

ECONOMIC GROWTH, INCOME INEQUALITY AND
POVERTY REDUCTION: A REGIONAL COMPARATIVE
ANALYSIS

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Dedication

I dedicate this thesis to my mother, Mrs. Elizabeth Obeng and my two siblings, Bismarck and Junior, as well as my grandmother, Rose Marfo.

Abstract

This study examines and compares the implications of economic growth on poverty and income inequality among 76 countries across sub-Saharan Africa (SSA), South and East Asia (SEA), Latin American countries (LAC) and the OECD region for the period 1990 to 2010. The results using SYS-GMM estimator leads to some interesting findings. We find that economic growth has led to reduction in both income and human poverty levels in all developing regions. We also find that, economic growth translates into little poverty reduction in all the regions when income inequality is high than when it is low. The results also show that economic growth significantly reduced income inequality in SSA. However, growth led to increase in income inequality in LAC and the OCED region.

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List of Abbreviations

AFDB: African Development Bank
EECA: Eastern Europe and Central Asia
ETEs: Emerging and Transitional Economies
DIFF-GMM: Difference Generalized Method of Moments
GDP: Gross Domestic Product
GLS: Generalized Least Squares
HIPC: Highly Indebted Poor Country
HPI: Human Poverty Index
IMF: International Monetary Fund
LAC: Latin America and Caribbean Countries
LSDV: Least Squares Dummy Variables
MDGs: Millennium Development Goals
MENA: Middle East and North Africa
OECD: Organisation of Economic Co-operation and Development
OLS: Ordinary Least Squares
PRSPs: Poverty Reduction Strategy Papers
SAS: South Asia
SEA: South and East Asia
SSA: Sub-Saharan Africa
SYS-GMM: System Generalized Method of Moments
UNDP: United Nation Development Plan
WDI: World Development Indicators

CHAPTER ONE

1.1 Introduction

The eradication of absolute poverty in the developing world has become a major policy objective to most governments and international organisations due to its importance to the general well-being of society. According to the 2013 World Bank report, poverty levels have been trending downwards since the 1980's. Despite these improvements, extreme poverty still exist in various parts of the developing world with close to one billion people still living under \$1.25 a day and some 2.7 billion people living on less than \$2.50 a day (World Development Indicators, 2013). Most of these reduction occurred in middle and high income countries with very few reductions occurring in low income developing countries. Particular example of such divided progress is the impressive improvements of poverty levels in China and India with the rest of the developing world, particularly low income countries, still experiencing almost the same levels of poverty that existed three decades ago. Though the Millennium Development Goal (MDG) of halving poverty levels by 2015 is achievable, most developing countries still face enormous challenges in fighting poverty. Moreover, other equally important goals such as reductions in child and maternal mortality, gender equality and education are still significant developmental problems in most developing countries.

Economic growth has been identified as the most important tool, if not the only mechanism, in the reduction of absolute poverty. In order to achieve significant economic growth and achieve significant progress in poverty reduction efforts, many developing countries adopted the structural adjustment reforms proposed by the Bretton Woods

institutions in the early 1980's¹. Some of the policies under the structural reforms included the adoption of flexible exchange rate policies and opening up to international trade. These policies attracted foreign investments, hence promoting economic growth. During the 1990's, the World Bank proposed a more general approach to bringing poverty levels down. This involved paying attention to environmental issues, investing in human capital, privatization of government owned-enterprises and improving economic development.

However, in the early parts of the 2000's, further emphasis on poverty reduction led to a shift in the process of growth in the developing world. Governments of developing countries were encouraged to formulate their own development programs, thus, the Poverty Reduction Strategy Papers (PRSPs) became an integral part of poverty reduction in the developing world. The PRSPs provided policies and strategies to mitigate poverty by integrating economic and social issues as well as external financial needs into its broad framework. A comprehensive poverty analysis and plans to address poverty issues form the core of the PRSPs. This became the basis for development assistance and the provision of debt relief to developing countries by World Bank and the International Monetary Fund (IMF) under the Highly Indebted Poor Countries (HIPC) initiative. The intended aim was for countries to meet their MDGs.

In many developing countries, the denial of basic human necessities such as shelter, food, education and health care have been identified as some of the main causes of poverty (Cypher and Dietz, 2004). These human needs form the basis of the MDGs. During the 1990's, the United Nation Development Plan (UNDP) moved away from the

¹ World Bank (2000)

World Bank income based poverty measures to a more human based poverty measure. This led to the introduction of Human Poverty Indices (HPIs) which encompasses the basic human necessities. Primarily, the HPIs are based on three key human deprivations. The first is deprivation of life. That is how long new born children are expected to live if they are subject to the mortality risk that prevails at their time of birth.² The second is of basic education and the third is of economic provisioning which includes people without access to improved drinking water and underweight children.

These important human needs were crucial to the PRSPs. Multilateral and bilateral donors provided aid to developing countries based on the performance of these important indicators outlined in the PRSPs. According to the UNDP Human Development Report 2013, there has been much progress towards reducing global human poverty and the pace has even been faster in lower income countries. This is a contradiction to the earlier claim by the World Bank because, whereas the World Bank income poverty measures concentrate on the number of people who live below various poverty lines (\$1.25 or \$2), the human poverty measures concentrate more on human development. These are very interesting trends which are worth investigating. Over the years, emerging countries have played a significant role in bringing down world poverty levels because of their high levels of economic growth. Ravallion and Chen (2007) claimed that, the significant growth performance of China, India and Brazil have contributed greatly in reducing poverty in the developing world.

In recent years, most countries in Asia have transformed their economies through technological innovations in recent years. These have helped them to produce and export

² World Development Indicators (2013)

more technologically advanced goods such as equipment and intermediate goods. They have transformed their economies from being predominantly agricultural based to relatively technologically advanced economies. These impressive growth experiences in the region have helped countries such as China and India to grow much faster than most developed countries. In sub-Saharan Africa and Latin America, natural resources and agricultural products dominate growth in the region. The rise in commodity prices before the recent financial crisis boosted growth significantly in the sub-Saharan African region. Exports of agricultural products, minerals and oil contributed about 70% of export revenue in the region (Africa Development Bank (AFDB) et al, 2013).

Over the years, these reforms and policies have helped most developing countries, particularly those in Asia, achieve some success in economic growth. Nonetheless, many developing countries that experienced relatively high rates of economic growth realised that such growth had brought little benefit to lower income people. One possible reason is that economic growth has been associated with an increase in income inequality. High income inequality is seen as detrimental to development since it reduces the benefits of economic growth to the poor. Extensive poverty and growing income inequality have become major issues in the development process and their reduction has become the principal objective of most economic development policies. An important concern that arises from this is whether the poor have really benefited from economic growth and to what extent does the distribution of income affect the fight against poverty.

This thesis attempts to address these developmental concerns by using data on the three main developing regions (South and East Asia, Latin America and sub-Saharan Africa) to empirically analyse and compare the effect of economic growth on poverty

among the developing regions in the world. The thesis contributes to the debate on economic growth, income inequality and poverty by empirically presenting comprehensive regional analysis on income inequality, growth and poverty reduction. We specifically analyse how different developing regions have experienced poverty reduction as a result of economic growth. We also examine and compare the impact of economic growth on income inequality among both developed and developing regions.

This thesis focuses on South and East Asia, Latin America and sub-Saharan Africa which are the three main developing regions. We include developed countries, specifically the OECD region in this analysis because most of those countries have overcome the basic human development problems mentioned earlier. These human problems are very important developmental issues because the economic dynamics may differ among countries and regions depending on factors such as the nature of economic growth, common heritage, international trade and regional integration. South and East Asia has been the best performers in terms of economic growth in recent years. The region contains the emerging giants of China and India that have contributed significantly to economic growth and poverty reduction in the developing world. Most countries in this region have been successful in transforming their economies from mainly agrarian to economies with significant industrial activities due to technological improvements in recent years. In spite of these, mass poverty still remains in the region. Latin American countries are notable for their similar institutions and languages because of their common heritage. Countries in this region gained their independence long before most of the countries in Asia and sub-Saharan Africa. Despite having relatively lower levels of poverty, Latin America is historically the region with high income inequality. Sub-

Saharan African countries on the other hand have the highest concentration of poverty in the world. The countries in this region have no common colonial heritage compared to Latin American countries. The region is dominated by agrarian economies, hence exports in agricultural commodities and natural resources have been the main driver of economic growth in the region. After we investigate the growth effect on poverty levels and income inequality in the selected regions, we make a comparative analysis among them to determine which region has performed better in terms of achieving greater reduction in poverty levels and creating more equal distribution of income.

1.2 Economic Growth and Income Equality

One of the goals of economic growth is to promote economic development and poverty reduction. However, the importance of the distribution of the benefit of economic growth has been widely acknowledged. In his classic work “Poverty, Inequality and Development”, Field (1980) linked income inequality with three types of economic growth. The first is *modern-sector enlargement growth* where the economy develops by enlarging the modern sector. Lewis (1954) classified the modern sector as industrialised sector that uses considerable amount of capital in production. Examples include advance economies and to some extent Asian economies like China and Taiwan. This type of growth increases absolute incomes and reduces poverty levels. The effect of modern sector growth on income inequality in the initial stages depends upon whether the rich or the poor benefit from the increase in economic growth. As the modern sector expands, there is a redistribution of labor as workers move from the traditional sector (low income) into the modern sector (upper income), hence, reducing income inequality and poverty levels. The second is *modern-sector enrichment growth* where growth is limited to

certain groups of people in the modern sector with the traditional sector experiencing little or no growth. Though this type of growth causes average incomes to rise, it leads to worsening income inequality and little or no change in poverty levels. Latin American and sub-Saharan African countries have mostly experience this type of growth. Lastly, *traditional sector enrichment growth* occurs where aggregate incomes increases in the traditional (subsistent) sector, with little or no income increase in the modern sector. Field (1980) explained that countries with this type of growth achieve reductions in absolute poverty even at very low incomes because they focus policies on poverty reduction. This type of growth leads to a more equal distribution of income and a significant reduction in poverty levels.

The prospect for alleviating absolute poverty therefore depends on the rate of sustained economic growth and how its benefits are distributed in the society. Some studies have claimed that economic growth has been the main catalyst of the decline in poverty levels with income inequality playing no significant role (egs, Dollar and Kraay, 2002). Nonetheless, the role of income distribution in the growth-poverty reduction relationship cannot be overlooked. Ravallion and Chen (2007), Fosu (2008), Ali and Thorbecke (2000) and Easterly (2000) have investigated the economic growth-poverty relationship. Though they found that economic growth reduced poverty levels, they also acknowledged that income inequality is harmful to poverty reduction. Thus income inequality affects the rate at which economic growth translates into poverty reduction. This suggests that countries can experience different levels of poverty even at the same level of economic growth. The importance of income inequality in the developmental process traces its roots to Kuznets (1955). His usual inverted-U hypothesis suggests

economic growth to worsen income distribution in the initial stages of economic development. However after a certain period in the process of development, income inequality is expected to fall with economic growth. Early economic growth may be concentrated in the modern sector where wages and productivity are high but with limited employment and therefore as the economy grows, the poor may be bypassed, resulting in a rise in income inequality. But as economic growth is sustained, human capital and technology are improved, more employment opportunities are created resulting in a fall in income inequality. The inverted 'U' pattern shows that countries should be able to transform their economies from agricultural economies to industrial economies where productivity is very high.

The Kuznets hypothesis can be related to Field's (1980) modern sector enlargement growth. Countries that grow under this type of growth may experience an increase in income inequality in the initial years but as the modern sector expands to include those formally at low incomes, income inequality may decrease. The implication of this hypothesis to the developing world is that though income inequality may rise in the initial stages of economic development, it is expected to decline in the development process. More importantly, if developing countries choose a development path similar to that of most developed countries, they can potentially avoid the inverted 'U'.

Income inequality among the poor is very important in understanding the depth of absolute poverty and the implications of government policies on the low income group. Several studies such as Ravallion (1995), Deininger and Squire (1998) and Schultz (1998) have investigated the relationship between economic growth and income inequality. Most of them found no significant relationship between income inequality and

economic growth. This thesis seeks to reinvestigate the income inequality-economic growth relationship by employing a consistent and efficient estimator which is different from what most of these studies have used.

In more recent years, income inequality in many countries has been increasing irrespective of whether those countries are growing or not (World Development Indicators, 2007). Ravallion (2011) explained that, although China has achieved sustained economic development since its structural reforms, income inequality in China has been rising sharply in recent years, while in Brazil, there has been a reduction in income inequality coupled with moderate rates of economic growth. Moreover most advanced economies have experienced a rise in income inequality in recent years with the United States having higher income inequality than any other high income OECD country (Smeeding, 2005). While studies such as Son (2007) found that sustained high rates of economic growth has been the main reason why most countries in Southern and Eastern Asia have seen a reduction in poverty levels, rapid economic growth has sometimes been seen as bad for the poor, because they are normally bypassed by such rapid economic growth. This is because rapid economic growth is normally of the modern-sector enrichment type where only small group of people mostly in the modern sector of the economy benefit. It is apparent that the nature of economic growth determines how effective growth can be translated into reduction in poverty and income inequality.

1.3 Thesis Contribution

This thesis makes three important contributions to the literature on the economic growth, income inequality and poverty relationship. Though there have been lots of

studies on this subject, there appears to be limited comprehensive regional comparative analysis across both the developed and developing worlds. One of the few studies include Fosu (2010) who investigated the effect of economic growth on poverty levels among Eastern Europe and central Asia (EECA), South Asia (SAS), Sub-Saharan Africa (SSA), Latin American Countries (LAC) and Middle East and North Africa (MENA). Unlike Fosu (2010), this thesis compares the relationship between economic growth and poverty among the three main developing regions as explained earlier. The progress of developing regions is further compared with high-income OECD countries. Though data on the various poverty lines for advanced countries are unavailable, we include OECD countries in this study for comparison purposes in terms of income inequality and human development (a measure of human poverty). Smeeding (2005), Stevans and Sessions (2008) and a series of World Bank reports have asserted that income inequality among advanced economies has increased over the years and since income inequality can have adverse effect on poverty reduction, the middle and lower-class families in advanced economies might not benefit from the full impact of economic growth. Moreover, the recent global meltdown has affected economic growth in most advanced and emerging economies as well as developing countries. This has impacted negatively on income levels and standards of living. The thesis compares how the developed and developing worlds have transformed economic growth into improving standards of living.

