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**Economic Growth as a Poverty Reduction Strategy in the Southern
African Development Community**

by

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DECLARATION

I certified that the minor dissertation / thesis submitted by me for the degree Master's of Commerce (Economics development) at the University of Johannesburg is my independent work and has not been submitted by me for a degree at another University.

Mutombo Emmanuel Kande



ABSTRACT

Economic growth has been at the core of poverty-reduction strategies in the Southern African Development Community (SADC) over the past years. To evaluate the impact of these strategies, the empirical analysis in this dissertation employs two-stage least squares estimation techniques to estimate the effect of economic growth and the distribution of income (proxied by the Gini coefficient) on the headcount index, the poverty gap and the squared poverty gap across 15 SADC countries over the period 1981 to 2013.

The empirical results show that a one percentage point increase in mean income growth leads to a reduction in all three poverty measures: the headcount index falls by 1.1 percentage points, the poverty gap by 1.6 percentage points and the squared poverty gap by 1.9 percentage points. An important policy-related insight from these findings is that growth is not only effective in reducing the percentage of the population below the poverty line, as measured by the headcount index, but also the intensity and severity of poverty, as measured by the poverty gap indices.

Moreover, income inequality is also found to be a significant determinant of poverty in the SADC. A one percentage point decrease in income inequality leads to a 1.5 percentage points decline in the poverty gap and a 2.5 percentage points decline in the squared poverty gap. These findings have important implications for poverty-reduction strategies in SADC countries. The main policy implication of the results is that SADC governments should, in addition to growth-promoting strategies, also implement specific measures to reduce the income gap between rich and poor people.

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LIST OF ACRONYMS / ABBREVIATIONS

FDI	: Foreign direct investment
FGT	: Foster-Greer-Thorbecke
G	: Gini coefficient
GDP	: Gross domestic product
HDI	: Human development index
IMF	: International Monetary Fund
MDGs	: Millennium Development Goals
OLS	: Ordinary least squares
HC	: Headcount poverty
PCG	: Per capita income growth
PG	: Poverty gap
PPP	: Purchasing power parity
PRSPs	: Poverty-reduction Strategy Papers
SADC	: Southern African Development Community
SSA	: Sub-Saharan Africa
SPG	: Squared poverty gap
UNDP	: United Nations Development Programme
TSLs	: Two-stage least squares

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CHAPTER 1: INTRODUCTION

1.1 Background to the study

Poverty alleviation remains a major concern for policy makers in the low and middle income countries in general, and the Sub-Saharan Africa (SSA) in particular. According to the World Bank (2015), poverty has fallen in the last decade from 56 percent in 1990 to 41 percent in 2013. Of the ten most unequal countries in the world, seven are located in Africa, especially in the southern region. Poverty has decreased significantly in East Asia, while SSA has seen an increase in its poverty headcount, despite the sustained economic growth witnessed in the last decade (Hillebrand, 2008). In addition, Chen and Ravallion (2008) show that East Asia was the world's poorest region in 1981, with 77.7 percent of poor people, followed by South Asia, with 59.4 percent, and SSA in third position, with 53.7 percent of people living under the poverty threshold. Nowadays, SSA is the world's poorest and most unequal region, with 51 percent of people living under the poverty line (World Bank, 2015). Katsushi and Raghav (2014) state that poverty in SSA countries is observed mostly in the rural areas, where the agricultural sector is more dominant. The most affected groups are women and children.

Poverty has a negative effect on the political, economic and social life of Africa. It affects social life by increasing the rate of infant mortality, crime, homelessness and migration. The United Nations Development Programme (UNDP, 2013), for example, reports that a child from a poor family is more likely to be born with low birth weight and to repeat a grade in school. Poverty also causes malnutrition, which generally affects children's mental development and prevents adults from having enough energy to be productive in the workplace.

Since 2000, the World Bank has implemented a new strategy to improve poor countries social welfare; the so-called Millennium Development Goals (MDGs). The first goal of the MDGs was to halve poverty by 2015. This goal has subsequently been revised, so that it is currently to decrease poverty levels to below three percent by 2030. In order to achieve this goal, sustained economic growth is necessary.

Dollar, Kraay and Kleineberg (2013) show that economic growth remains an important tool for reducing poverty, because the increase in the average income of the country proportionately increases the income of the poor. Fosu (2011) maintains that a pro-poor growth strategy is an appropriate instrument to combat poverty in developing countries. Grant (2005) argues that it is important to generate growth in the sector where the poor are most represented, and thereby to improve their welfare. Adams (2004) finds that a 10 percentage point increase in economic growth will lead to a 20 to 30 percentage point decrease in poverty. According to the International Monetary Fund (IMF) statistics (IMF, 2014), SSA countries witnessed output per capita growth of 4.5 percent in 2014. Despite this significant growth, it appears that the level of poverty remains high in SSA countries. The UNDP (2015) report states that, although human development indicators have improved worldwide, the level of human development in Africa remains low and vulnerable to shocks. The World Bank report (2015) confirms that South Asia and SSA remain bastions of poverty in the world. The proportion of people living under the threshold of \$1.90 per day decreased by 13 percent from 1990 to 2012, but more than one billion people still experience extreme poverty, with most of them living in SSA and South Asia.

1.2 Motivation for the study

The Southern African Development Community (SADC) has a variety of natural resources, which create opportunities for the region to produce more goods and services and to promote economic growth, an important instrument for reducing poverty. Despite this potential, poverty remains severe. The most vulnerable groups are households headed by the elderly and by children. According to SADC Statistics (2014), around 70 percent of the population are living under the \$2 international poverty line per day. Across the region, poverty is the main cause of infant mortality and malnutrition, and generally aggravates levels of ill health. Due to the absence of safety nets, young people are tempted to engage in high-risk prohibited activities, such as crime, drug abuse and transactional sex, to escape their circumstances and to gain the means to survive. Reducing severe poverty and its effects, such as food insecurity and malnutrition, are the most important challenges that the SADC faces in order to meet the MDG targets. Many efforts are being made in the region to raise

production with the aim of alleviating poverty. The most recent assessment of poverty reduction shows that the world as a whole met the MDG targets, but certain regions were unable to do so.

Attempts have also been made to raise growth and reduce poverty. It is therefore important to formally test the poverty-growth relationship in the SADC region. It appears that some studies support the view that economic growth reduces poverty, while others endorse the opposite view. The lack of consensus on the poverty reduction effect of economic growth is the motivation for this study. Understanding the determinants of poverty reduction is crucial and, in this regard, economic growth needs to be analysed in order to discover whether it is indeed a determining factor in reducing poverty in the SADC region.

