (Sum = 2, Average = 1)					
Number	Value	Difference	Proportion	Cumulative Value	Cumulative Proportion
1	1.93	1.85	0.96	1.93	0.96
2	0.07		0.04	2	1
Eigenvectors (loadings):					
Variable	PC 1	PC 2			
LPR	0.71	-0.71			
LCL	0.71	0.71			
Ordinary correlations:					
	LPR	LCL			
LPR	1				
LCL	0.93	1			

LPR = log of political rights index; LCL = log of civil rights index

Source: Data from Freedom House and authors calculation using EViews 8.0

APPENDIX III: TABLES FOR CHAPTER FIVE

Table 5.1: Non nested test suggesting log-transformation is better than raw data series

Dependent Variable: HDI
Method: Panel Least Squares
Cross-sections included: 29

Variable	Coefficient
C	1.142*** (9.911)
M2Y	-0.001 (-1.348)
INQM2Y	0.017 (0.493)
GCY	-0.002 (-1.478)
TRDY	0.000 (-1.459)
ODAY	-0.002*** (-2.926)
RPOP	0.003*** (2.996)
PCI1	0.020** (2.549)
DUMINQBI	-0.091 (-0.831)
LNHDIFIT	0.811*** (6.172)
Statistics	
R-Squared	0.768
Adjusted R-Squared	0.752
F- Statistic	46.743***
Durbin Watson Statistic	0.524

Table 5.2: Output for Hausman test of exogeneity of included variables

Dependent Variable: LNHDI
Method: Panel Least Squares
Cross-sections included: 29
Total panel (unbalanced) observations: 107

Variable	Coefficient
C	3.145*** (5.773)
LRER	0.070*** (5.752)
LM2Y	-0.570*** (-10.070)
LGCY	0.382*** (4.812)
LTRDY	0.207*** (2.763)
LODAY	-0.072*** (-1.842)
LRPOP	-0.922*** (-7.315)
PCI2	-0.150*** (-7.700)
RESID_LRER	-0.106*** (-8.174)
RESID_LM2Y	0.667*** (9.156)
RESID_LGCY	-0.276*** (-3.541)
RESID_LTRDY	-0.441*** (-5.609)
RESID_LODAY	0.337*** (8.459)
RESID_LRPOP	1.275*** (10.708)
RESID_PCI2	0.084*** (2.989)
R-squared	0.947
Adjusted R-squared	0.939
F-statistic	117.445***
Durbin-Watson stat	1.439

APPENDIX IV: TABLES FOR CHAPTER SIX

Table 6.1: *Causality test with M2Y as dependent variable and HDI as regressor*

Vector Error Correction Estimates	
Included observations: 78 after adjustments	
Cointegrating Eq:	CointEq1
LM2Y(-1)	1
LNHDI(-1)	-56.06 [-4.70]
INQLM2Y(-1)	-48.42 [-4.07]
LODAY(-1)	-11.92 [-2.96]
LRER(-1)	-3.15 [-2.57]
LTRDY(-1)	-14.29 [-1.93]
LRPOP(-1)	35.73 [2.15]
LGCY(-1)	12.44 [1.16]
C	-111.07
Error Correction:	D(LM2Y)
CointEq1	**0.002** **[1.11]**
D(LM2Y(-1))	-0.02 [-0.18]
D(LNHDI(-1))	0.11 [0.22]
D(INQLM2Y(-1))	0.015 [0.02]
D(LODAY(-1))	-0.06 [-0.83]
D(LRER(-1))	-0.06 [-0.56]
D(LTRDY(-1))	0.86 [3.29]
D(LRPOP(-1))	-0.28 [-0.28]
D(LGCY(-1))	-0.18 [-0.91]
C	-0.18 [-0.93]
DUMINQBI	0.41
PCI2	-0.03 [-1.11]
R-squared	0.21
Adj. R-squared	0.08
F-statistic	1.62
Schwarz SC	1.14

Values in [ ] are t-statistics

Table 6.10: VEC Granger causality/Block Exogeneity Wald test results

Dependent variable: D(LNHDI)			
Excluded	Chi-sq	df	Prob.
D(LDCPSY)	0.23	4	0.89
All	0.23	4	0.89

Dependent variable: D(LNHDI)			
Excluded	Chi-sq	df	Prob.
D(LM2Y)	8.95		0.01
All	8.95	2	0.01

Dependent variable: D(LDCPSY)			
Excluded	Chi-sq	df	Prob.
D(LNHDI)	3.66	4	0.16
All	3.66	4	0.16

Dependent variable: D(LM2Y)			
Excluded	Chi-sq	df	Prob.
D(LNHDI)	1.65	2	0.44
All	1.65	2	0.44

Table 6.12: Causality test with M2Y as dependent variable and IMRU5 as regressor

Vector Error Correction Estimates	
Included observations: 78 after adjustments	
Cointegrating Eq:	CointEq1
LM2Y(-1)	1
LIMRU5(-1)	-15.49 [-6.19]
INQLM2Y(-1)	10.45 [2.96]
LODAY(-1)	7.74 [5.55]
LRER(-1)	-0.25 [-0.66]
LTRDY(-1)	3.23 [1.51]
LRPOP(-1)	8.51 [1.84]
LGCY(-1)	-9.92 [-3.22]
C	18.93
Error Correction:	**D(LM2Y)**
CointEq1	**-8E-05** **[-0.01]**
D(LM2Y(-1))	-0,05 [-0.37]
D(LIMRU5(-1))	**0.19** **[0.40]**
D(INQLM2Y(-1))	0.022 [0.08]
D(LODAY(-1))	-0.05 [-0.64]
D(LRER(-1))	-0,05 [-0.41]
D(LTRDY(-1))	0.81*** [3.39]
D(LRPOP(-1))	0,39 [0.41]
D(LGCY(-1))	-0.16 [-0.80]
C	0.06 [0.45]
DUMINQBI	-0.03
PCI2	-0,02 [-0.62]
R-squared	0.19
Adj. R-squared	0.06
F-statistic	1.45
Schwarz SC	1.16

Values in [ ] are t-statistics

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