Second, studies in the literature have mainly used income-based poverty measures such as the headcount ratio or the poverty gap index as measures of poverty, without acknowledging the importance of human development based poverty measure which is

very crucial to economic development.³ In addition to these two income-based poverty measures, this thesis uses Human Poverty Indices (HPIs).⁴ Income-based poverty measures place little emphases on human development. According to the 2013 MDGs report, though poverty has been halved, little has been achieved in terms of human development. HPIs are very crucial in poverty reduction and the achievement of the MDGs. Health and education are very important input into any production function because of their role as elements of human capital. HPIs therefore comprise of a broader measure of socio-economic development. It is a good measure of poverty because it unveils that a country can achieve much development and poverty reduction than might be expected at low levels of income. On the other hand, countries with substantial income gains can still achieve little in human development.

Third, this thesis contributes to the literature by employing an estimating technique that is more appropriate for the analysis than what is mostly used in the literature. Most studies use OLS, fixed effects or random effects estimation procedures (for examples Adam, 2004; Fosu 2008; Easterly, 2000; Tridico, 2010). One weakness in using these estimation techniques is that they fail to address the variable endogeneity problem associated with dynamic panel data analysis. The problem of endogeneity arises when there is a correlation between one or more of the explanatory variables and the error term. Generally, the causality between explanatory variables and the dependent variable in a model can lead to endogeneity. This thesis investigates the relationship among economic

³ Headcount ratio measures the percentage of the population living under the various poverty lines. Poverty gap index measures the extent to which the income of the poor lies below the poverty lines.

⁴ As noted earlier, the HPI measure of poverty is based on three basic human deprivations. These include deprivation of life which is measured by how long people live, knowledge which is measured by illiteracy rate and overall economic provisioning.

growth, poverty and income inequality by specifying a dynamic model that employs a dynamic panel data estimator. We employ the System Generalized Method of Moments (SYS-GMM) that was developed by Blundell and Bond (1998) to address the endogeneity problem, country specific heterogeneity, and the possibility of serial correlation in the data generating process. Moreover, we include other important explanatory variables which most empirical works exclude. Our rationale for including other important explanatory variables is that, economic policies that affect inflation, unemployment, foreign aid, and education may all influence the distribution of income and poverty.

1.4 Thesis Organisation

The rest of the thesis is organised as follows. Chapter Two discusses some of the empirical literature on the relationship between economic growth, income inequality and poverty. Chapter Three provides insight into the trends in poverty, economic growth and income inequality among the selected regions. Chapter Four discusses the methodology and models specification of the thesis. It also addresses some econometric challenges that characterize the models and how to address these challenges. In Chapter Five, we estimate the models and discuss the empirical findings of the thesis. Chapter Six summarises and concludes the thesis and also makes some policy recommendations.

CHAPTER TWO

2.1 A Brief Review of the Literature

This chapter reviews the empirical literature on the relationship among economic growth, income inequality and poverty. The general consensus in the economic development literature is that, economic growth is important to the elimination of absolute poverty and reducing income inequality. However, understanding the importance of income distribution over the course of economic development is of significant relevance. One of the most influential hypotheses which has received enormous attention in the income distribution and economic development literature was proposed by Kuznets (1955). He suggested that in the initial stages of economic growth, income inequality worsens but after a certain period in the process of economic development, income inequality will improve. Therefore the relationship between economic growth and income inequality can be represented by an inverted 'U' pattern referred to as the Kuznets inverted 'U' hypothesis. The hypothesis suggests that developing countries would experience a more favorable distribution of income in the process of development though it may be less favorable in the initial stages.

The inverted 'U' hypothesis has motivated many studies on the relationship between economic growth and income inequality. Khasru and Jalil (2004) empirically investigated the Kuznets hypothesis using data for 24 countries. They used the fixed effect estimation technique to estimate their panel data model. In general, they found an un-inverted 'U' pattern. Though the second part of the hypothesis applies to most countries, they found that it is not applicable to developing countries like Ecuador, Cyprus, Egypt, Turkey and Chile and for newly industrialised countries like Singapore.

Whereas the role economic growth plays in reducing poverty levels is extensively acknowledged, the same cannot be drawn for the role economic growth plays in reducing income inequality. There are contrasting views on the relationship between economic growth and income inequality. In a study involving Latin American countries, Psacharopoulos et al. (1995) showed that economic growth is negatively related to income inequality. Other studies such as Ravallion and Chen (1997) found no evidence that increases in aggregate incomes led to significant reduction in income inequality among developing countries. We should however stress that both studies used scatter points that relate changes in economic growth to changes in income inequality. Several other authors such as Deininger and Squire (1998) and Schultz (1998) investigated the economic growth-income inequality relationship but found no significant relationship.

With the distribution of income becoming increasingly important to economic development, a number of studies have investigated the economic growth and poverty relationship taking into account the role income inequality plays in that relationship. Tridico (2010) analysed the effect of economic growth on poverty and income inequality in 50 emerging and transitional economies (ETEs) between 1995 and 2006. He defined economic development as a broader process of economic growth that includes institutional changes and human development. His results suggested that economic growth had no positive impact on poverty levels. Though the estimated average growth among these countries during the period is 4.7 percent, he explained that because economic growth was not accompanied by other components of development, poverty levels were not significantly affected. He also investigated the impact of economic growth on income inequality and found that economic growth worsened income

inequality during the period. According to him, lower levels of education and public expenditure may have led to high income inequality. He therefore concluded that income inequality will increase with economic growth unless educational standards improve and governments promote good institutional quality as well as develop strategies to promote human development.

Adam (2004) used data on 60 developing countries to analyse the relationship between economic growth and poverty. He argued that while economic growth leads to reductions in poverty among developing countries, the magnitude of the effect depends more on how economic growth is defined. He defined two measures of economic growth; the survey mean income and changes in GDP per-capita. He found that economic growth leads to poverty reduction irrespective of how growth is defined. However, poverty is reduced more when mean income is used than when GDP per-capita is used.

2.2 Regional Studies

Other studies have conducted regional analysis of the relationship between economic growth and poverty. Fanta and Upadhyay (2009) used data on 16 African countries to estimate the effect of economic growth on poverty levels. They argued that although growth is fundamental to reducing poverty levels in Africa, the growth elasticity of poverty is different among countries.⁵ Their results suggested that economic growth tends to reduce poverty in Africa. Attaining high levels of economic development allows countries to improve their standard of living. They therefore recommended policies that aim at economic development and bringing down income inequality in Africa.

⁵ Growth elasticity of poverty is defined as the percentage change in poverty resulting from a percentage change in economic growth.

Stevens and Sessions (2008) examined the impact of economic growth on poverty levels in the United States from 1959 to 1999. They used an error-correction model to estimate a dynamic long-term relationship between poverty and economic growth. They found that increase in economic growth are significantly related to poverty reduction for all families in the United States. According to them, growth had a more pronounced impact on poverty levels during the expansionary periods of the 1960's, 1970's, 1980's and 1990's. This is because workers, particularly the poor, found employment opportunities during periods of high and sustained economic growth as opposed to economic slowdowns.

The relationship between economic growth, income inequality and poverty among Latin American countries was investigated by Sadoulet and Janvry (2000). They asserted that, Latin American countries have exceptionally higher levels of income inequality than other regions at similar levels of average income per-capita. They investigated the effects of economic growth on rural and urban poverty levels in Latin America from 1970-1994 taking into account the differences in income distributions. They found that, growth significantly reduced poverty levels when there were low levels of income inequality. There is therefore a high cost of income inequality. They recommended that income inequality in the region needs to be addressed through government policies since improving the distribution of income is unlikely to be achieved with economic growth alone. They recommended that, in order for growth to significantly reduce absolute poverty in the region, income inequality must be sufficiently low and countries should have higher levels of education.

Lee and Perera (2013) investigated the contribution of economic growth and institutional qualities to the reduction in poverty in Asia from 1985 to 2009. They argued that, there are many factors behind the persistent poverty problems in developing countries and that economic growth alone cannot account for all the changes in poverty levels. Some of the factors include government stability and rule of law, corruption, and democratic accountability. They found that economic growth significantly reduced poverty levels in the South and East Asia region. Economic growth leaves the income distribution unchanged and therefore results in a higher reduction in poverty levels. On the institutional qualities, they found a negative relationship between government stability, rule of law, and poverty. Thus, improvements in institutional qualities led to a reduction in poverty levels over the years. However, a reduction in corruption, improvements in democratic accountability and bureaucracy have not contributed to reducing poverty and income inequality. This result is interesting since corruption in particular is seen as detrimental to economic development. Moderate rates of corruption may not be harmful to growth initially but in the long run, they argued that corruption will have an adverse effect on economic development and may worsen poverty levels even further. Therefore governments in Asia should adopt policies to mitigate corruption and promote quality institutions.

2.3 Comparative Global Studies

Notwithstanding these studies, there is not much global comparative evidence on the relationship between economic growth, income inequality and poverty levels. One of the few studies is Fosu (2010) who provided global evidence on how economic growth translated into poverty reduction among developing countries. He examined the impact of

growth on poverty among Eastern Europe and Central Asia (EECA), South Asia (SAS), sub-Saharan Africa (SSA), Latin American Countries (LAC) and Middle East and North Africa (MENA) for the period 1981-2005. With the exception of EECA, he found that, poverty levels for all regions decreased for both the \$1.25 and \$2 a day poverty lines. He also found that with the exception of MENA, all regions exhibited greater poverty declines in the mid-1990s to 2005 sub-periods. Growth since the early 1990s has been substantial, mainly because of the various structural reforms implemented by most developing economies since the early 1980s. He explained further that while growth is a major factor behind changes in poverty levels, income inequality nevertheless is very important because of its effects on the poverty pattern in most countries. This is because economic growth drives down poverty drastically under a favorable income distribution. He therefore proposed that special attention should be paid to reducing income inequality particularly in countries with highly unfavorable income distribution.

In conclusion, most of the studies in the economic development literature have found a negative relationship between economic growth and poverty levels; economic growth is associated with reduction in poverty levels. The relationship between income inequality and economic growth on the other hand is inconclusive. Most of the results in the literature suggest that, there is no significant relationship between income inequality and economic growth. This thesis investigates the economic growth, poverty reduction and income inequality relationship by taking a different approach as already discussed in the previous chapter.

CHAPTER THREE

3.1 Regional Trends in Economic Growth, Income Inequality and Poverty

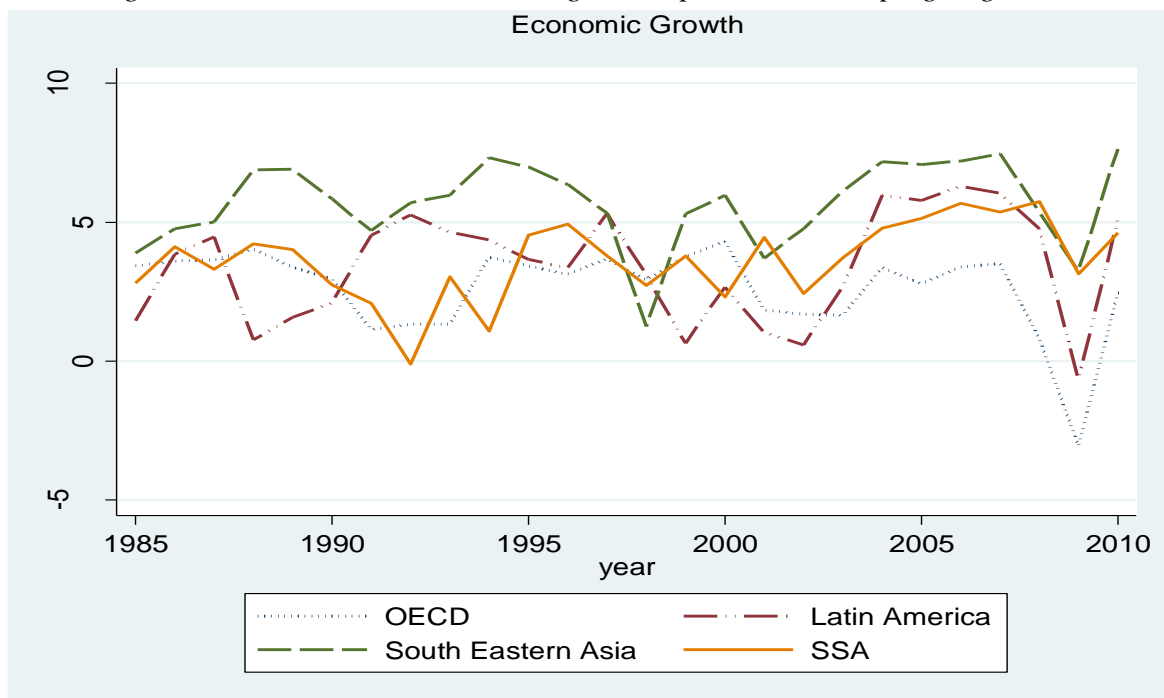
This chapter analyses the trends in economic growth, income inequality and poverty levels among the regions selected for this study. We specifically analyse and compare how the economic development path of the regions has affected poverty and income inequality patterns over the years. The regions are made up of three developing regions and the OECD region. The developing regions are sub-Saharan Africa (SSA), South and East Asia (SEA) and Latin American countries (LAC). We present the trends for the period 1985 to 2010. We further divide the period into two sub-periods to reflect the various development policies and economic growth patterns of the developing world over the years. Another reason why we divide the data is to account for the effects of business cycles over the years. The first sub-period is from 1985 to 1995 where most of the developing countries adopted structural reforms with the aim of enhancing economic growth and development as well as reducing poverty and income inequality levels. The second sub-period is from 1996 to 2010. This includes the information technology boom, the Poverty Reduction Strategy Papers (PRSPs) and the provision of debt relief to most low income developing economies.