1.3 Problem statement

Despite the various economic policy initiatives that have been implemented over the years, such as structural adjustment programmes, the MDGs and poverty-reduction strategy papers, there is a strongly held argument that the alleviation of poverty in the SADC region remains below the expected level. According to the SADC (2011), approximately 45 percent of the Southern African population is living under the threshold of \$1.9 a day, life expectancy is estimated at 40 years, and infant mortality is estimated to be 50 deaths per 1 000 births. These statistics are far below the MDGs, which aim to halve poverty, increase life expectancy at birth to 70 years, and decrease the infant mortality rate to 18 deaths per 1 000 live births. Poverty-reduction policy is therefore a necessity, and is at the centre of development debates. Among the suggestions for the eradication of poverty in developing countries there is consensus that broad economic growth typically leads to higher income for the population, which, in turn, increases their spending and their welfare (Dollar & Kraay, 2002; Dollar *et al.*, 2013; Fosu, 2011, 2015; Gafar, Mukalaila, Raji & Michael, 2011). This means that an economy that grows on a sustained basis will raise wages, thereby lifting households out of poverty. There are, however, concerns that economic growth is often not enough to reduce poverty, especially in the presence of high levels of inequality. Kakwani and Pernia (2000) argue that the degree of poverty reduction in developing countries depends on the level of the of

the average income as well as the extent of disparity in the distribution of income. There are different views in the world on the extent to which economic growth affects poverty. Although there is various studies that have been carried out at various times and in different parts of the world, re-assessing the poverty reduction effects of economic growth still important. This is for two reasons: re-evaluate the poverty-growth nexus in the context of the most recent debate, and in the view of the fact that literature relating to the SADC region is in relatively short supply.

1.4 Research question

The objective of this study is to investigate whether there is a link between poverty reduction and economic growth across the SADC region. Despite the rapid growth in mean income (defined as the annual total income divided by the number of households) in Southern Africa, a large number of people still suffer from severe poverty. The primary purpose therefore is to explore empirically how strongly mean income growth can be translated into poverty reduction. Similar rates of growth in mean income can produce different outcomes in poverty reduction, because the extent to which growth is effective on poverty is determined by the degree of the participation of the poor in the growth generation process, and on how equitable the distribution of growth is amongst the population. Furthermore, the study analyses the severity of poverty distribution among the poor in SADC countries, because not all the poor are equally poor.

Growth in mean income is not sufficient to reduce poverty in the SADC countries. Many countries, such as the DR Congo, Angola and Mozambique, face less progress of poverty reduction, although their high growth rates achieved in the last decade. The poverty-growth relationship is complex, and there are other factors that contribute to poverty reduction, such as income distribution, political stability and democracy. Adams (2004) finds that the growth elasticity of poverty is greater in countries with a more equal distribution of income. This study pursues to demonstrate empirically how growth impacts poverty with income inequality as an intermediate factor. The purpose of this study is therefore to examine whether poverty declined with increases in per capita growth in SADC countries over the

period 1981 to 2013, and how sensitive this relationship is with respect to the distribution of income.

1.5 Contribution to the literature

The relationship between poverty reduction, economic growth and income distribution has been studied extensively in the literature on economic development. Overall, the results are ambiguous. Several of the empirical studies conducted to test the effectiveness of economic growth to reduce poverty in developing countries find that income growth is a driving force in reducing poverty and inequality in most developing countries. See, for example, Dollar and Kraay (2002), Nkomo (2007) and Wieser (2011), who use income per capita growth. Fosu (2009, 2011, 2015) and Bourguignon (2003), on the other hand, use mean income growth (mean income is defined as total share of annual household income divided by the number of households).

In contrast, Chen and Ravallion (2008) investigate China's progress against poverty and find that economic growth and globalisation have led to an increase in income disparities in China and did not reduce poverty. Paolo (2010), however, claims that an increase in production is important but does not necessarily reduce poverty, because a country in the middle of a recession can reduce poverty through redistributive economic policy measures. When there is economic growth, the poor do not necessarily benefit if they do not participate in the production process.

Several studies emphasise the importance of growth in reducing poverty in developing countries. In general, the number of studies dealing explicitly with the SADC countries appears to be limited, with only the study by Nkomo (2007) to be found. Nkomo's study uses the percentage change in income per capita to measure the impact of economic growth in reducing poverty in SADC countries from 1994 to 2003. It shows that output per capita growth benefits the poor, but inequality reduces the income of the poor, which constrains the use of basic energy and weakens the poverty-reduction effect of growth.

Other studies, however, do not consider income per capita growth, but rather aggregate mean income growth. For instance, Fosu (2015) analyses the factors behind falling or increasing poverty and inequality using an inclusive sample of developing countries. He concludes that high inequality damps the poverty reduction effect of economic growth. Fosu uses the headcount index, that is the percentage of a population below the poverty line, to express the share of poor and the percentage change in mean income to measure economic growth. This contrasts with Nkomo's study, which uses the human development index (HDI) as the measure of poverty, and the percentage change in income per capita as the standard measure of economic growth.

Against this background, the main contributions of this study to the literature are the following. Firstly, it intends to make some important contribution to the new development agenda (that is the post-2015 development agenda) by using the updated dataset published by the World Bank, with the poverty line estimated at \$1.90 over the period 1981 to 2013. This differs from the study by Nkomo (2007), who uses a poverty line of \$1.25 over the period 1994 to 2003.

Secondly, the study uses three dependent variables to measure poverty: the headcount index (incidence), the poverty gap index (intensity) and the squared poverty gap index (severity). It provides a different perspective on the growth-poverty relationship compared with that of Nkomo, who uses the HDI developed by the UNDP as the measurement of poverty. Although the HDI is useful to measure other dimensions of poverty, such as education and health, the income approach adopted in this dissertation provides an important extension. The income measures of poverty used here capture the incidence, intensity and severity of poverty. These different dimensions of poverty are not directly captured by the HDI.

Thirdly, consider Fosu's (2009, 2010) studies, which consider the relative effectiveness of mean income growth to reduce the three measures of poverty mentioned above across SSA countries, using the international poverty line of \$1 per day at 1993 purchasing-power-parity (PPP) prices. Fosu's studies emphasise the role that inequality plays in determining the effectiveness of mean income growth to

reduce poverty, using income per capita growth and population growth as instruments.

In contrast to Fosu (2009, 2010), this study selects a sample of fifteen SADC countries and uses the constructed KOF globalisation index (see Gygli, Haelg & Sturm, 2018) as an additional exogenous instrument of mean income growth and inequality in the poverty models. The empirical strategy is motivated by Thorbecke's (2013) theoretical exposition. He identifies globalisation as an exogenous determinant of income growth and income distribution which, in turn, affects poverty. Furthermore, this study uses the most recent World Bank dataset, POVCALNET, at an international poverty line of \$1.90 per day, based on 2011 PPP adjusted prices.

To summarise, this study contributes to the existing literature by examining the relative effectiveness of growth-promoting policies in reducing the incidence, intensity and severity of poverty in the SADC region over the period 1981 to 2013, using a constructed globalisation index as an additional exogenous instrument.

1.6 Structure of the dissertation

The rest of the dissertation is structured as follows:

Chapter 2 provides a literature review. Chapter 3 introduces the different poverty measures and analyses their trends in the SADC region. Chapter 4 presents the methodology, econometric model and data. Chapter 5 details the empirical results and Chapter 6 concludes with some policy implications.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter provides an overview of the existing empirical literature on the poverty-growth nexus in developing countries. The overview will shed light on what has been done in the field, and how this dissertation contributes to the existing literature.

2.2 Literature on poverty and growth

Dollar and Kraay (2002) assesses the poverty reduction impact of economic growth on poverty in 92 countries. They establish that the average income of the poor rises in proportion to the average income in the economy. In other words, this means that an increase in the average income of the country also leads to an increase in the average income of the poor.