3.1.1 Economic Growth

Figure 3.1 below depicts the real GDP growth rate for all four regions for the full sample period 1985-2010. Generally, GDP growth has been volatile over the years for all of the regions. Coming out of the 1982-83 recession, most countries enjoyed an increase in growth from the mid-1980s with South East Asian countries growing faster than the rest

of the regions. Economic growth in most developing regions during the 1980s was mainly attributable to the various structural adjustment programs proposed by the Bretton Woods institutions. The programs included most developing countries opening up to international trade and relaxing restrictions on their foreign exchange and also investing in human capital. The figure also shows higher GDP growth in the mid-1990s for all of the regions, particularly the South and East Asia region. This resulted partly from the information technology boom in the mid-1990s. Thailand, Singapore and Hong-Kong were some of the countries that benefited from this economic expansion. The trend continued until the late-1990s where most Asian economies experienced a financial crisis.

Figure 3.1: Real GDP Growth among Developed and Developing Regions



Source: Author's calculations based on World Bank (2013) World Development Indicators (WDI)

The adoption and implementation of the PRSPs in the early 2000s led to an improvement in economic growth in the developing world. As shown in Figure 3.1, GDP

growth rose from the early 2000s through the mid-2000s for all of the developing regions. The Sub-Saharan region and Latin American region had similar trends particularly after the early 2000s when natural resources and commodities prices were rising.

A major decline in GDP growth occurred between 2007 and 2009 with the world experiencing the financial crisis and the Great Trade Collapse. Speculative attacks on alternative investments, particularly mortgage backed securities, led to the financial downturn. In the United States, asset prices began to fall and banks became reluctant to give out loans. Households reacted by lowering consumption particularly on durable goods and output fell considerably. The Federal Reserve's attempt to reduce interest rates together with other policies to mitigate the economic slowdown in the United States was less than effective, subsequently, there was a fall in GDP growth in all regions across the world.

Table 3.1 below presents summary statistics of the average real GDP growth, poverty headcount ratio and the Gini (income inequality) index for the 1985-1995 sub period and 1996-2010 sub period. This table links the importance of economic growth to poverty and income inequality. The South and East Asian economies have the highest average growth over the entire period. This is particularly due to the advancement in technology that has driven growth in the region in recent years. China and India have been the main contributors of economic growth in this region. Average GDP growth in Sub-Saharan Africa has increased over the period 1985-2010. Most countries in sub-Saharan Africa adopted the policies under the PRSPs. Countries that performed better under the PRSPs were given aid incentives and huge debt relief through the HIPC

initiatives. Therefore resources that would have been used to settle external debt were channeled to productive sectors of their economies. These policies contributed to economic growth and development in the region. Poverty in Sub-Saharan Africa however worsened during the 1995-2010 period. Part of the economic growth success in Latin America and sub-Saharan Africa during the second sub-period may also have resulted from stronger export growth and increases in commodity prices, particularly oil and minerals, before the recent financial crisis. Developed countries particularly the United States experienced their lowest average economic growth since the Great Depression between 2007 and 2009.

Table 3.1: Real GDP Growth, Income Inequality and Poverty by Regions

| Regions/Variables | GDP Growth | | Poverty Rate (\$1.25) | | Inequality | |
|---------------------------------|------------|-----------|-----------------------|-----------|------------|-----------|
| | 1985-1995 | 1996-2010 | 1985-1995 | 1996-2010 | 1985-1995 | 1996-2010 |
| OECD | 2.9 | 2.4 | – | – | 0.39 | 0.42 |
| South Eastern Asia (SEA) | 5.8 | 5.6 | 41.52 | 25.57 | 0.46 | 0.48 |
| Sub-Saharan Africa (SSA) | 2.9 | 4.2 | 44.69 | 51.05 | 0.49 | 0.45 |
| Latin America (LAC) | 3.3 | 3.5 | 11.17 | 9.33 | 0.48 | 0.49 |

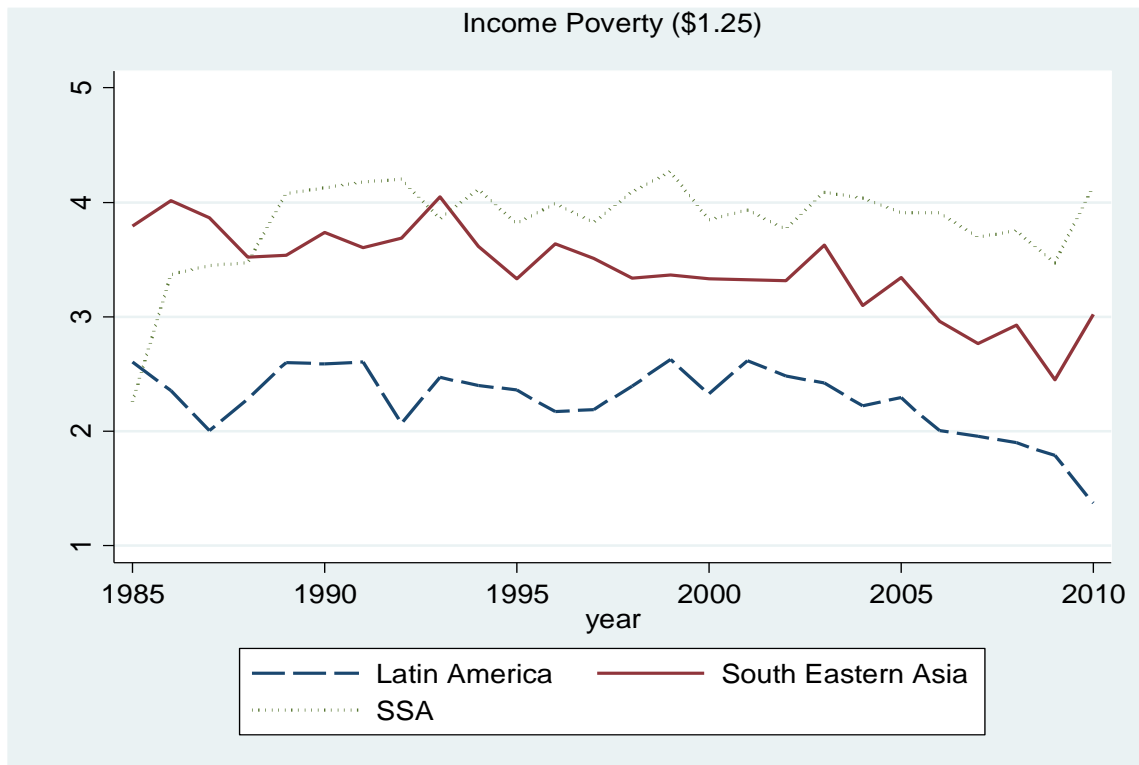
Note: GDP growth and poverty are annual averages calculated from the World Bank (2013). Inequality is the average Gini index calculated from the Standardized World Income Inequality Database SWIID (2013) annual values.

3.1.2 Income Poverty Indices

Figure 3.2 and 3.3 show the trends in the poverty headcount ratio and the poverty gap index respectively. It appears that both the headcount ratio and the poverty gap have similar trends among the selected developing regions. Sub-Saharan Africa has very high average poverty levels relative to the rest of the developing regions. From Table 3.1, the percentage of the population living on less than \$1.25 a day has increased from the 1985-1995 period to the period 1996-2010. These trends suggest that economic policies and

reforms over the years have had little impact on the incomes of the poor. Though economic growth in this region is driven by natural resources which are mainly found in areas populated by the poor, the poor have not benefited much from economic growth. Table 3.1 demonstrates that poverty rates in the Latin America have fallen over the period of study. Not only have countries in Latin America experienced a reduction in poverty, historically, the region also has the lowest average poverty levels when compared to the other developing regions. The trends suggest that while Latin American economies have experienced a reduction in poverty levels, sub-Saharan Africa countries still have high poverty levels, although both regions depend heavily on natural resources and agricultural commodities for their economic growth.

Figure 3.2: Trends in Income Poverty among Developing Regions



Source: Author calculation based on World Bank (2013) World Development Indicators (WDI)

From these observations, we can summarise that there are enormous regional differences in the responsiveness of poverty to economic growth in the developing world. Some of the possible explanations why economic growth has not translated into a significant poverty reduction in sub-Saharan Africa are the growing income inequality and weak institutions in the region. Fosu (2010) suggested two possible explanations why poverty levels are still high in sub-Saharan Africa. The first is that economic growth may not adequately reflect the actual growth in household incomes.⁶ The second is that, there might be an increase in income inequality in sub-Saharan Africa over the years. Relating economic growth to the poverty patterns of the regions suggest that, economic growth in the South and East Asian region has improved the incomes levels of the poor in region. This is more evident in the poverty gap index which calculates the amount of income necessary to bring the poor out of poverty. However, most of these reductions have been attributed to China and India (World Bank, 2013), therefore, there is still much work to be done in the lower income countries of South and Eastern Asia.

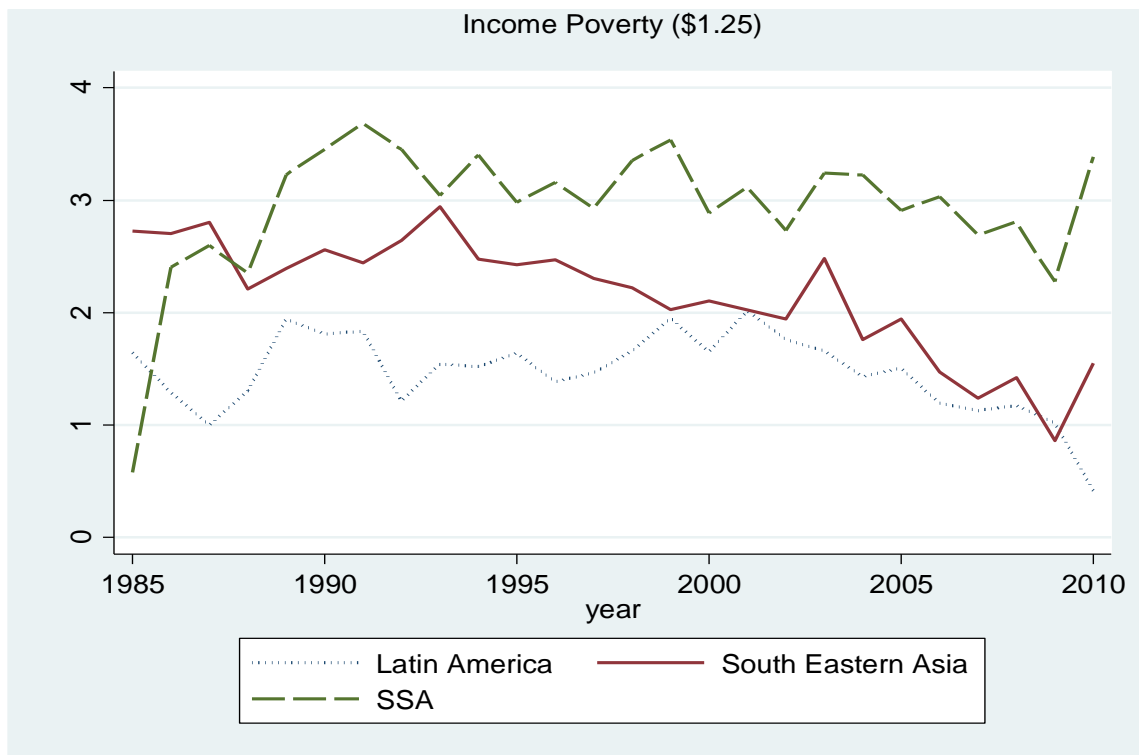
These developments are quite interesting because during the late-1980s to the early 1990s, income poverty levels in Sub-Saharan Africa and South and East Asia were similar.⁷ However, over the years, South and East Asia has experienced a fall in poverty levels while Sub-Saharan Africa still has high levels of poverty. If we relate the nature of economic growth as well as the various economic policies and reforms undertaken over the years to poverty levels, we can make the following conclusion. The reforms and policies, as well as technologically driven economic growth in South and East Asia, has

⁶ Income is the PPP-adjusted per-capita consumption from household surveys or the interpolated private consumption from the national accounts (Ravallion and Chen, 2008).

⁷ World Bank (2013).

affected the incomes and living conditions of the poor more than natural resources dependent economic growth in sub-Saharan Africa. Some of the concerns that arise from the trends are; have the various economic reforms and policies particularly the PRSPs and MDGs which are very popular in Sub-Saharan Africa had less impact on the incomes of the poor? Moreover does the Latin American region have lower poverty levels than the SSA because the region is relatively more industrialised?

Figure 3.3: Trends in Income Poverty among Developing Regions



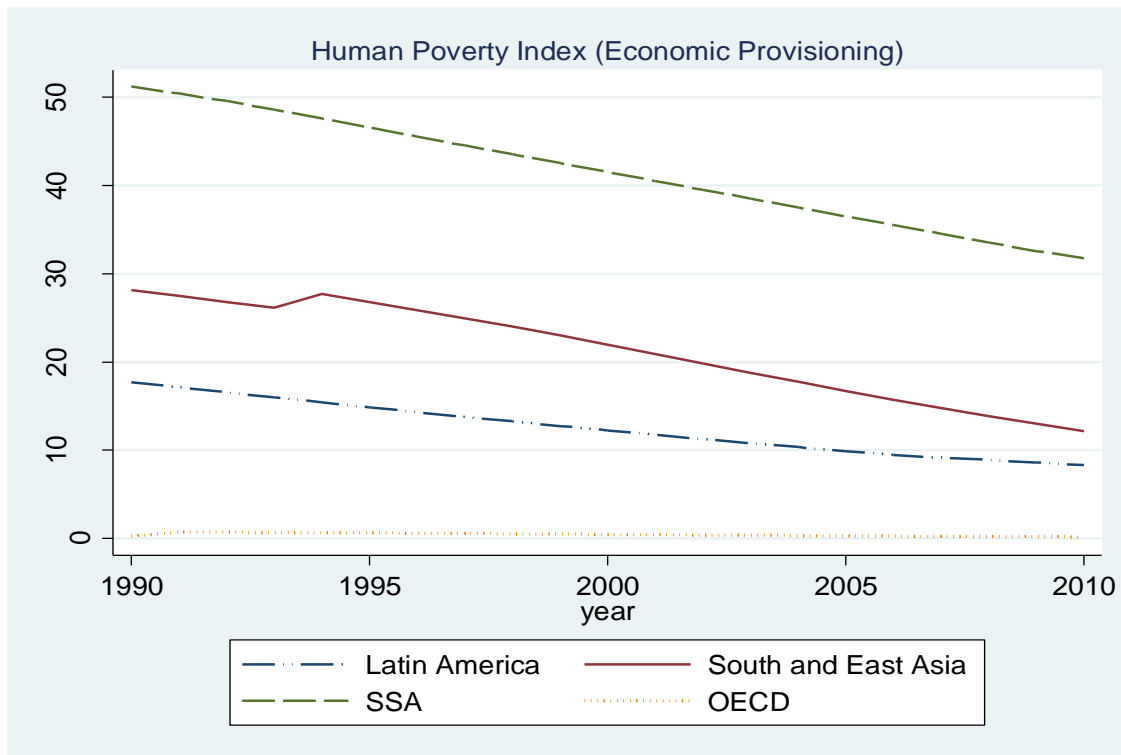
Source: Author calculation based on World Bank (2013) World Development Indicators (WDI)

3.1.3 Human Poverty Indices (HPIs)

The United Nations argues that human poverty should be measured in terms of three main human deprivations. The first is the deprivation of life, the second is the deprivation of education and the last is deprivation of economic provisioning (measured by the

percentage of people without safe water and underweight children). In this thesis, we use two of these three key human poverty deprivations. Illiteracy rate (education) is omitted due to data unavailability. Specifically, we use life expectancy at birth to represent health and the percentage of the population without access to improved water to represent economic provisioning.⁸

Figure 3.4: Trends in Human Poverty Index (Economic Provisioning)



Source: Author's calculation based on World Bank (2013) World Development Indicators (WDI)

Figure 3.4 above depicts the trends in population without access to improved water among all of the four regions. It is obvious that there has been a tremendous decline in this statistic among the developing regions over the years. The variation around these trends is almost zero. There seems to be constant effort of countries to improve access to

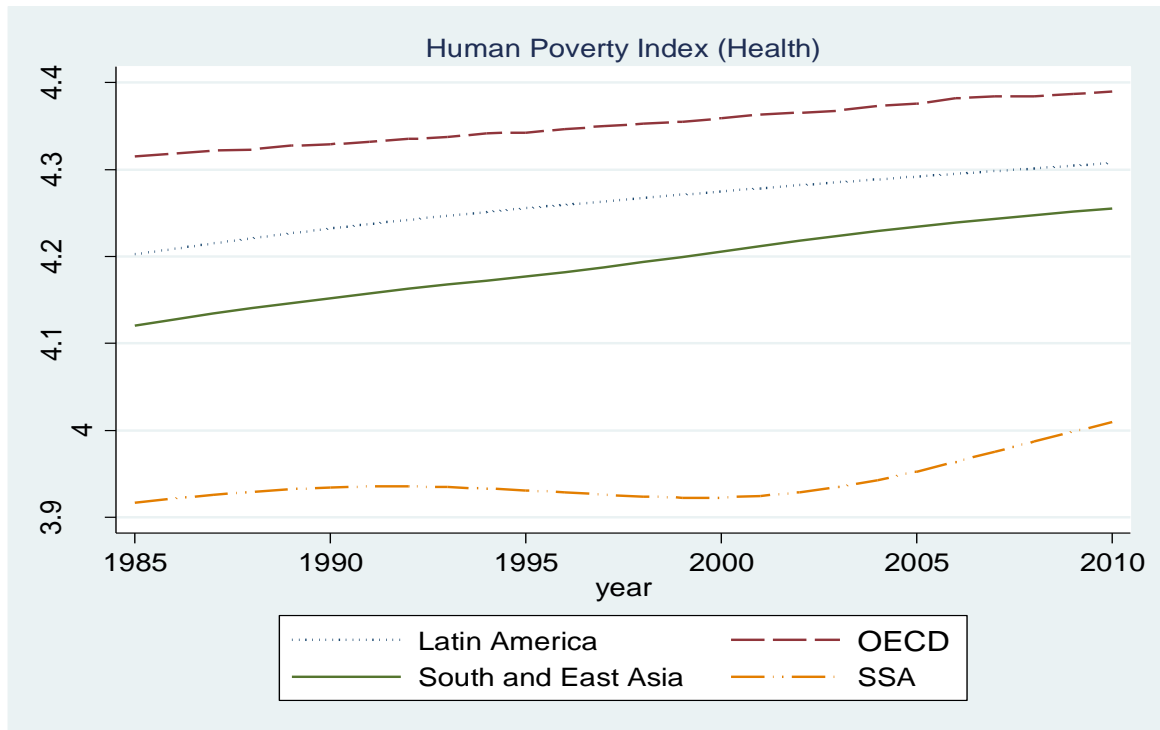
⁸ Life expectancy rate is calculated by subtracting life expectancy for the previous generation from the current life expectancy and divide this by the range of life expectancy for both the previous and current generation.

water. This may not have resulted from economic growth alone, but other governments social interventions directed towards promoting human development. Though there has been a decline in all these regions, sub-Saharan Africa still has the highest average percentage of its population without improved water. This means that in terms of economic provisioning, sub-Saharan Africa is still behind other developing regions when using this metric. In the OECD region where most of the countries have overcome such human problems, almost every person has access to improved water. Among the selected developing regions, Latin American countries have the smallest percentage of people without improved water.

Figure 3.5 below shows the life expectancy rate for all of the regions. Similar to the trends in economic provisioning, there have been improvements in the life expectancy rates (health) across all of the developing regions over the years. Sub-Saharan Africa is still far behind with the lowest average life expectancy rate during the entire period of study. However, it started rising faster after the early-2000s. Part of this may be due to the promotion and implementation of policies in the PRSPs and the Millennium Development Goals (MDG's) which had lots of health targets. This may also have resulted from a stable political atmosphere as well as the reduction in ethnic conflict in recent years. According to the 2013 Human Development report, the pace of human development has been faster in low income countries than high income countries and this is particularly evident in the Latin America, South and East Asia and sub-Saharan African region. Comparing the trends in the developing world to that of the OECD however shows that there exists a significant gap between life expectancy in the developing world and the OECD. This indicates how advanced the region is in terms of

providing basic human necessities and improving human development. Countries in the OECD have improved health facilities and improved access to healthcare, hence, it is not surprising the region has a better standard of living in the world.

Figure 3.5: Trends in Human Poverty (Life Expectancy Rate)



Source: Author's calculation based on World Bank (2013) World Development Indicators (WDI)

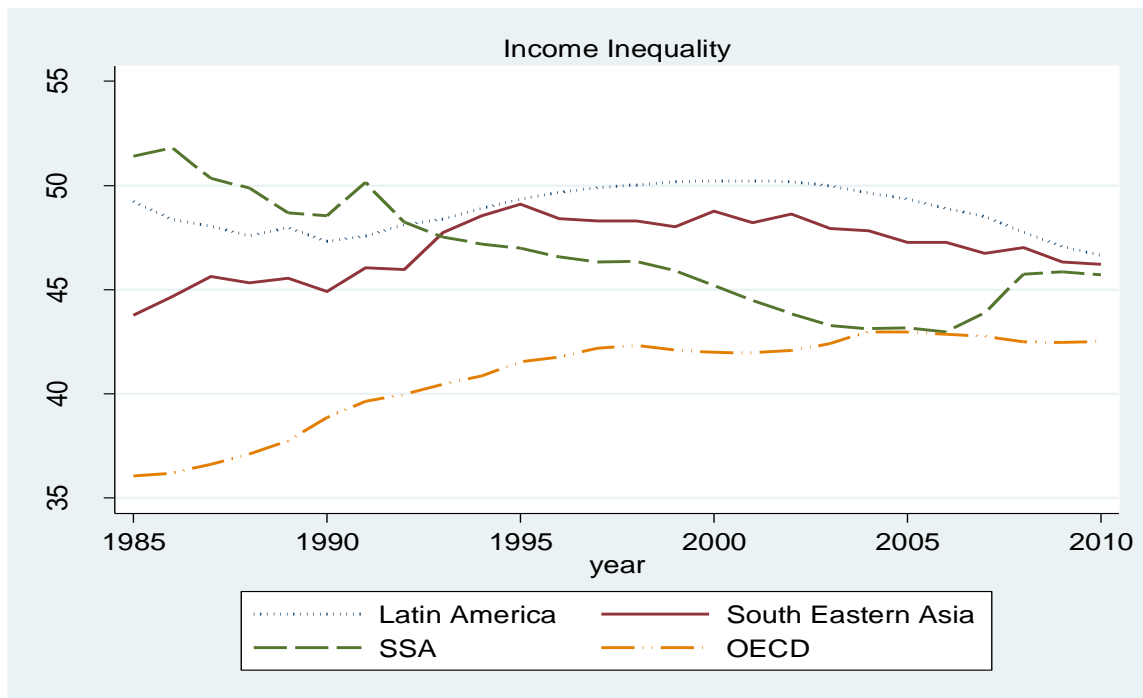
3.1.4 Income Inequality

Figure 3.6 below demonstrates the trend in income inequality (Gini index) among both developed and developing regions.⁹ The trends in income inequality show that the sub-Saharan African region has had a reduction in income inequality over the years, which is not the case in the other developing regions. On the other hand, high income OECD economies have been experiencing an increase in income inequality since the 1980s.

⁹ Gini index measures the extent to which the distribution of income deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentage of total income against the percentage of income recipients. The Gini index is computed as the area between the Lorenz curve and the line of absolute equality, expressed as a percentage of the maximum area under the line. (World Bank, 2013)

Average income inequality has increase for the OECD from the 1985-1995 sub period to 1996-2010. Latin American countries that are traditionally associated with high income inequality have the highest average income inequality compared to the rest of the regions. This implies that the rich benefit the most from economic growth in the region.

Figure 3.6: Trends in Income Inequality



Source: Author's calculation based on Standardized World Income Inequality Database (SWIID)

Furthermore, income inequality in south Eastern Asia is relatively higher than those in sub-Saharan Africa and the OECD countries though the region has experienced an improvement in economic growth than any other region over the period 1985-2010. The reason for this may probably be that economic growth has not significantly transformed the lives of the poor more than the rich in the region. The analysis here shows that only sub-Saharan Africa has experienced a significant fall in average income inequality over the years, hence, the World Bank (2013) report which argued that the increase in world

income inequality is attributed to developed and emerging economies is consistent with these trends.

Income inequality seems to be converging among developing regions, particularly in recent years. Ravallion (2001) and later Dhongde and Miao (2013) found income inequality to be converging across countries. This is much evident during the mid-1990s and in recent years. Countries with high income inequality are experiencing a decrease in inequality while countries with low income inequality are experiencing increase in income inequality. Does economic growth explains some of these differences in income inequality, human and income poverty? More importantly, to what extent has income inequality affected the poverty patterns in these regions over the years? The next two chapters of this thesis empirically analysis the economic growth, income inequality and poverty relationship.

CHAPTER FOUR

4.1 Methodology and Model Specification

The analysis of the trends in economic growth, income inequality and poverty among the regions in the previous chapter serves as an important starting point for a thorough econometric investigation into the relationship among them. In this chapter, we first derive the econometric models that will be used to investigate the relationship between economic growth, income inequality and poverty, and discuss some of the econometric challenges associated with the model and how to address these challenges. After deriving the models, we discuss the data for the thesis as well as the rationale behind the choice of variables, regions, and countries.

4.1.1 Model Specification

This section discusses two models; the poverty model and the income inequality model. First, we derive the model for the relationship between economic growth and poverty. A person is considered poor if he is unable to command sufficient resources to satisfy basic needs. The basic human needs include food, clothing and shelter which are very essential physical needs in order to ensure continued survival. We follow Fosu (2008) by assuming that if these basic human needs are an increasing function of economic growth, then poverty function can be specified in a Cobb-Douglas form as:

$$Pov = B_0 Y^\alpha \tag{1}$$

In (1), Pov is a vector of poverty variables, Y is real GDP, α is the income elasticity of poverty and B_0 is a constant whose value is an estimate of the subsistence level of poverty. The poverty variables could be either human or income-based poverty measures.

For human poverty, we use the life expectancy rate and the percentage of the population without access to improved water. For income poverty, we use the headcount ratio and the poverty gap index. Thus equation (1) gives us four separate models depending on the poverty measure used.

We incorporated other important explanatory variables that affect poverty levels such as Official Development Assistance (ODA) and government spending. We included government spending to examine whether various policies and government programs have improved the lives of the poor. Government spending includes expenditures on goods and services (including workers compensation) as well as transfer payments. Under the PRSPs, assistances were given to countries that achieved success in bringing down poverty levels and achieving the MDGs. ODA has therefore become an important tool in reducing poverty levels. We also incorporated inflation to account for macro-economic instability.¹⁰ High levels of inflation affect the purchasing power of the people, hence, adversely affecting the income and living conditions of the poor.

By taking into account regional and individual country specific heterogeneity using a one-way fixed effect error component model, equation (1) is modified and further specified as:

$$Pov_{it} = B_0(Y_{it}^\alpha Z_{it}^\psi)\varepsilon_{it} \quad (2)$$

Where $\varepsilon_{it} = \mu_i + v_{it}$

(For $i = 1, 2, 3 \dots, N; t = 1, 2, 3 \dots, T$)

¹⁰ Inflation is measured as a percentage change in consumer prices.

pov_{it} is the poverty level of country i at time t , Y_{it} is real GDP of country i at time t . ε_{it} is the compound error term which includes the country specific term, μ_i and the time-varying disturbance term, v_{it} assumed to be identically and independently distributed (iid). Z_{it} is a set of explanatory variables that affect poverty other than real GDP (inflation, government expenditure and ODA).