According to the same researchers, private property rights, stability and openness to trade help to create an environment that benefits poor people. There are many variables relating to the improvement of the welfare of poorer sectors of the population, with economic growth as the most important. Other variables identified by Dollar and Kraay include achievement at primary school level, the amount of government spending on social projects, the extent of agricultural production, and the implementation and sustaining of genuine democratic institutions. Of these factors, educational achievement and the level of agricultural production seem to be the ones that influence the average income of poor people the most. When the initial level of inequality is high, the impact of output growth on the poverty level is minimal.

According to Kakwani and Pernia (2000), an increase in the level of output is pro-poor when the benefits to the poor are greater than the benefits to the non-poor; this approach focuses on reducing the incidence and severity of poverty. Ravallion (2001) explains that growth is pro-poor when an increase in the real income of a country is followed by an improvement in the welfare of the poor. Ravallion's (2001) approach considers only the share of people that lives under the poverty line. He

does not look at the extent to which growth is beneficial to the poor. According to his model, even when the richer gain more than the poor, growth is still pro-poor.

Fosu (2009) conducts an empirical analysis of 86 developing countries in order to determine the extent to which the poverty reduction effects of growth is effective with inequality as an intermediate factor. He concludes that income inequality reduces the impact of income growth on poverty reduction. Furthermore, the income growth elasticity in SSA countries is less than in non-SSA countries for three measures of poverty, namely the headcount index, the poverty gap as well as the squared poverty gap.

Fosu (2010) also analyses the importance of inequality in the growth versus poverty relationship for African countries. The analysis is conducted on a sample of 16 African countries. He finds that income distribution plays a major role in determining how much economic growth is transformed into poverty reduction. Furthermore, the study finds that the change in income distribution impacts more on poverty than does the change in income growth. In another study of 80 countries over the period 1981 to 2005, Fosu (2011) finds the following: firstly, that global poverty, at poverty lines of both \$1.25 and \$2.5 per day, decreased between 1981 and 2005. SSA countries experienced a decrease in real GDP per capita and an increase in poverty rates between 1981 and 1995. However, during the period 1996 to 2005, all the regions experienced positive growth followed by a decrease in poverty rates, which differed across regions but was not significant for the SSA countries. The countries with lower inequality and higher income were better equipped to transform output growth into poverty reduction. Also, the reduced poverty levels can be attributed mainly to growth in income, rather than to the redistribution. In addition, it should be noted that, over time, poverty rates increased in countries experiencing negative growth.

Leandro (2005) uses panel data techniques to analyse a sample of twenty countries in Latin America. He finds that reductions in poverty is due to the growth of average income as well as on the redistribution. Where inequality is high, output growth does not seem to reduce poverty. The study indicates that poverty reduction in Latin America is a result of the combination of a growth in average income and a fall in inequality, and that what is required is the implementation of redistributive policies.

These include progressive taxes, transfers and other changes in government spending.

Nkomo (2007) discusses the relationship between energy use, poverty reduction and economic growth in the Southern African Development Community (SADC). A relationship exists between energy and human development, since energy is a key instrument in developing the socio-economic classification of households. Nkomo (2007) maintains that income alone is insufficient for assessing the standard of living of households and stresses the importance of other factors, such as life expectancy and educational attainment. Assets such as livestock must also be considered when assessing the income of some households. Nkomo employs the human development index (HDI), which was developed by the UNDP, to measure the level of poverty as the dependent variable. While the per capita income growth may be regarded as the most important variable, growth by itself may not be enough to alleviate poverty.

Nkomo's study finds that a significant number of people in SADC countries lack access to basic energy supplies and services: the poorest households depend on wood and other biomass sources of energy, which cause indoor pollution and consequent risks to health. The poor use this kind of energy because they cannot afford energy sources such as gas or electricity. The HDI includes income per capita, education and health (life expectancy). Although the HDI is useful as a way of measuring different aspects of poverty, the income approach adopted in this dissertation comprises an important extension. The income measures of poverty employed here directly capture the extent and severity of poverty. These dimensions of poverty are not directly measured in the HDI.

Previous indicators support the view that income growth reduces poverty in developing countries, but some theorists disagree. Paolo (2012) uses parametric and non-parametric techniques to examine the poverty reduction effect of growth in Kazakhstan. His analysis indicates that growth has a negligible effect on poverty reduction, and he can find no evidence that income growth reduces poverty. His conclusion therefore is that an increase in production is neither necessary nor sufficient to reduce poverty. The author argues that, since the poor do not necessarily benefit unless they participate in the process of production, a country

that is experiencing a recession requires redistribution policies in order to reduce poverty. In general, Paolo's research makes it clear that income growth per capita in developing countries results in heterogeneous outcomes with regard to the welfare of communities.

Jackson (2009) maintains that growth fails to decrease poverty because many countries have achieved high growth rates, but the proportion of poor in the population has remained high. In addition, growth alone seems not to be a sufficient condition of poverty reduction in developing countries.

2.3 Summary

Table 2.1 provides a summary of the literature discussed in the preceding section, as well as some additional studies. The literature on output growth and poverty reduction can be summarised as follows. Poverty is negatively correlated with output growth in many cases, but where inequality is high, the trickle-down effect is insignificant. Output growth decreases poverty in countries where income is more equitably distributed. Thus an important insight from the literature review in Table 2.1 is that regression models must control for income inequality to get accurate growth elasticity estimates.

Finally, the majority of studies summarised in Table 2.1, with the exception of Fosu (2009, 2010), view the headcount index as an appropriate measure of poverty. The next chapter discusses broader measures of poverty and some of their advantages relative to the headcount index.

Table 2.1: Summary of literature review

Topic	Author(s) & year	Region or countries	Methodology	Main results
Growth, poverty and inequality	Dollar & Kraay (2002)	Sample of 92 countries from 1960-2000	Panel data GMM technique	The average income of individuals who are poor rises equi-proportionately with the average income in the economy. Private property rights, political stability and openness to trade are necessary conditions to create a favourable environment for the poor. Furthermore, when the initial level of inequality is high, the output growth impact on poverty is insignificant.
Inequality and the impact of growth on poverty: comparative evidence for Sub-Saharan Africa	Fosu (2009)	Sub-Saharan and non-Sub-Saharan countries	Panel data technique	The poverty reduction impacts of growth is a function which decreases with the initial level of inequality in SSA countries relatively to that in non-SSA countries. Furthermore, the income growth elasticity is lower in SSA countries relatively to non-SSA countries.

Table 2.1: Summary of literature review (continued)

Topic	Author(s) & Year	Region or countries	Methodology	Main results
Does inequality constrain poverty-reduction programmes? Evidence from Africa	Fosu (2010)	Sample of 16 African countries	Cross-sectional data	The impact of mean income growth on the three measures of poverty is a function that decreases with inequality. Furthermore, the change in income distribution causes more changes in poverty than the change in income growth.
Growth elasticity of poverty	Fosu (2011)	Sample of 80 developing countries from 1981 to 2005	Panel data technique	Firstly, the country with lower level of inequality and higher level of income presents greater capabilities to transform output growth into poverty reduction. Secondly, the reduction of poverty is mostly allocated to growth in income rather than change in inequality. Thirdly, the countries that experienced negative growth have seen their poverty rates rising.