Taking logs of equation (2) yields:

$$\ln Pov_{it} = \beta_0 + \alpha \ln Y_{it} + \psi \ln Z_{it} + \varepsilon_{it} \quad (3)$$

We further argue that equation (3) can be modified as a dynamic panel data model to allow for some degree of persistence in the data generating process. For instance with the downward trending nature of poverty levels, it is reasonable to assume that poverty levels of countries in a particular period may depend on that of previous years' levels. How fast poverty levels change at the end of this period may depend on the initial levels of poverty. It also takes time before policies such as the structural reforms and the PRSPs actually affect the lives of the poor. Therefore, there may possibly be long lags between the time policies are implemented and their impacts on economic variables. Thus, the inclusion of lags can help explain partial adjustment of poverty levels over time in order to reach long-run equilibrium. We also include lags in the model to account for exogenous shocks in the economy which may have persistent effect over time. Examples of such shocks are political instability in most developing countries and also natural disasters which are unavoidable. Beck and Katz (1996) explain that the inclusion of lag dependent variable as a regressor in the model is also a parsimonious way to account for

the continuing effect of explanatory variables in the past. The dynamic form of equation (3) after including the lag dependent variable becomes:

$$\ln Pov_{it} = \beta_0 + \gamma \ln Pov_{it-1} + \alpha \ln Y_{it} + \psi \ln Z_{it} + \varepsilon_{it} \quad (4)$$

Where Pov_{it-1} is the lagged poverty variable, $\ln Y_{it}$ is the logarithmic increase in real GDP (growth), \ln means natural log. $\beta_0, \alpha, \psi, \gamma$ are all expressed as elasticities.

4.1.2 Income Inequality Model

The second model of the thesis is the income inequality model which will be used to examine the relationship between economic growth and income inequality. If economic growth benefits the poor more than the rich, then income distribution will improve. However, if economic growth benefits the rich more than the poor, then income inequality worsens. Hence, the impact of growth on income inequality cannot be determined a priori. We also include other variables that affect income inequality other than economic growth. These factors include the rate of unemployment, government spending and educational levels. Unemployment is important determinant of income inequality in the developing world because it is mostly more prevalent among the poor more than the rich. Education improves the human capital of any economy. In the long run, education enhances the productive potential of the poor which could help decrease income inequality. On the contrary, if education benefits the rich more than the poor, then income inequality will increase. We include government expenditure because, if government policies and programs benefit the poor the most, then we expect income

inequality to improve. We specify the relationship between economic growth and income distribution in a dynamic form similar to what we did for the poverty model.

We follow Wawro (2002) by modeling persistence in the data if we assume that the individual country specific effects do not vary over time. The dynamic form of the economic growth-income inequality relationship is specified as follows:

$$\ln inq_{it} = \phi + \delta \ln inq_{it-1} + \sigma \ln Y_{it} + \rho \ln A_{it} + \varepsilon_{it} \quad (5)$$

In (5), inq_{it} is income inequality of country i at time t (where the Gini index is a measure of income inequality), $\ln Y_{it}$ is logarithmic increase in real GDP (growth) of country of i at time t . A_{it} is vectors of control variables that affect income inequality other than economic growth. These variables include unemployment rate, level of education and government expenditure. $\phi, \delta, \sigma, \rho$ are parameters to be estimated which are all expressed as elasticities.

The coefficients in both models are expressed as elasticities. For the income poverty model (equation 4), the income elasticity of poverty, α is hypothesized to be negative. This is because economic growth is expected to lead to a reduction in poverty levels. For the human poverty measures, we expect an increase in real GDP to reduce the percentage of the population without access to improved water. However for the life expectancy rate, an increase in economic growth should improve the health of the poor by increasing their life expectancy rate, hence, we hypothesize a positive relationship. For the income inequality model (equation 5), σ which measures the rate at which growth affects inequality cannot be determined a priori. While economic theory suggests that growth should reduce income inequality, a number of studies have shown that economic growth

could either worsen or have no significant effect on income distribution. If economic growth benefits the rich more than the poor, income inequality will worsen. On the other hand if economic growth benefits the poor the more than the rich, then income inequality will improve. Therefore the coefficient of economic growth cannot be determined a priori.

4.1.3 Econometric Challenges

In the previous section, we have specified two dynamic models. The most commonly used estimation techniques in panel data models include Pooled OLS, Fixed Effects (FE), Random Effects (RE), Generalised Least Squares (GLS), Difference (DIFF)-GMM and System (SYS)-GMM. The inclusion of a lagged dependent variable together with the other regressors in equations (4) and (5) introduces the problem of endogeneity which needs to be carefully addressed. Whereas Fixed Effects assumes the individual specific heterogeneity to be correlated with the explanatory variables, Random Effects assumes that these specific effects are uncorrelated with the regressors. Fosu (2010) used both the FE and RE methods in estimating the growth and poverty reduction relationship. However these techniques face difficulties due to the presence of the lagged dependent variable in the models. This is because in both techniques, the lagged dependent variable is correlated with the disturbance term, ε_{it} . Moreover, Pov_{it-1} and the fixed effect term, μ_{it} are correlated. This results from the fact that the determinants of μ_{it} contribute to the lagged dependent variable regardless of time subscript. Roodman (2009) argued that FE cannot be used because the pov_{it-1} and inq_{it-1} variables are correlated with the disturbance term even after transforming equations (4) and (5) by first-differencing. In addition, OLS cannot be used because of the correlation between the lagged dependent

variable and the compound error term, ε_{it} . Though studies such as Tridico (2010) used OLS estimation techniques in their estimations, Bond (2002) argued that applying OLS to dynamic panel equations leads to biased and inconsistent estimates of the parameters. This is because the lagged dependent variable Pov_{it-1} is correlated with the individual specific effects, μ_{it} which violates the assumption necessary for the consistency of OLS. Baltagi (1995) and Kiviet (1995) asserted that estimating equations (4) and (5) with standard panel data estimators like “Within Group” (WG) or “Least Squares Dummy Variables” (LSDV) transformation that eliminates the individual country effects also leads to biased and inconsistent results because the correlation still remains between the transformed lagged dependent variables and the transformed error terms. The bias is of order $1/T$ and is a problem in panel data sets where T is small (Nickell 1981).

Though the asymptotic properties of these estimators suggest that as the time period increases, the effects of such bias become minimal, we do not employ such estimation techniques because the data (time period) used by this thesis is arguably too small to overcome the bias. Fanta and Upadhyay (2009) tried to account for the country-specific effects in their model by using Generalised Least Squares (GLS) which is adjusted for heteroscedasticity across countries. They however failed to address the endogeneity in the model (for instance the relationship between growth and income inequality) which still becomes an econometric issue.

Roodman (2009) suggested two estimators to deal with the endogeneity problem. The first is DIFF-GMM which transforms the model by taking first difference to

eliminate the Fixed Effects. The poverty model (equation 4) after the transformation becomes:¹¹

$$\ln Pov_{it} - \ln Pov_{it-1} = \beta_0 - \beta_0 + \gamma(\ln Pov_{it-1} - \ln Pov_{it-2}) + \alpha(\ln Y_{it} - \ln Y_{it-1}) + \psi(\ln Z_{it} - \ln Z_{it-1}) + v_{it} - v_{it-1} \quad (6)$$

$$\Delta \ln Pov_{it} = \gamma \Delta \ln(Pov_{it-1}) + \alpha \Delta \ln(Y_{it}) + \psi \Delta \ln(Z_{it}) + \Delta v_{it} \quad (7)$$

Where Δ denotes first differences. Though the fixed effect term is eliminated, the lagged poverty variable is potentially endogenous because the Pov_{it-1} term in ΔPov_{it-1} is correlated with the v_{it-1} in Δv_{it} . Moreover, any other variables that are not strictly exogenous becomes potentially endogenous because they may also be related to v_{it-1} . Alonso-Borrego (1996) argued that estimating dynamic models using DIFF-GMM would result in large finite sample biases and poor precision because lagged levels provide weak instruments for first differences. As a result of the lagged dependent variables, Blundell and Bond (1998) and Arellano and Bond (1991) proposed the second model, SYS-GMM which constructs an instrumental variable for Pov_{it-1} and any other endogenous variables. These variables are assumed to be uncorrelated with the Fixed Effects component, μ_{it} in the compound error term, ε_{it} . The SYS-GMM supplements equations in first differences with equations in levels. Estimations with first differences use lagged levels as instruments while the levels equations use lagged differences. The first-difference and levels equation for the SYS-GMM under the poverty model (equation 5) become:

¹¹ Similar transformations are applied to the income inequality model (equation 5).

$$\Delta \ln Pov_{it} = \gamma \Delta \ln(Pov_{it-1}) + \alpha \Delta \ln(Y_{it}) + \psi \Delta \ln(Z_{it}) + \Delta v_{it} \quad (8)$$

and

$$\ln Pov_{it} = \beta_0 + \gamma \ln Pov_{it-1} + \alpha \ln Y_{it} + \psi \ln Z_{it} + \varepsilon_{it} \quad (9)$$

Blundell and Bond (1998) argued that SYS-GMM is an improvement to DIFF-GMM because it does not only supplement the equation in first differences with the equation in levels but also allows for the correction of measurement errors in the other regressors. Studies that have used the SYS-GMM method have found it to perform better in dynamic panel data models than the other techniques. Fosu (2010b) used the SYS-GMM, FE and RE estimation methods in analysing the relationship between economic growth, and poverty. By comparing all three methods, he concluded that SYS-GMM is a better estimator for dynamic panel models. Based on the arguments, we employ the SYS-GMM here to estimate the poverty and income inequality models (equations (4) and (5)).

4.1.4 Data Description

The thesis uses annual data from 1985 to 2010 for four regions in the world. The regions include three developing regions (sub-Saharan Africa, South and Eastern Asia and Latin America) and one developed region (high income OECD countries). The choice of these regions is due to their unique characteristics which have already been discussed in the introduction to the thesis. The Sub-Saharan Africa region consist of 26 countries, the South and East Asian region is made up of 16 countries, Latin American countries and high income OECD regions consist of 18 and 23 countries respectively. In total, 83 countries are used in this thesis (refer to Appendix A.1 for the list of countries used in this thesis). The choice of countries in each region is dictated by the availability of data for key variables. Not all countries were observed for every year due to missing values.

The data for the study is taken from two main sources, the World Bank and the Standardized World Income Inequality Database (SWIID). Descriptive statistics of the data is presented in appendix A.2. The poverty headcount ratio, poverty gap, life expectancy, population without access to improved water, real GDP and GDP growth rate are taken from the World Development Indicators (WDI) of the World Bank (2013). Illiteracy rate (education) is omitted as a human-based poverty measure due to data unavailability. The poverty gap and the headcount ratio are used for the developing regions alone. Poverty headcount ratio is measured as the number of people who live on less than \$1.25 as percentage of the total population while the poverty gap index calculates the amount of income needed to bring the poor from poverty up to the \$1.25 poverty line. Inflation, the secondary school enrolment rate (education), Official Development Assistance (ODA), the unemployment rate and government spending are taken from World Development Indicators (WDI) of the World Bank (2013). Government spending and Official Development Assistance (ODA) are expressed as a percentage of GDP. Gini coefficient which is the measure of income inequality is taken from the SWIID.

CHAPTER FIVE

5.1 Estimation and Econometric Results

In the preceding chapter, we specified and discussed the models used in the empirical investigation of the economic growth, income inequality and poverty relationship. In this chapter, we present and discuss the econometric results. The discussion is done in three parts. First, we discuss and compare the results among all of the regions for human and income poverty measures as well as income inequality. Second, we investigate the role income inequality plays in the growth-poverty model. In order to do this, we break the entire dataset into high and low income inequality periods. When the Gini index (measure of income distribution) is 0.5 and above, then income inequality is high.¹² However, when the Gini index is less than 0.5, then income inequality is low. We examine the impact of economic growth on poverty in both the low and high income inequality periods. Third, we investigate the effect of economic growth on income inequality. All models are estimated using the SYS-GMM estimation technique. We report both Arellano and Bond test for second order autocorrelation (AR (2)), and the Sargan tests for over-identifying restriction which is a test of the efficiency and validity of the SYS-GMM estimator.¹³

In order to examine the effect of economic growth on the poor in the developing world, we first estimate the effect of economic growth on both income and human poverty measures using the data set for all the developing regions combined before

¹² We followed studies in the literature that uses Gini index of 0.5 and above as a threshold for high income inequality, and less than 0.5 as a threshold for low income inequality.

¹³ Sargan test is based on the assumption that the residuals are not correlated with the instruments. Validity of the test is established when the null hypothesis that the over-identifying instruments are valid is accepted. The Sargan statistic is asymptotically distributed as $\sim \chi^2$ with $(j - k)$ d.f. Where $j-k$ is the degree of overidentification. See for example Roodman (2009).

estimating for each region separately. The results for the entire developing world are presented in table 5.1 below. The Arellano and Bond AR (2) test shows that, the null hypothesis of no second order autocorrelation is accepted at the 5% significance level in these and most of the regional poverty models. Exceptions are the poverty gap model for SEA region and the life expectancy model for the LAC region.

Table 5.1 Poverty Models for the developing world

| Variables | HCR | PGI | LE | PWIW |
|----------------|--------------------|---------------------|--------------------|----------------------|
| Lagged Poverty | 0.84*** (24.99) | 0.65*** (16.23) | 1.03*** (420.8) | 1.05*** (666.47) |
| Real GDP | -0.08*** (3.3) | -0.05 (1.2) | 0.05*** (15.99) | - 0.001 (0.93) |
| Inflation | 0.02 (1.6) | 0.0045*** (2.58) | 0.001*** (4.46) | -0.006*** (13.09) |
| Government | 0.061 (1.22) | 0.13*** (2.65) | 0.0001 (0.55) | -0.005*** (4.47) |
| ODA | 0.048** (3.72) | 0.08*** (3.2) | 0.001*** (6.83) | -0.01*** (12.13) |
| AR (2) Test | 0.069 | 0.378 | 0.848 | 0.996 |
| Sargan Test | 0.086 | 0.072 | 0.00 | 0.00 |

Note: ***, **, * represent 1%, 5% and 10% significance level respectively. Absolute values of 't'-statistics are in parenthesis. HCR is poverty headcount ratio, PGI is poverty gap index, LE is life expectancy and PWIW is the percentage of the population without improved water.

The income elasticity of all poverty variables have their expected signs. In the short run, a one-percent increase in real GDP leads to 0.08% decrease in the proportion of people living below \$1.25 a day. The relationship is statistically significant at the 1% significance level. This implies that economic growth has led to reduction in poverty in the developing world. This result is consistent with the findings of Ravallion and Chen (2007), Adam (2004), and Dollar and Kraay (2000). Those studies found that economic growth leads to reduction in poverty levels, implying that the various policies and reforms implemented in the developing world since the 1980's have positively impacted

the incomes of the poor. From the poverty gap index model, we found that economic growth did not significantly reduced the depth of poverty.

In terms of real economic benefits, the results show that economic growth has improved life expectancy in the developing world. A one-percentage increase in growth improves life expectancy by 0.05%. This implies that, the health of the poor which is an important goal of the MDGs has improved as a result of economic growth. We can attribute this to the policies and programs, particularly the PRSPs that aimed at promoting the MDGs. Economic growth nevertheless did not significantly reduced the percentage of the population without improved water in the developing world. The results also show that increase in ODA has led to increase in income poverty in the developing world. When aid is misappropriated in most countries, it does not meet its intended aim of bringing the poor out of poverty in the developing world, but rather leading to an increase in poverty. On the other hand, ODA has improved life expectancy and the percentage of the population with improved water. Donors and development partners have always given assistance to developing countries in order to improve standards of living. This has reflected in improving basic human necessities such as good health and improved water. Government programs in the developing world have also improved some basic human needs of the poor rather than increasing their incomes. Programs such as the provision of improved water has directly helped reduced human poverty levels in most developing countries. As expected, inflation has led to an increase in income poverty. This is because inflation reduces the purchasing power of the poor, hence leading to a decrease in their real incomes. However, in terms of real economic benefit, inflation has neither decreased

the life expectancy rate nor increased the percentage of the population without improved water.

The coefficient of lagged poverty implies some degree of persistence in poverty in the developing world. Thus, current year's poverty levels depend on that of previous year's levels. This parameter also helps in estimating the long run effect of economic growth on poverty¹⁴. In the long run, a one-percent increase in economic growth leads to a reduction of poverty (headcount ratio) by 0.5% in the developing world. In terms of real economic benefit, we found that a one-percent increase in growth will lead to decrease in the life expectancy rate by 1.67% in the long run. Thus, given the short run effects, economic growth will decrease the life expectancy rate in order to reach long run equilibrium, all other things remaining the same.

5.1.1 Income Poverty Model

Having estimate the effect of economic growth on poverty in the developing world, we now proceed to estimate the effect of economic growth on poverty for each of the developing regions. The results of the headcount ratio model are presented in Table 5.2.¹⁵ In all of the regions, the coefficient of the lagged poverty is positive and significant. This implies that, the level of poverty in the previous year has a direct influence on current year's poverty levels. In all of the regions, the partial adjustment process is very slow with the coefficient of lagged poverty close to one. There is a negative relationship between economic growth and poverty in all three developing regions in the short run.

¹⁴ Long run coefficient is computed as $\beta_i / (1 - \gamma)$, for $i = 1, 2, \dots, T$. where β is a vector of short run coefficients of the explanatory variables, $(1 - \gamma)$ is the adjustment coefficient and γ is the coefficient of the lagged dependent variable. We discuss only the coefficients of real GDP which is the focus of this thesis.

¹⁵ For this model and the poverty gap model, we do not include the OECD due to data unavailability.

Table 5.2 Poverty Headcount Model

| Regions/Variables | SSA (1) | SEA (2) | LAC (3) |
|-------------------|---------------------|--------------------|--------------------|
| Lagged Poverty | 0.99*** (169.43) | 0.98*** (43.08) | 0.87*** (21.27) |
| Real GDP | -0.012** (2.43) | -0.085* (1.98) | -0.07** (2.07) |
| Inflation | 0.007** (2.44) | -0.026 (1.60) | 0.004 (0.2) |
| Government | -0.023*** (2.99) | 0.05 (0.97) | 0.054 (0.55) |
| ODA | -0.004 (1.25) | 0.002 (0.13) | 0.039* (1.97) |
| AR (2) Test | 0.155 | 0.876 | 0.001 |
| Sargan Test | 0.216 | 0.965 | 0.329 |

Note: ***, **, * represent 1%, 5% and 10% significance level respectively. Absolute values of 't'-statistics are in parenthesis

From column (1), it can be seen that poverty has declined as a result of economic growth in the SSA region. This result is statistically significant at the 5% significance level. A one-percent increase in real GDP leads to a 0.012% decrease in the proportion of people living on less than \$1.25 a day. This inelastic result makes sense as an increase in real GDP shifts the distribution of income to the right without changing the poverty threshold of \$1.25. Economic policies and reforms which are mostly targeted at the poor have transformed the lives of the poor by improving their income levels. Debt cancelation as well as increased commodity prices boosted economic growth in the early to mid-2000's. Most countries in the SSA were able to channel resources from the debt cancelation into other productive sectors of their economies. As a result, these policies have helped reduce poverty levels in sub-Saharan Africa. Comparing this result to other similar studies on SSA, this study produces a greater coefficient than for instance Fanta and Upadhyay (2009) who had -0.0044% with the GLS estimation technique. The SYS-GMM result of our dynamic model is more efficient than GLS that biases the estimates downward. The GLS fails to address problems such as variable endogeneity, and shocks

in the model. Other explanatory variables have the expected effects. There is a positive relationship between inflation and poverty levels. High levels of inflation reduce the purchasing power of the people, hence increasing poverty levels.

The results also show that government expenditures have led to poverty reduction. Governments over the years have undertaken developmental projects and programs with the aim of improving the standard of living. In most countries in SSA, small loan concessions were given to individuals and small and medium scale enterprises (SMEs) by the local governments during the early-2000's through to the mid-2000's. Governments also employ middle and low-income individuals in most of their programs with the aim of improving standards of living and eliminating poverty. Programs such as youth in agriculture and other vocational training programs have helped the poor in gaining employment. Official Development Assistance however has not significantly affected the percentage of the population living on less than \$1.25 a day in SSA.

Column (2) shows the results for the South and East Asian (SEA) region. There is a negative relationship between economic growth and poverty. The percentage of the population living on less than \$1.25 a day has decreased by 0.085% as a result of a percentage increase in economic growth. The result is statistically significant at the 10% significance level. This shows how economic growth has transformed the lives of the poor in this region, especially in China and India. As the World Bank (2013) report asserted, China and India have contributed massively to the downward trend in poverty levels in the developing world over the years. Official Development Assistance (ODA) and government expenditures have not significantly improved the income levels of the poor in the SEA region.

Column (3) reports the results for the Latin America (LAC) region. The relationship between poverty and economic growth is negative and is statistically significant at the 5% significance level. This result implies that a 1% increase in real GDP has significantly led to a 0.07% reduction in poverty in Latin America. The results also show that Official Development Assistance (ODA) which is mostly provided by the OECD countries and multilateral institutions has rather increased poverty levels in the LAC. This may be due to misappropriation of aid. Finally, inflation and government spending have no significant relationship with poverty levels in the LAC.

We further estimate the long run effects of growth on poverty given our short run coefficients. The long run coefficients of real GDP under the headcount model are -1.2, -4.25 and -0.54 for the SSA, SEA and LAC respectively (Appendix A.3 reports the long run coefficients on poverty). A percentage increase in growth leads to poverty reduction of 1.2%, 4.25% and 0.5% respectively in SSA, SEA and LAC. The long run coefficients are larger than that of the short run. The magnitude of the lagged poverty coefficients suggest that, it takes longer time to reach long run equilibrium. Given the short run effects of growth on poverty, the positive impact of the economic growth will be greatly felt by the poor in the foreseeable future, other things being equal.

Table 5.3 presents the results on the poverty gap index model which is a very important measure of income poverty. For this model and all subsequent poverty models, we discuss the results for only economic growth which is the main focus of this thesis. The coefficients of the lagged poverty for the developing regions are positive which implies that, the level of poverty in the previous year has a direct influence on current year's poverty levels. These results happen to be same under the poverty headcount ratio

model. The results show that in the immediate effect (short run), economic growth has a negative relationship with poverty levels in all three developing regions. However, economic growth does not significantly affect poverty in the SEA region using the poverty gap index metric. A 1% increase in real GDP leads to a reduction of 0.027% and 0.088% in poverty levels in SSA and LAC respectively. The results imply that economic growth in the LAC has helped improve the income levels of the poor more than the SSA. The reason could be that countries in LAC particularly Brazil, are relatively technologically advanced than most SSA countries. Moreover, LAC historically has lower poverty levels than SSA countries.

Table 5.3 Poverty Gap Model

| Regions/Variables | SSA (1) | SEA (2) | LAC (3) |
|-------------------|----------------------|--------------------|-------------------|
| Lagged Poverty | 1.001*** (116.72) | 0.96*** (31.29) | 0.8*** (15.8) |
| Real GDP | -0.027** (2.4) | -0.13 (1.6) | -0.088* (1.75) |
| Inflation | 0.024*** (3.78) | -0.02 (0.72) | 0.014 (0.42) |
| Government | -0.022 (1.3) | 0.1 (1.06) | 0.17 (1.04) |
| ODA | -0.0001 (0.01) | 0.006 (0.21) | 0.05* (1.71) |
| AR (2) Test | 0.022 | 0.010 | 0.109 |
| Sargan Test | 0.36 | 0.973 | 0.368 |

Note: ***, **, * represent 1%, 5% and 10% significance level respectively. Absolute values of 't'-statistics are in parenthesis

Considering the nature for economic growth in these regions, the results from these income poverty measures, specifically the headcount ratio shows that the SEA, that has experienced enormous growth mainly due to rapid technological advancement in recent years, have improved the income levels of the poor the most. Though economic growth in most developing countries has mainly been driven by agricultural commodities, the SEA has added more value to these commodities as reflected in the significant expansion of

the manufacturing and industrial sectors in the region. In terms of policy implications, these results imply that given the nature of economic growth and the pace of development in the regions, poverty levels in SEA will be reduced greatly in the coming years. The results for the income poverty measures are consistent with most studies such as Fosu (2010) who did similar regional analysis albeit different methodology and dataset. In his case, he found that the growth elasticity of poverty (headcount ratio) is greater in the LAC region than in SEA and SSA, with SSA achieving very little reduction in poverty.

5.1.2 Human Poverty Model

In this section, we discuss the results of human poverty measures which are very important to the general well-being of the society. The importance of human development made the UNDP developed a practical measure of poverty that represents real economic benefit to the people, hence the human poverty indices. This is because, they capture the real benefit of economic growth on the poor. We discuss and compare the results among all of the four regions. The OECD region is very important because of their high human developmental standards and improved living standards. The coefficients of lagged poverty for the human poverty models imply that, there is a positive relationship between previous and current year's poverty in all of the regions. This is an indication of some degree of persistence in these poverty measures.

Table 5.4 presents the results on the percentage of the population without access to improved water. The results show that poverty levels in the SSA and SEA reduced as a result of economic growth in the short run. An increase in growth by 1% has led to a decrease in the percentage of the population without improved water by 0.012% in SSA.

The result is statistically significant at the 1% significance level. This implies that, there has been an improvement in terms of real economic benefit and living conditions of the poor in SSA as result of economic growth. Economic growth has also led to improvement in economic provisioning of the poor in SEA. A one-percent increase in real GDP has led to reduction in poverty by 0.02%.

Table 5.4 Percentage of Population without Improved Water Model

| Regions/Variables | SSA (1) | SEA (2) | LAC (3) | OECD (4) |
|-------------------|---------------------|---------------------|---------------------|---------------------|
| Lagged Poverty | 1.03*** (452.32) | 1.04*** (416.4) | 1.04*** (503.06) | 0.95*** (194.82) |
| Real GDP | -0.012*** (11.4) | -0.02*** (15.86) | 0.004*** (2.88) | -0.001 (0.17) |
| Inflation | -0.002 (0.47) | 0.001 (0.65) | 0.0036*** (5.74) | 0.01 (1.35) |
| Government | 0.017*** (13.86) | -0.02*** (9.3) | -0.015*** (5.66) | -0.21*** (6.15) |
| ODA | 0.0003 (0.52) | -0.09 (12.12) | -0.005*** (8.52) | |
| AR (2) Test | 0.373 | 0.526 | 0.363 | 0.586 |
| Sargan Test | 0 | 0 | 0 | 0.812 |

Note: ***, **, * represent 1%, 5% and 10% significance level respectively. Absolute values of 't'-statistics are in parenthesis

On the other hand, the percentage of the population without access to improved water has increased as a result of economic growth in LAC. When economic growth increases by 1%, the population without improved water increases by 0.004%. This could be because the region has relatively higher percentage of the population with improved water, hence, the policies and programs of governments have been directed towards other areas of the economy. This neglect has led to an increase in the percentage of the population without improved water. The coefficients of the lagged poverty are greater than one in all three developing regions which imply that, economic growth will lead to increase in the percentage of the population without improved water in the SSA and SEA

in the long run, a case that is different in the short run. On the other hand, while economic growth in LAC leads to an increase in poverty in the short run, the lagged poverty coefficient implies that growth will decrease the percentage of the population without improved water in the long run.

Comparing the short run results of the SSA and LAC, the two developing regions both of which rely heavily on agricultural commodities and natural resources for economic growth, we can conclude that while SSA has improved living conditions by reducing human poverty, LAC has rather experienced increase in human poverty. The results also mean that the various economic policies and reforms particularly under the PRSPs have positively affected the living conditions of the poor more in the SEA and SSA than in the LAC region. Table 5.4 however shows that, economic growth has not significantly affected the percentage of the population without improved water in the OECD regions. For the OECD region, this is not a surprise because almost every person has access to improved water.

In Table 5.5 below, we present and discuss the results for the effect of economic growth on life expectancy rate, which is a proxy for health. In the short run, the results show a significant positive relationship between economic growth and life expectancy rate in all of the four regions, albeit small effects. Among the regions, SSA has experienced greater increase in life expectancy as a result of economic growth. An increase of 1% economic growth has led to a 0.009% increase in life expectancy. The result for SSA is not surprising because, the health targets and goals of the MDGs which were part of the PRSPs have been given a lot of attention since the early 2000's. For instance, the prevalence of malaria, maternal mortality and child mortality in the region

are closely monitored by multilateral organisations and bilateral donors. SEA has also performed better than LAC and the OECD in terms of improving life expectancy rate. For the OECD region, because most of the countries have overcome such human poverty, it is not surprising that economic growth has translated little into human poverty reduction. Though SSA and LAC have similar growth drivers, SSA seems to have performed better than LAC in terms of improving life expectancy of its people. This is because, SSA has lower life expectancy rate as depicted in Figure 3.5, more resources have been channeled into improving healthcare and health facilities which has improved the health status of the people. The coefficients of lagged poverty for the SSA and the OECD are greater than one which implies that in the long run, economic growth will lead to a fall in life expectancy in the OECD and SSA. Conversely, growth will continue to improve life expectancies in the LAC and the SEA regions in the long run.