Table 2.1: Summary of literature review (continued)

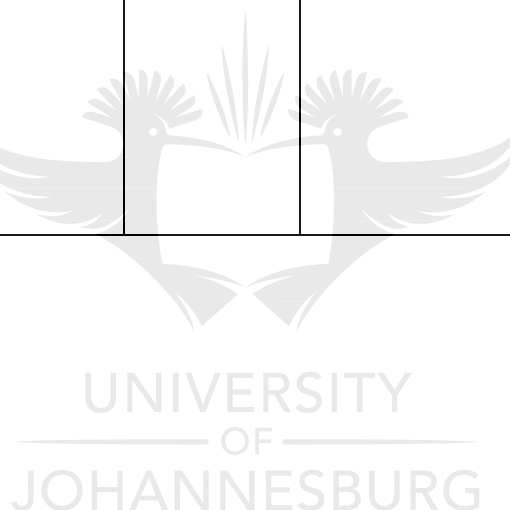
Topic	Author(s) & year	Region or countries	Methodology	Main results
Poverty and growth	Son & Kakwani (2006)	Sample of 15 African countries	Panel data techniques	Government must implement a pro-poverty programme and deliver basic services such as infrastructure, health and education. A universal transfer scheme– the universal transfer programme is pro-poor when it is more beneficial to poor families relatively to non-poor families. The pro-poor outcome is more efficient in the case where it is implemented in rural areas, where the majority of people lives under the threshold of poverty.
Poverty, inequality and growth	Leandro (2005)	A sample of 20 countries in Latin America	Panel data technique	Poverty reduction depends on growth in average income and on how income is distributed geographically. Output growth is not sufficient to reduce poverty where inequality is high. Poverty reduction in Latin America is explained by the combination of growth in average incomes and the fall in inequality. The implementation of government spending, transfers, and progressive taxes are necessary to reduce poverty and inequality.

Table 2.1: Summary of literature review (continued)

Topic	Author(s) & year	Region or countries	Methodology	Main results
Growth elasticity of poverty and inequality	Bourguignon (2003)	A sample of 50 developing and transitional countries, 1980 to 1990	Panel data techniques	Poverty is negatively related to economic growth. The contribution of growth to alleviation of poverty can be allocated to pure growth effect and distribution.
Growth elasticity of poverty	Wieser (2011)	A sample of 65 developing countries between 1983 and 2009	Panel data techniques	Growth is an important tool to alleviate poverty in developing countries. The related growth-poverty elasticity differs with trade openness, human capital and government expenditure.
Effect of poverty on growth and energy used	Nkomo (2007)	SADC countries	Panel data techniques	The study finds that there is a positive association between the human development index and energy consumption, economic growth and poverty reduction. Poor do not have enough income to afford energy.
Effect of poverty on growth and inequality	Wodon (2007)	A sample of six countries in West Africa	Panel data techniques	The relationship between output growth and poverty in West Africa is investigated. The finding is that inequality always reduces the impact of growth to improve the standard of living of poor people.

Table 2.1: Summary of literature review (continued)

Topic	Author(s) & year	Region or countries	Methodology	Main results
Can high-inequality developing countries escape absolute poverty?	Ravallion (1997)	Developing countries	Panel data techniques	At any positive rate of growth, when the initial inequality is high, poverty rises.
Why don't we see poverty convergence?	Ravallion (2012)	Developing countries	Panel data techniques	Ravallion explains why countries experiencing initial high poverty do not reduce poverty when they have a high proportionate growth rate. The study concludes that initial high poverty impacts negatively on consumption growth, which, in turn, reduces the impact of growth on poverty.



CHAPTER 3: MEASURES OF POVERTY IN THE SADC REGION

3.1 Introduction

Most of the studies reviewed in the previous chapter focus on the headcount index, which records the share of people who fall under a certain threshold (the poverty line) as a proportion of the total population. However, the headcount index does not capture other aspects of poverty, such as its depth and severity. The poverty gap and squared poverty gap provide more information on the differences of poverty state within the poor which does not reflect in the headcount index. This is because there are people who are marginally poor and those who are extremely poor. Each category requires an appropriate policy to alleviate its degree of poverty. The first part of this chapter introduces and defines the different measures of poverty that are used to analyse the poverty-growth nexus in the SADC region in the period 1981 to 2013. The chapter then provides some descriptive evidence of the poverty reduction effects of growth in the SADC region.

3.2 Measures of poverty

The World Bank (2000:15), provides a broad-based comprehensive and inclusive definition of poverty. It defines poverty as a state of deprivation in many dimensions of well-being. It includes the lower level of income and its ability to afford the primary goods and services need for survival. This approach also includes human capital (level of education and low access to health), poor sanitation and clean water access, inadequate and inappropriate physical security, restrictive voice expression as well as job opportunities for the poor; it can be expressed in terms of money spent or in terms of a specific standard of consumption.

In monetary terms, the poor are those who do not have enough income to spend and who fall below the minimum requirement, which is the poverty line. Every country has its own poverty line, which differs from that of other countries, but a national poverty line cannot be used to compare poverty levels in two different countries. A comparison between countries uses the international poverty line, which is set by the World Bank, as the yardstick The World Bank has recently revised the minimum

poverty line from \$1.25 to \$1.90 a day (in 2011 purchasing power parity) and the maximum poverty line from \$2.5 to \$3.10. According to the World Bank (2016), the poor in SSA countries constituted 41 percent of the total population in 2013 at the poverty line of \$1.90. However, if the poverty line is shifted to a maximum level (\$3.10/day), the proportion of poor rises from 41 percent to 65 percent.

Poverty can also be expressed in terms of specific standard consumption. This approach may involve investigating whether people have enough food, shelter, health care or education. It goes beyond the traditional monetary measures of poverty. A household is poor when the intake of calories consumed per day per person is less than 2 100, and where life expectancy is low and the quality of health and education is poor.

This study considers the monetary/income measures of poverty (the headcount index, poverty gap and squared poverty gap). The monetary approach is the most objective measure: given enough income, a household is assumed to know best how to allocate these resources, whether on food, clothing or housing. Income is thus a good indicator of well-being. According to Foster, Greer and Thorbecke (1984), there are three basic measures of income poverty. The following sections provide a detailed discussion of each measure.

3.2.1 Headcount index

The headcount (*HC*) index measures the incidence of poverty and is the most commonly used measure of poverty. This index expresses the number of people that fall below the poverty line as a percentage of the total population. The *HC* index is calculated by means of the following formula:

$$HC = \frac{N_p}{N} , \quad (3.1)$$

where N_p represents the number of poor and N is the total population (or sample).

From equation (3.1) N_p can be defined as:

$$HC = \frac{1}{N} \sum_{i=1}^N I ; (y_i < Z) , \quad (3.2)$$

where y_i is the income of household i and Z is the poverty line.

When the bracket expression is true, $I = 1$. In other words, the income of the household is less than the poverty line. But when the bracket expression is not true, $I = 0$, which means that the income of the household is greater than the poverty line and the household is not poor. For example, consider four hypothetical households with incomes denoted in dollars (\$): 40, 90, 80 and 150. It is assumed that the poverty line is \$100, so the headcount poverty is the proportion of households with incomes less than \$100. In this example, three out of four households have an income of less than \$100, and the headcount index is 0.75 or 75 percent.