Table 5.5 Life Expectancy Model

| Regions/Variables | SSA (1) | SEA (2) | LAC (3) | OECD (4) |
|-------------------|----------------------|----------------------|-----------------------|----------------------|
| Lagged Poverty | 1.005*** (197.96) | 0.97*** (895.61) | 0.97*** (1580.11) | 1.005*** (129.97) |
| Real GDP | 0.009*** (13.37) | 0.001*** (9.55) | 0.00013*** (4.36) | 0.0004* (1.71) |
| Inflation | -0.001*** (4.22) | -0.001*** (8.13) | 0.0001*** (3.83) | 0.002 (1.04) |
| Government | -0.003*** (4.21) | -0.004*** (23.91) | -0.003*** (5.9) | -0.001** (2.32) |
| ODA | 0.003*** (9.85) | -0.003*** (7.17) | -0.0002*** (12.07) | |
| AR (2) Test | 0.889 | 0.355 | 0.00 | 0.203 |
| Sargan Test | 0 | 0 | 0 | 0.812 |

Note: ***, **, * represent 1%, 5% and 10% significance level respectively. Absolute values of 't'-statistics are in parenthesis

The implications from the short run results are that, whereas economic growth in SEA has increased the incomes of the poor more than the case of LAC and SSA, the nature of economic growth in SSA is such that provision of basic human necessities has

been the main focus. With the focus of poverty shifting from the traditional poverty measure to measures that captures the real economic benefit of growth to the poor, countries in SSA have directed policies and programs towards improving human poverty. This is because these human needs are lacking in most countries in the region and therefore needs significant attention.

The short run results also show that, for all of the regions, the effects of economic growth on income poverty are much larger than that of the human poverty measure. This could imply that economic growth does not have direct or immediate effect in meeting the basic human needs of the poor. However, it may affect the income levels of the poor which will in turn help improve their living conditions in the long run.

5.1.3 Income Inequality in the Economic Growth-Poverty Relationship

As already noted in the introduction to the thesis, the study also investigates the role income inequality plays in the economic growth-poverty relationship. To do this, we divided the dataset into low and high income inequality periods using the criteria outlined in the previous section. We discuss only the results of economic growth which is our primary explanatory variable. Table 5.6 and 5.7 present the results on poverty headcount model and the poverty gap model respectively.

From Tables 5.6 and 5.7, it can be seen that, in periods of low income inequality, economic growth leads to greater reduction in poverty levels than in periods of high inequality. The results are however not statistically significant for the SEA region. In periods of low income inequality, a percentage increase in economic growth leads to a reduction in poverty of 0.016% and 0.028% respectively under the headcount and poverty

gap models in SSA. The coefficients under low income inequality are greater than that of the entire dataset. Economic growth however does not significantly affect poverty levels in SSA when income inequality levels are high. Similarly, a one-percent increase in economic growth led to a reduction in poverty of 0.14% and 0.21% respectively under the headcount and poverty gap models in LAC. Conversely, economic growth has little impact on the poverty in high income inequality periods in LAC.

Table 5.6 Poverty Headcount Model

| Regions/Variables | SSA | | SEA | | LAC | |
|-------------------|--------------------|--------------------|------------------|--------------------|-------------------|--------------------|
| | Low | High | Low | High | Low | High |
| Real GDP | -0.016** (2.51) | -0.013 (0.94) | -0.3 (1.52) | -0.04 (0.96) | -0.135* (1.87) | -0.037 (1.5) |
| Inflation | 0.006 (1.54) | 0.017** (2.57) | 0.12* (2.19) | -0.08*** (3.94) | 0.018 (0.39) | 0.017 (0.92) |
| Government | 0.001 (0.01) | -0.06*** (3.93) | -0.18 (1.47) | 0.05 (0.8) | -0.346* (1.88) | 0.27*** (2.83) |
| ODA | -0.02 (1.6) | -0.01* (1.75) | -0.002 (0.07) | 0.012 (1.21) | 0.08 (0.19) | 0.064*** (2.97) |
| AR (2) Test | 0.064 | 0.871 | 0.901 | 0.00 | 0.233 | 0.290 |
| Sargan Test | 0.351 | 0.005 | 1 | 0.004 | 0.045 | 0.003 |

Note: ***, **, * represent 1%, 5% and 10% significance level respectively. Absolute values of 't'-statistics are in parenthesis

Table 5.7 Poverty Gap Model

| Regions/Variables | SSA | | SEA | | LAC | |
|-------------------|--------------------|------------------|-----------------|------------------|-------------------|-------------------|
| | Low | High | Low | High | Low | High |
| Real GDP | -0.028** (2.43) | 0.014 (0.3) | -0.48 (1.58) | -0.007 (0.07) | -0.206* (1.75) | -0.04 (1.23) |
| Inflation | 0.027*** (3.65) | 0.025 (1.03) | 0.12 (1.45) | -0.06 (1.12) | 0.028 (0.36) | 0.03 (1.38) |
| Government | -0.015 (0.59) | -0.03 (0.71) | -0.13 (0.63) | 0.17 (1.04) | -0.37 (1.24) | 0.55*** (3.64) |
| ODA | 0.033* (1.78) | -0.026 (1.52) | 0.01 (0.37) | -0.005 (0.13) | -0.013 (0.2) | 0.09*** (3.43) |
| AR (2) Test | 0.044 | 0.00 | 0.640 | 0.00 | 0.079 | 0.737 |
| Sargan Test | 0.055 | 0.119 | 1 | 0.175 | 0.012 | 0.384 |

Note: ***, **, * represent 1%, 5% and 10% significance level respectively. Absolute values of 't'-statistics are in parenthesis

These results imply that income inequality plays an important role in the economic growth-poverty relationship of countries. How fast countries can eliminate absolute poverty depends not only on the nature of economic growth but also on how aggregate incomes are distributed. High and growing income inequality reduces the benefit of economic growth in terms of improving the income levels of the poor.

Tables 5.8 and 5.9 below report the effect of economic growth on human poverty levels in low and high income inequality periods. Generally, both tables show that the impact of economic growth on economic provisioning and health is greater when income inequality is low than when it is high. However, there are two surprising results. First, the results show that in LAC, economic growth does not significantly affect the percentage of the population without improved water when income inequality is low. Second, in SSA, the impact of economic growth on life expectancy is lower in low income inequality periods than high inequality periods. In periods of low income inequality, SSA and SEA have achieved greater reductions in the percentage of the population without improved water than in high inequality periods. The results however show that economic growth in the OECD region does not significantly affect the percentage of the population without improved water in both low and high income inequality periods. Furthermore, at low levels of income inequality, economic growth in the SEA and OECD countries led to greater improvements in life expectancies. Similar to income poverty, the results on human poverty show that high income inequality reduces the positive impact of economic growth on the health and economic provisioning of the people. The implication we draw from this subsection is that economic growth leads to a greater reduction in poverty under a favorable income distribution.

Table 5.8 Percentage of Population without Improved Water Model

| Regions/Variables | SSA | | SEA | | LAC | | OECD | |
|-------------------|--------------------------|-------------------------|-------------------------|------------------------|-------------------------|---------------------|------------------|------------------------|
| | Low | High | Low | High | Low | High | Low | High |
| Real GDP | -0.007** * (12.17) | -0.004** * (3) | -0.035** * (3.02) | -0.003 (1.03) | 0.002 (0.72) | 0.002 (1.53) | -0.008 (1.12) | 0.002 (1.31) |
| Inflation | 0.001** (2.21) | -0.005** * (6.05) | 0.003 (0.05) | 0.03*** (9.33) | 0.01*** (8.32) | 0.013 * (1.7) | 0.004 (0.49) | 0.003 (1.22) |
| Government | -0.006** * (5.34) | 0.027** * (16.09) | -0.002 (1.55) | 0.06*** (6.7) | -0.012** * (2.37) | 0.007 (1.2) | -0.11* (1.96) | 0.095 (3.52)** * |
| ODA | -0.003** * (5.06) | 0.008** * (12.27) | -0.007 (1.59) | 0.001** * (0.59) | 0.005** * (5.7) | 0.001 (1.3) | | |
| AR (2) Test | 0.985 | 0.56 | 0.001 | 0.187 | 0.288 | 0.398 | 0.708 | 0.986 |
| Sargan Test | 0 | 0 | 0 | 0 | 0.075 | 0.807 | 0.526 | 1 |

Note: ***, **, * represent 1%, 5% and 10% significance level respectively. Absolute values of 't'-statistics are in parenthesis

Table 5.9 Life Expectancy Model

| Regions/Variables | SSA | | SEA | | LAC | | OECD | |
|-------------------|-------------------------|-------------------------|--------------------------|-------------------------|-------------------------|--------------------------|-----------------------|----------------------|
| | Low | High | Low | High | Low | High | Low | High |
| Real GDP | 0.002** * (10.04) | 0.007** * (8.89) | 0.002** * (8.13) | 0.0006** * (4) | 0.0003** * (4.02) | 0.0001** * (3.35) | 0.001* * (1.99) | 0.002 (1.31) |
| Inflation | -0.01*** (6.38) | -0.001** (2.4) | 0.001** * (6.72) | -0.002*** (10.78) | 0.0001** * (2.73) | 0.0001** * (6.07) | -0.0005 (1.26) | 0.003 (1.22) |
| Government | -0.007 (1.53) | 0.01*** (6.77) | -0.003** * (16.52) | -0.007*** (16.92) | -0.0002 (1.14) | 0.002*** (27.99) | -0.0006 (0.53) | 0.1** * (3.52) |
| ODA | 0.002** * (6.93) | 0.004** * (11.22) | 0.0001 (1.28) | 0.0004** * (3.88) | 0.0002** * (6.2) | 0.0002** * (17.17) | | |
| AR (2) Test | 0.00 | 0.097 | 0.145 | 0.183 | 0.00 | 0.00 | 0.00 | 0.942 |
| Sargan Test | 0 | 0 | 0 | 0.25 | 0 | 0 | 0.815 | 1 |

Note: ***, **, * represent 1%, 5% and 10% significance level respectively. Absolute values of 't'-statistics are in parenthesis

5.1.4 Income Inequality Model

This section investigates how economic growth impact on income inequality among the regions. We present and discuss the regression results of equation (5) that was specified in Chapter four. The results on all of the four regions (LAC, SSA, SEA and the OECD) are discussed in Table 5.10. The Arellano and Bond AR (2) test show that, with the exception of the OECD region, the null hypothesis of no second order autocorrelation is rejected at the 5% level in all three developing regions. In all of the regions, the results suggest some level of persistence in income inequality implying that the level of income inequality in the previous year partly determines the direction of the current year's income inequality. High income inequality in the previous year leads to even higher inequality in the current year period.

Table 5.10 Income Inequality Model

| Regions/Variables | SSA (1) | SEA (2) | LAC (3) | OECD (4) |
|-------------------|---------------------|-------------------|--------------------|--------------------|
| Lagged Inequality | 0.95*** (48.67) | 0.89*** (22.2) | 1.04*** (42.55) | 0.93*** (53.0) |
| Real GDP | -0.033*** (3.77) | -0.015 (1.36) | 0.004** (2.4) | 0.005*** (2.61) |
| Unemployment | 0.009** (2.38) | -0.006 (0.6) | 0.002 (0.9) | 0.003 (4.69) |
| Government | 0.04* (4.2) | 0.06** (2.15) | 0.013** (2.06) | 0.03*** (5.1) |
| Education | 0.01* (2.14) | -0.04** (2.01) | -0.04*** (5.5) | -0.19*** (4.69) |
| AR (2) Test | 0.00 | 0.002 | 0.009 | 0.926 |
| Sargan Test | 1 | 0.18 | 0.11 | 0.006 |

Note: ***, **, * represent 1%, 5% and 10% significance level respectively. Absolute values of 't'-statistics are in parenthesis

The income elasticity of income inequality is negative for the SSA and the SEA regions in the short run. For the SSA, a percentage increase in real GDP decreases income inequality by 0.033%. The result is statistically significant at the 1% significance

level. This result suggests that over the years income growth in SSA has led to a decrease in the gap between the rich and the poor, a more equitable distribution of income. This result is evident in the downward trend of sub-Saharan Africa's average income inequality. Unemployment has a positive relationship with the income inequality. The poor in this region constitute a greater portion of the unemployed, therefore as the unemployment rate increases, the gap between the rich and the poor increases. Education and government expenditures have both led to an increase in income inequality. In sub-Saharan Africa, rich families mostly receive better education than the poor because they are able to take their children to good schools that are quite expensive. It is therefore not surprising that an increase in educational levels has increased income inequality. The positive relationship between government spending and income inequality could be explain by the existence of weak institutions that creates incentives for the diversion of government programs from their core aim of bridging the gap between the poor and the rich as well as improving living conditions of the poor.

The results on column 2 indicate that for the SEA, economic growth has not significantly affected income inequality levels over the period. However, education in the region has contributed significantly to the improvement in income distribution. A percentage increase in education level decreases income inequality by 0.04%. The relationship is statistically significant at the 5% significance level. As educational levels improves in the region, it leads to improvements in productivity incomes of the poor the most, hence income inequality decreases. Government expenditures however have led to an increase in income inequality over the years. This result is surprising because it has always been the goal of governments particularly in the developing world to empower the

poor by implementing policies and programs that would improve their incomes and living conditions.