Jonathan and Shahidur (2009), however, find that the main disadvantage of the headcount index is that it does not capture how far the poor fall below the poverty line. This, in turn, may entice politicians to allocate their budget in a sub-optimal way. For example, a policymaker with a limited budget will focus only on the individuals who are marginally poor. From the illustration above, if there is a budget of \$30, the policymaker will opt to allocate \$10 to the household with an income of \$90 (\$90 + \$10) and \$20 to the household with an income of \$80 (\$80 + \$20). The proportion of poor will change from 75 percent to 25 percent. The household with an income of \$40 may not be considered, because even if the policymaker allocates the total budget to this person, the headcount index will remain unchanged. Therefore, although the headcount index is useful to measure the incidence of poverty, it is also important to measure the intensity of poverty to ensure that the budget is allocated in a more efficient way.

3.2.2 Poverty gap index

The poverty gap (PG) index measures the intensity of poverty and reports the total income shortfall of the poor from the poverty line. The formula for the PG index is:

$$PG = \frac{1}{N} \sum_{i=1}^N \frac{G_i}{Z} \quad (3.3)$$

$$G_i = (y_i - Z)(I); (y_i < Z) \quad (3.4)$$

where y_i is the income of household i and Z is the poverty line. When $I = 1$, the income of the household is less than the poverty line. But when the bracketed expression is not true, $I = 0$, which means that the income of the household is greater than the poverty line and the household is not poor. The poverty gap index measures the extent to which the incomes of the poor fall below the poverty line. From the hypothetical example above, the poverty gap is found by adding up the amounts by which each person's income, $y_i = (40, 90, 80, 150)$, falls below the absolute poverty line, $Z = 100$:

$$G_i = (|40-100|, |90-100|, |80-100|, |100-100|)$$

$$\sum \frac{G_i}{Z} = \frac{60+10+20+0}{100} = \frac{90}{100} \approx 0.90$$

$$PG = \frac{1}{4} \times 0.90 = 0.225$$

The advantage of the poverty gap index relative to the headcount index can be illustrated by comparing two hypothetical countries. Figure 3.1 plots income on the vertical axis and the poverty line is given by V . It can be seen that both countries, A and B, have the same headcount index; 50% of the population falls below the poverty line. It is also clear, however, that the poverty gap is larger in country A relative to country B. Thus, the headcount incorrectly shows that both countries are equally poor. The poverty gap index, in contrast, will accurately show that country A is poorer than country B.

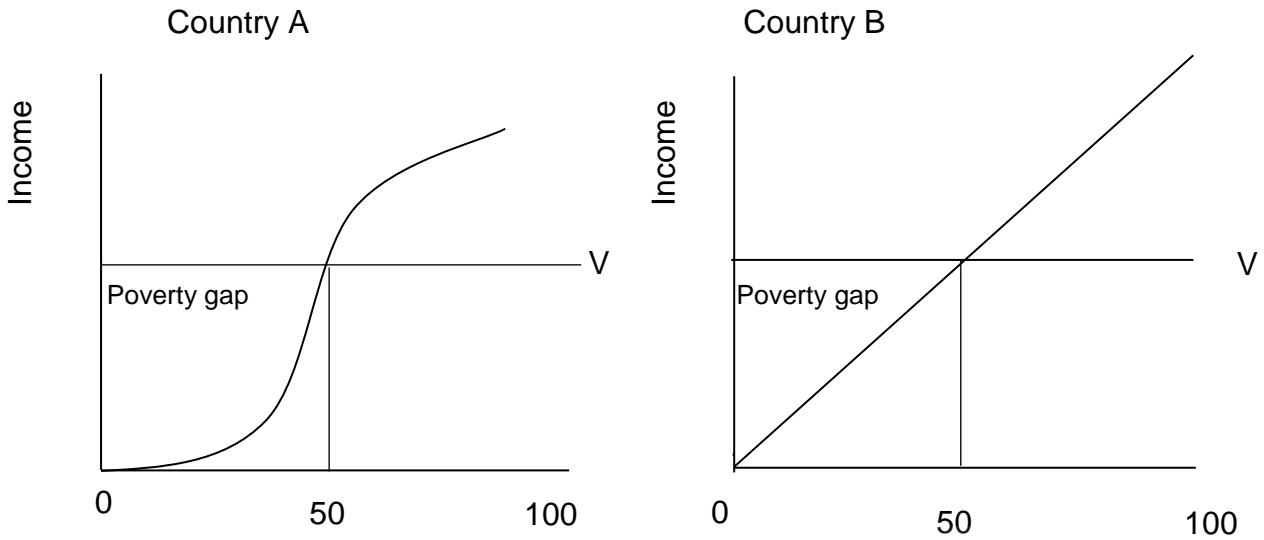


Figure 3.1: Illustration of the poverty gap ratio in two countries

Despite its advantage over the headcount index, the poverty gap index is insensitive to income inequality among the poor. The squared poverty gap index in the next section, however, takes this into account by allocating more weight to the poorest people.

3.2.3. Squared poverty gap index

The squared poverty gap (*SPG*) index measures the severity of poverty. It is sensitive to the distribution of income and it takes inequality among the poor into account. This index captures the inequality amongst the poor and provides more weight to those who are extremely poor. The *SPG* index is calculated in the following way, using the same income distribution as in section 3.2.2:

$$SPG = \frac{1}{N} \sum_{i=1}^N \left(\frac{G_i}{z} \right)^2 \quad (3.5)$$

$$SPG = \frac{0.1^2 + 0.6^2 + 0.2^2 + 0^2}{4} = \frac{0.41}{4} = 0.102$$

An increase in the squared poverty gap means greater income inequality among the poor, and thus more severe poverty. The intensity (equation (3.2)) and severity (equation (3.5)) measures of poverty provide complementary information to the headcount poverty index. For instance, some groups may have a high headcount poverty rate but a low poverty gap, where the majority of poor people in the group

are just below the poverty line. On the other hand, another group may have a low headcount index and high intensity and severity of poverty. This situation occurs when relatively few members fall below the poverty line, but those that do have extremely low incomes and large income inequalities. The poverty gap and the squared poverty gap indices are then the most relevant for a significant reduction in poverty. In each scenario, the policymaker has to implement a different type of intervention to reduce poverty. With regard to the main hypothesis of this dissertation, it is important for the policymakers to establish the relative effectiveness of growth-promoting measures across the different poverty indices.

3.3 Economic growth and poverty in the SADC region

Figure 3.2 plots the SADC headcount, poverty gap and squared poverty gap indices over the period 1981 to 2013. Figure 3.3 plots the natural logarithm of mean income, which is defined as the total income or revenue divided by the number of households in the survey. The data for the poverty measures and mean income are sourced from the World Bank's POVCALNET dataset. From the figures it appears as if the three poverty measures are inversely related to mean income growth. This is especially visible since the late 1990s, when most African countries benefited from the boost in primary commodity prices and the influx of Chinese foreign direct investment (see Chen *et al.*, 2015).

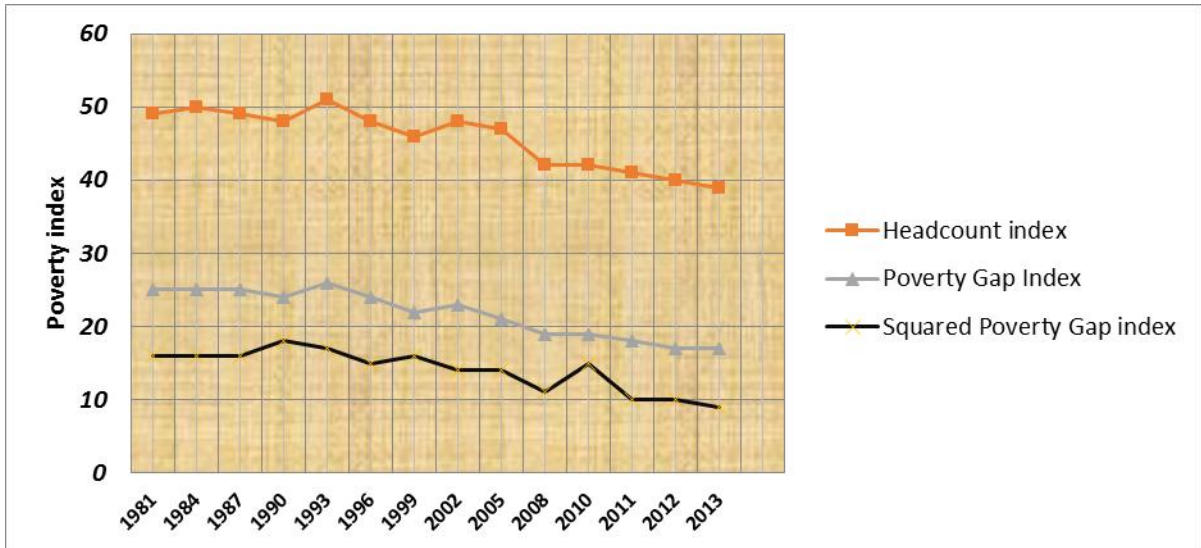


Figure 3.2: Trend of poverty measures in the SADC region
 Source: Data from World Bank (2015a).

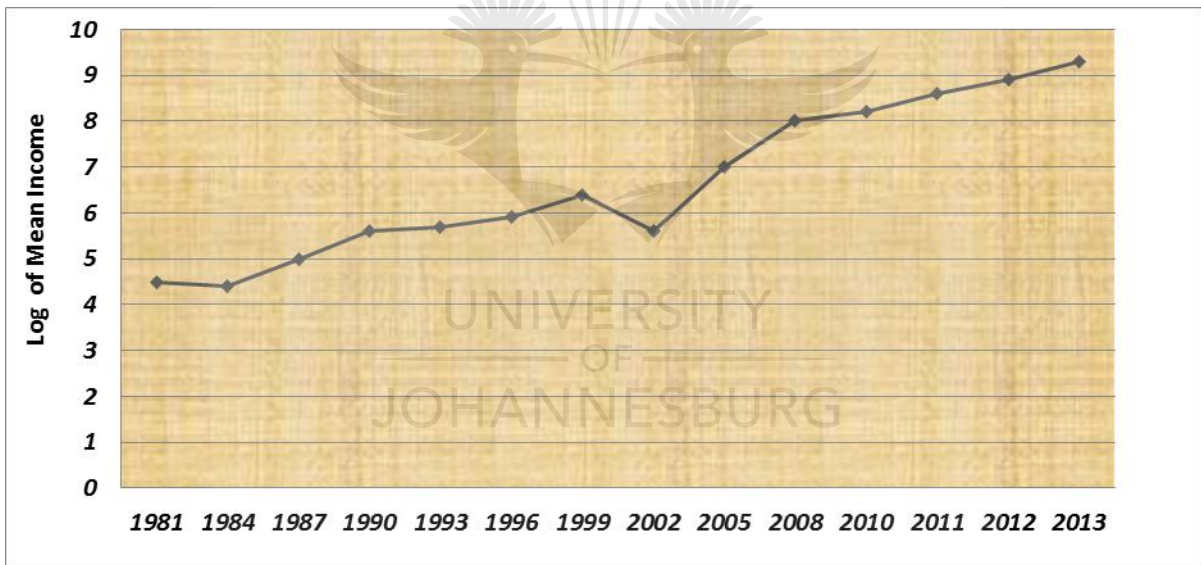


Figure 3.3: Mean income in the SADC region
 Source: Data from World Bank (2015a).

In Figure 3.4, the headcount index of the SADC is compared with that of other developing regions. It is apparent that the headcount index is lower in East Asia, Latin America and South Asia, and that the gap has been growing since the mid-1990s.

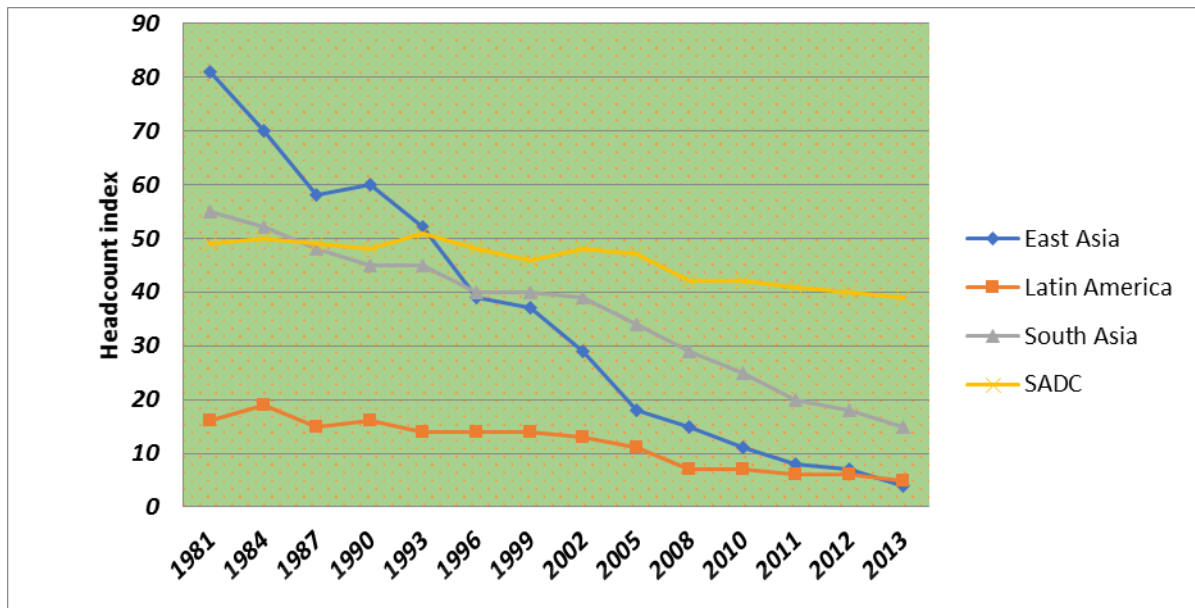


Figure 3.4: Headcount poverty across global developing regions

Source: Data from World Bank (2015a).

From the analysis above, it can be concluded that, although the SADC region has experienced a decline in poverty over the period 1981 to 2013, its poverty rate, on average, remains much higher than that of other developing regions.