The results for the LAC and the OECD regions for the effects of educational level and government expenditure are similar to that of SEA, however, income growth in the regions has worsened income inequality over the period of study. A percentage increase in Real GDP leads to a 0.004% and 0.005% increase in income inequality in LAC and the OECD respectively. Economic growth has worsened the distribution of income more in the OECD than in LAC. These results are consistent with the findings of Smeeding (2005) and the World Bank report (2013) suggesting that income inequality in advanced countries has increased slightly over the years. The result of the OECD region is also in line with the average trend in income inequality in the OECD as depicted in Figure 3.6. Income inequality in the OECD has reached its highest point for the past 30 years. The average income of the richest 10% of the population is about nine times that of the poorest 10% across the OECD region.¹⁶ The gap between the lower and middle class families and the upper class has created uncertainties and fears of social decline among the lower and middle class families. This is not good because of the adverse effect that inequality may have on economic development. Unemployment has a positive relationship with income inequality. The relationship is however not statistically significant in both the LAC and the OECD regions.

Further investigations show that, the long run coefficients of real GDP for the income inequality model are -0.66, -0.014, -0.1 and 0.07 for the SSA, SEA, LAC and OECD respectively (Appendix Table A3.3). The long run coefficients in all of the

¹⁶ OECD-library (2011)

regions are larger than the short run coefficient except for SEA. For almost all of the regions, it takes longer period for income inequality to adjust to its long run equilibrium as indicated by the coefficients of the lagged income inequality variable. The long run results imply that, given the short run effects, economic growth will decrease income inequality in the selected developing regions while growth will increase income inequality in the OECD region. As figure 3.6 shows, income inequality in recent years is converging among the regions. Regions that had lower income inequality such as the OECD are now experiencing high income inequality while developing countries like those in SSA are experiencing lower income inequality levels in recent years. These long run results are generally consistent with studies such as Ravallion (2001) and Dhongde and Miao (2013) that have found income inequality to be converging among countries.

Relating the short run results from the income inequality model to Field's (1980) growth typologies reveals that, economic growth in SSA and SEA can be classified as traditional sector enrichment growth. This is because, economic growth has led to a reduction in income inequality and poverty levels. Countries in these regions have focused on policies and programs that affect the living conditions of the poor more than the rich. This is more evident in SSA which has experienced a significant decrease in human poverty. Conversely, we can classify economic growth in the LAC region as modern sector growth, because though poverty levels have declined, income inequality has increased. This implies that economic growth has benefited the rich more than the poor in the LAC region.

CHAPTER SIX

6.1 Summary and Conclusion

6.1.1 Summary

The importance of economic growth to the eradication of poverty and the promotion of a more equitable distribution of income, have been embraced by the developing world and the international institutions that provide development assistance to them. Various forms of economic policy reforms have been proposed by international institutions and other development partners. These policy reforms became popular in the 1980s and have helped some nations to transform their economies and promote economic growth and development over the years. Examples of such developments are found in the South and East Asian region particularly China that has gone through massive economic transformation since the early 1990s. The World Bank 2013 report states that poverty levels have been reducing in recent years and that the Millennium Development Goal (MDGs) of halving poverty levels by 2015 will be achieved.

Though economic growth has played an important role in reducing poverty among the developing regions, there are considerable differences in how countries have transformed economic growth into poverty reduction. Some of these differences may be attributed to the growing income inequality and also the nature of economic growth in these countries. Hence, the role income inequality plays in reducing poverty levels cannot be overlooked. Countries with high and growing income inequality have translated economic growth into little poverty reduction. This is because high income inequality reduces the benefits of economic growth in poverty reduction by widening the gap between the poor and the rich.

This thesis empirically examines the implications of economic growth on poverty levels and income inequality among 76 countries across the sub-Saharan Africa, the South and East Asia, the Latin America and the OECD regions for the period 1990 to 2010. First, we analysed and compared the effect of economic growth on both human and income poverty levels among the selected regions. We also investigated and compared the effect of economic growth on the distribution of income among the regions. Second, the thesis examined the indirect role income inequality plays in the economic growth-poverty relationship.

This thesis contributes to the literature in three simple ways. First, unlike most studies in the literature that uses only traditional income poverty measures such as the headcount ratio or the poverty gap index for poverty levels, this thesis use both the traditional measures of poverty and human poverty measures which have become very important indicators of living conditions and human development. Second, the thesis contributes to the literature by estimating the economic growth, poverty and income inequality relationship with a more reliable dynamic panel data estimator. We employ the SYS-GMM estimator to estimate the effect of economic growth on income inequality and poverty. Studies have shown that the SYS-GMM estimator produces a more consistent and efficient estimates in dynamic models than estimators such as the OLS, LSDV and the WG which faces econometric issues such as variable endogeneity in dynamic panel data models. Third, we made regional comparative analysis which includes the three main developing regions and the OECD. The developing regions are compared to the OECD region in terms of income inequality and human development.

The results of the SYS-GMM estimator suggest that, economic growth has led to a reduction in income poverty in all of the three developing regions. Further examination of the results revealed that, given the nature of economic growth in these regions, SEA region which has grown as result of technological transformation in recent years, has improved the income levels of the poor more than SSA and LAC that mostly depend on natural resources for their economic growth. With regards to human poverty which is very important because of its real economic benefit to the poor, we found that economic growth has significantly reduced the percentage of population without improved water in the SEA and SSA regions. This is not the case in LAC. We also found that life expectancy rate has improved in all the regions as a result of economic growth. Sub-Saharan Africa has achieved greater improvements in life expectancy rate than any other region. These improvements in human development could be due to the various economic policy reforms which has focused more on achieving the MDGs in the region. These results are generally consistent with the trends in human poverty levels, though the trends show that the developing world needs to do more if they want to achieve the rate of human development and provision of basic human necessities in the OECD region. However, the effects of economic growth on human poverty variables are very small in all the regions, hence, the results should be interpreted with caution.

Further investigations revealed that, the positive impact of economic growth on poverty levels depends on the level of income inequality in the regions. Economic growth leads to greater reduction in poverty when income inequality is low than when it is high. This implies that countries that promotes economic growth by focusing policies and programs on the poor achieve greater reductions in poverty. This is because, income

inequality reduces the positive impact of economic growth on the incomes and living conditions of the poor.

The thesis also investigated the effects of economic growth on income inequality. The results led to some interesting findings. On one hand, the results show that economic growth has significantly decreased income inequality in sub-Saharan Africa. On the other hand, in Latin America, income inequality has increased as result of economic growth. The results also showed that, the OECD has experienced increase in income inequality with economic growth. In the SEA region however, the results show no significant relationship between economic growth and income inequality.

6.1.2 Policy Implications and Recommendations

The results of the empirical analysis suggest that economic growth has led to a reduction in poverty levels in the developing world. This is also shown in the downward trends in both human and income poverty levels. The results of this thesis imply that, countries should not only target the incomes of the poor as a means of reducing poverty, however, equally important means such improving life expectancies and economic provisioning are channels of eliminating absolute poverty. This is an important step that has been taken by most SSA countries to reduce poverty. Though economic growth helps improve basic human needs and reduce poverty levels, other factors such as the promotion of macroeconomic stability, financing of government programs, and provision of foreign aid have all affected the poor. This thesis recommends that governments should not only focus on economic growth in its effort to reduce poverty but should also pay important attention to promoting macroeconomic stability, proper channelling of development assistance and also the effectiveness of their spending. Foreign aid is very important in

reducing poverty if it can be used effectively. The empirical results show that aid has increase poverty levels in the developing world. Hence, governments should focus on policies that will fight aid misappropriation. This may include reducing bureaucracies and fighting corruptions as well as promoting environment that helps aid to be more effective. With the recent redistribution of foreign aid to the developing world, multilateral institutions and bilateral donors should focus on giving aid to countries that maximize its use in terms of benefiting the poor. For instance promoting good health care and health facilities that will help improve the health and economic provisioning of the poor. This in the long run would help reduce poverty and income inequality as well promotes economic development.

Furthermore since most countries in the developing world particularly SSA are characterised by bad government policies, political and ethnic violence, corruption and lack of political will, eradicating absolute poverty will always be a challenge. For economic growth to effectively transform the lives of the people, governments should aim at stabilising the macroeconomic environment. This is because good macroeconomic environment can guarantee stable economic growth and development. Promoting good political atmosphere free from political violence, civil wars and other political unrest particularly in Africa and some parts of the South and East Asia regions is very important. This is because resources that would have been used to promote good political environment can be directed to other important areas of development. This importance sectors include those that promote good health and economic provisioning which helps in eliminating human poverty. In addition, multilateral institutions, development partners and governments in the developing world should come to a consensus on reviewing

already set development targets particularly with regards to the MDGs. With the current goal of halving extreme poverty by 2015 within reach, new targets should be set and existing ones be reviewed to reflect the current challenges in order to eliminate poverty. Other equally important goals such as those that eliminate human poverty and promote human development need significant attention.

Though economic growth has contributed to reduction in poverty levels and improved standard of living across the developing world, this thesis has shown that income inequality is still a major constrain to that positive relationship. This is particularly more so in emerging countries and advanced economies. In order for countries to deal with poverty problems successfully, the issues of rising income inequality must also be dealt with. We propose that, governments should implement policies that aim at redistributing wealth in favor of the poor and middle class families.

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Appendix

Appendix A.1: Selected Countries

| sub-Saharan Africa (SSA) | South and East Asia (SEA) | Latin America Countries (LAC) | OECD |
|--------------------------|---------------------------|-------------------------------|----------------|
| Burkina Faso | Bangladesh | Argentina | Australia |
| Burundi | Cambodia | Bolivia | Austria |
| Cameroon | China | Brazil | Belgium |
| Central African republic | India | Chile | Canada |
| Cote d'Ivoire | Indonesia | Columbia | Denmark |
| Ethiopia | Lao PDR | Costa Rica | Finland |
| Ghana | Mongolia | Dominican Republic | France |
| Guinea-Bissau | Nepal | Ecuador | Germany |
| Kenya | Pakistan | El Salvador | Iceland |
| Lesotho | Philippines | Honduras | Italy |
| Madagascar | Sri Lanka | Jamaica | Japan |
| Mali | Thailand | Mexico | Korea Rep |
| Mauritania | Vietnam | Nicaragua | Netherlands |
| Mozambique | Yemen | Panama | New Zealand |
| Niger | | Paraguay | Norway |
| Nigeria | | Peru | Poland |
| Senegal | | Uruguay | Portugal |
| South Africa | | Venezuela | Spain |
| Swaziland | | | Sweden |
| Tanzania | | | Switzerland |
| Uganda | | | United Kingdom |
| Zambia | | | United States |

Appendix A.2: Descriptive Statistics

| Variables | Observations | Mean | Std. Dev. | Min Value | Max Value |
|---------------------|--------------|----------|-----------|-----------|-----------|
| Country | 1596 | 38.5 | 21.94443 | 1 | 76 |
| Year | 1134 | 2000 | 6.057199 | 1990 | 2010 |
| GDP Growth | 1581 | 3.623174 | 3.665 | -28.1 | 21.018 |
| Poverty Gap Index | 981 | 5.385474 | 11.45787 | -1.71034 | 268.1505 |
| Headcount Index | 588 | 12.54099 | 11.37652 | 0.1 | 57.41 |
| Inflation | 1265 | 44.34846 | 251.161 | -1.34672 | 7481.664 |
| Unemployment | 1556 | 20.1486 | 24.4475 | -9.61615 | 183.312 |
| Real GDP | 1572 | 590.7235 | 1414.081 | 2.98 | 13206 |
| Income Inequality | 1488 | 45.62627 | 6.7936 | 29.82303 | 79.35268 |
| Government | | | | | |
| Spending | 1361 | 16.67466 | 7.804 | 2.975538 | 64.3 |
| ODA | 853 | 8.55444 | 10.8935 | -0.63986 | 81.29034 |
| Education | 1006 | 72.8596 | 38.4052 | 5.03213 | 160.6186 |
| % of the population | | | | | |
| with Safe Water | 1277 | 79.91864 | 21.28158 | 13.6 | 100 |
| Life Expectancy | | | | | |
| Rate | 1596 | 66.40721 | 11.236 | 40.78 | 82.93 |

Appendix A.3: Long and Short Run Coefficients

Table A.3.1: Long and Short Run Coefficients of the Poverty Headcount Model

| Regions/Variable | SSA | | SEA | | LAC | |
|------------------|-----------|----------|-----------|----------|-----------|----------|
| | Short Run | Long Run | Short Run | Long Run | Short Run | Long Run |
| Real GDP | -0.012 | -1.2 | -0.085 | -4.25 | -0.07 | -0.54 |
| Inflation | 0.007 | 0.7 | -0.026 | -1.3 | 0.004 | 0.031 |
| Government | -0.023 | -2.3 | 0.05 | 2.5 | 0.054 | 0.42 |
| ODA | -0.004 | -0.4 | 0.002 | 0.1 | 0.039 | 0.3 |

Table A.3.2: Long and Short Run Coefficients of the Poverty Gap Model

| Regions/Variable | SSA | | SEA | | LAC | |
|------------------|-----------|----------|-----------|----------|-----------|----------|
| | Short Run | Long Run | Short Run | Long Run | Short Run | Long Run |
| Real GDP | -0.027 | 27 | -0.13 | -3.25 | -0.088 | -0.44 |
| Inflation | 0.024 | -24 | -0.02 | -0.5 | 0.014 | 0.07 |
| Government | -0.022 | 22 | 0.01 | 0.25 | 0.17 | 0.85 |
| ODA | -0.0001 | 0.1 | 0.006 | 0.15 | 0.05 | 0.25 |

Table A.3.3: Long and Short Run Coefficients of the Income Inequality Model

| Regions/Variables | SSA | | SEA | | LAC | | OECD | |
|-------------------|-----------|----------|-----------|----------|-----------|----------|-----------|----------|
| | Short Run | Long Run | Short Run | Long Run | Short Run | Long Run | Short Run | Long Run |
| Real GDP | -0.033 | -0.66 | -0.015 | -0.136 | 0.004 | -0.1 | 0.005 | 0.071 |
| Unemployment | 0.009 | 0.18 | -0.006 | -0.055 | 0.002 | -0.05 | 0.003 | 0.043 |
| Government | 0.04 | 0.8 | 0.06 | 0.55 | 0.013 | -0.325 | 0.03 | 0.43 |
| Education | 0.01 | 0.2 | -0.04 | -0.36 | -0.04 | 1 | -0.19 | -2.71 |