3.4 Summary

This chapter described three different measures of poverty and how they have evolved between 1981 and 2013 in the SADC region. The headcount index measures the proportion of population below the poverty line. This measure, however, does not capture other aspects of poverty, such as the intensity and severity of poverty. The poverty gap measures the intensity of poverty and determines how far the poor fall below the poverty line. The squared poverty gap measures the severity of poverty; it pays more attention to those who are extremely poor.

The analysis reveals that the three measures of poverty are inversely related to mean income growth in the SADC region over the period 1981 to 2013. Although the SADC region has experienced a decline in its poverty rate over time, the poverty rate remains high relative to other developing regions, such as Latin America, South Asia

and East Asia. This finding outlines the importance of designing appropriate policy measures to reduce poverty in the SADC region. The next chapter sets up an empirical model to test the relative effectiveness of growth-promoting policies in reducing poverty across the three different measures in the SADC region.



CHAPTER 4: METHODOLOGY AND DATA

4.1 Introduction

The main purpose of this chapter is to explain the econometric methodology that is used to test the poverty-growth nexus for the SADC region. Section 4.2 specifies the poverty model, while section 4.3 discusses the data and the expected signs of the variables. Section 4.4 explains the two-stage least squares (TSLS) procedure that is used to control for simultaneity bias. Section 4.5 provides some descriptive statistics. Section 4.6 conducts panel unit root tests to ensure that all the variables are stationary. The final section summarises.

4.2 Model specification and estimation techniques

Following Adams (2004), the poverty equation can be written as:

$$P_{it} = \delta_i + \beta_1 Y_{it} + \beta_2 G_{it} + \delta t + \varepsilon_{it} \quad (4.1)$$

where P_{it} is the poverty measure in country i at time t , therefore P_{it} represents the headcount (HC) index, poverty gap (PG) index and squared poverty gap (SPG) index; δ_i is the fixed effects parameter, which captures time-invariant differences between SADC countries; β_1 is the elasticity of poverty with respect to changes in mean income (Y_{it}); β_2 is the elasticity of poverty with respect to income inequality measured by the Gini coefficient (G_{it}), with 0 indicating perfect equality and 1 perfect inequality; δ is the trend rate of change over time t , and ε_{it} is the error term.

When equation (4.1) is transformed into growth rates, that is, log differences, the fixed effects parameter, δ_i , drops out:

$$\Delta \log P_{it} = \delta + \beta_1 \Delta \log Y_{it} + \beta_2 \Delta \log G_{it} + \Delta \varepsilon_{it} \quad (4.2)$$

Equation (4.2) is the “standard poverty equation” originally estimated by Bourguignon (2003), which is used to estimate the elasticity of poverty with respect to mean income growth and income inequality in this dissertation.

4.3 Data and expected signs

4.3.1 Dependent variable

From the World Bank's (2015a) POVCALNET dataset, observations on the different poverty measures in equation (4.2) over the period 1981 to 2013 are only available after every three years for the 15 SADC countries listed in Appendix A. To account for the missing years in the headcount index, the poverty gap and squared poverty gap, the linear interpolation technique in the STATA software package is used to construct annual data for the missing years.

4.3.2 Independent variables and their expected signs

As a proxy for economic growth, the study uses changes in mean income ($\Delta \log Y_{it}$) as the independent variable in equation (4.2). Mean income is defined as the total income in the country divided by the number of households. Several studies (Dollar & Kraay, 2013; Fosu, 2011, 2015; Nkomo, 2007) have shown that economic growth is a determinant factor in reducing poverty. These studies state that poverty falls as the mean income growth ($\Delta \log Y_{it}$) of households rises. Therefore, the expected sign of mean income growth is anticipated to be negative: $\beta_1 < 0$. Income inequality is measured by the Gini coefficient ($\Delta \log G_{it}$) in equation (4.2). It is expected that an increase in income inequality raises poverty, so the expected sign is positive: $\beta_2 > 0$. Data for the Gini coefficient and mean income are also sourced from the POVCALNET dataset of the World Bank (2015a). There are missing observations similar to the poverty measures, so the linear interpolation technique in STATA is again used to construct annual data for the missing years.

4.4 Two-stage least squares procedure

To control for potential endogeneity bias in equation (4.2), mean income growth and the Gini coefficient require plausible instruments. In other words, instrumental variables that are correlated with the regressor but uncorrelated with the error term. In order to deal with the endogeneity issues, this study uses the two-stage least

squares estimation procedure. The first-stage regression for growth in mean income can be specified as follows:

$$\Delta \log Y_{it} = \theta_0 + \theta_1 \Delta \log Glob_{it-2} + \theta_2 \Delta \log PC_{it} + \theta_3 \Delta \log Y_{it-2} + \theta_4 \Delta \log G_{it-2} + \mu_{it}, \quad (4.3)$$

where $\Delta \log Glob_{it-2}$ is the second-period lag of a constructed globalisation index; $\Delta \log PC_{it}$ is the growth in GDP per capita income; $\Delta \log Y_{it-2}$ represents the second-period lag of growth in mean income; $\Delta \log G_{it-2}$ is the second-period lag of the Gini coefficient; and μ_{it} is an error term.

The first-stage regression for growth in income inequality can be specified as follows:

$$\Delta \log G_{it} = \lambda_0 + \lambda_1 \Delta \log Glob_{it-2} + \lambda_2 \Delta \log G_{it-2} + \lambda_3 \Delta \log PC_{it} + \lambda_4 \Delta \log Y_{it-2} + \psi_{it}, \quad (4.4)$$

where ψ_{it} is an error term.

The analysis considers the second-period lag of mean income ($\Delta \log Y_{it-2}$) and the second-period lag of income inequality ($\Delta \log G_{it-2}$) as plausible instruments in equations (4.3) and (4.4). The second-period lags of these variables are uncorrelated with the first-period lag of the error term ($\Delta \varepsilon_{it} = \varepsilon_{it} - \varepsilon_{it-1}$) in equation (4.2).

Furthermore, following Ravallion (2001) and Kalwij and Verschoor (2007), the growth rate of GDP per capita ($\Delta \log PC_{it}$) is used as an additional instrument. The growth rate of per capita income may control for correlated errors that are present in the survey data of mean income and the poverty measures (see Ravallion, 2001). Per capita income is sourced from the World Development Indicators (2015).

The last instrument considered in equations (4.3) and (4.4) is the second-period lag of globalisation ($\Delta \log Glob_{it-2}$). The KOF globalisation index used in this study, which was originally developed by Dreher (2006) and updated by Dreher, Gaston and Martens (2008), combines three dimensions of globalisation, namely economic, social and political globalisation (see Gygli *et al.*, 2018). In short, the KOF globalisation index broadly measures the degree of trade, capital account and

financial openness, as well as the diffusion of ideas, information and government policies.

The impact of globalisation on poverty is ambiguous, however. On the one hand, globalisation may stimulate growth through international trade, capital inflows and associated new technologies (Dollar & Kraay, 2002). On the other hand, following Samimi and Jenatabadi (2014), globalisation only promotes growth when the labour force is educated, the financial system is well developed and democratic institutions are in place.

From equations (4.3) and (4.4), the fitted values of mean income ($\Delta \log \widehat{Y}_{it}$) and the Gini coefficient ($\Delta \log \widehat{G}_{it}$) are obtained to estimate the second-stage regression:

$$\Delta \log P_{it} = \phi + \beta_3 \Delta \log \widehat{Y}_{it} + \beta_4 \Delta \log \widehat{G}_{it} + v_{it} \quad (4.5)$$

The Sargan (1958) and Basmann (1960) tests are used in the empirical section to examine the validity of the set of instruments.

4.5 Descriptive statistics

There are 480 observations for the 15 SADC member countries over the period 1981 to 2013. For the list of SADC member countries, see Appendix A. This section presents some descriptive statistics of the variables in equations (4.2) to (4.4). For illustrative purposes, Table 4.1 reports the mean values, minimum and maximum values and standard deviations of all the variables in their original-level format rather than log differences.

Table 4.1: Descriptive statistics for the SADC, 1981–2013

Variable	Variable code used in the analysis					
		Obs	Mean	Std dev	Min	Max
Dependent variables						
Headcount index	$\Delta \log HC_{it}$	480	46.77	27.92	0.25	92.63
Poverty gap	$\Delta \log PG_{it}$	480	22.60	16.81	0.04	77.71
Squared poverty gap	$\Delta \log SPG_{it}$	480	20.84	12.34	0.01	65.23
Independent variables						
Gini coefficient	$\Delta \log G_{it}$	480	49.16	9.69	36.8	65.8
Mean income	$\Delta \log Y_{it}$	480	151.95	124.61	24.73	699.1
Globalisation	$\Delta \log Glob_{it}$	480	44.04	9.96	24.80	69.7
GDP per capita	$\Delta \log PC_{it}$	480	2,652.4	2,616.2	255.5	8,616.4

Source: Author's computation using STATA 14

In Table 4.1, the statistics show that the SADC region has an average mean income of \$152, with a standard deviation of \$125. The minimum mean income in the SADC is \$25, while the maximum mean income is \$699. The poverty indices show that the region has an average headcount poverty of 47 percent, a poverty gap of 23 percent and a squared poverty gap of 21 percent. Income inequality in the SADC countries remains high, with an average Gini coefficient of 49 percent. The globalisation index ranges from zero to 100 percent and is measured by a set of indicators weighted in the following ways: economic globalisation (36 percent), social globalisation (37 percent) and political globalisation (27 percent). The overall globalisation index averages 44 percent in the SADC countries. Furthermore, the statistics indicate that the region has an average income per capita of \$2 652.4 per year.

4.6 Unit root tests

To ensure that the regression results in the next chapter do not capture spurious relations, it is necessary to establish whether all the growth rate variables in equations (4.2) to (4.4) are stationary. As emphasised by Asteriou and Hall (2010), non-stationary variables may lead to spurious regression results and hence to

misleading inferences. The panel unit root tests of Levin-Lin-Chu (Levin, Lin & Chu, 2002) and Im-Pesaran-Shin (Im, Pesaran & Shin, 1997, 2003) are used to check the stationarity of all the variables. The unit root test results in Table 4.2 show that the null hypothesis of a unit root can be rejected at the 1 percent significance level for all the variables. This implies that all the variables in equations (4.2) to (4.4) are stationary at conventional significance levels.

Table 4.2: Panel unit root tests

	Levin-Lin-Chu (LLC)	Im-Pesaran-Shin
$\Delta \log HC_{it}$	2.64 (0.004) ***	-11.2 (0.000) ***
$\Delta \log PG_{it}$	-2.69 (0.000) ***	-12.1 (0.000) ***
$\Delta \log SPG_{it}$	-6.9 (0.000) ***	-12.5 (0.000) ***
$\Delta \log G_{it}$	-6.6 (0.000) ***	-31.9 (0.000) ***
$\Delta \log Y_{it}$	185.3 (0.000) ***	-11.7 (0.000) ***
$\Delta \log Glob_{it}$	-20.6 (0.000) ***	-19.8 (0.000) ***
$\Delta \log PC_{it}$	-6.4 (0.000) ***	-9.2 (0.000) ***

Notes: *** shows that the null hypothesis of a unit root can be rejected at the 1 percent significance level. P-values are in parentheses.

Source: Author's computation using STATA 14

4.7 Summary

This chapter described the poverty-growth model, as originally developed by Bourguignon (2003), which is estimated in the next chapter for the sample of 15 SADC countries over the period 1981 to 2013. The benchmark model depicts the three different measures of poverty as a function of mean income growth and income inequality (as measured by the Gini coefficient). It was argued, however, that the benchmark model might suffer from simultaneity bias due to reverse causality from poverty to mean income growth and income inequality. To correct for this bias, two-

stage least squares estimation techniques are used, with per capita income growth, a constructed globalisation index and the second-period lags of the Gini coefficient and mean income growth as instruments. Finally, the chapter showed that the growth rate variables in all the models are stationary. This is a necessary condition to ensure that the regression results in the next chapter do not capture spurious relations. The next chapter presents the empirical results of the benchmark poverty model in equation (4.2) and the two-stage least squares model in equation (4.5)



CHAPTER 5: EMPIRICAL RESULTS

5.1 Introduction

This chapter presents and discusses the empirical results of the poverty-growth models for the 15 SADC countries over the period 1981 to 2013. The first part of the chapter presents the pooled OLS estimates of the benchmark poverty model in equation (4.2). The benchmark regression results are then subjected to a battery of exogeneity tests. Evidence of endogeneity bias is found, so the second part of the chapter considers the two-stage least squares estimation procedure outlined in the previous chapter.

5.2 Pooled OLS results

The pooled OLS estimates of equation (4.2) for the headcount index ($\Delta \log HC_{it}$), poverty gap ($\Delta \log PG_{it}$) and squared poverty gap ($\Delta \log SPG_{it}$) are reported below in Table 5.1. Due to the presence of first-order serial correlation and heteroscedasticity effects (not reported here), robust standard errors are used. Table 5.1 shows that mean income growth and the Gini coefficient, as a measure of income inequality, are statistically significant and yield the expected signs in all the specifications. However, the pooled OLS estimates do not control for potential endogeneity bias in the poverty-growth-inequality relationship. To test whether the regressions suffer from simultaneity bias, Table 5.1 reports the Hausman (1978), Wu (1973) and Durbin (1954) statistics, using the instruments identified in equations (4.3) and (4.4). For all the poverty measures, the Wu-Hausman and Durbin tests reject the null hypothesis that the underlying regressors are exogenous at 1 percent significance level. The pooled OLS results therefore suffer from endogeneity bias, and the estimates are inconsistent. The next section considers the two-stage least squares.

Table 5.1: Pooled OLS regression results, 1981–2013

Dependent variable	$(\Delta \log HC_{it})$	$(\Delta \log PG_{it})$	$(\Delta \log SPG_{it})$
Constant	-0.006(0.033)	-0.004 (0.005)	-0.001(0.007)
$\Delta \log Y_{it}$	-0.933(0.064) ***	-1.408 (0.099) ***	-1.734(0.141) ***
$\Delta \log G_{it}$	2.969(0.428) ***	5.744 (0.667) ***	8.301 (0.942) ***
R-squared	0.35	0.36	0.31
Durbin (score) $\chi^2(2)$	15.268 [0.001] ***	12.028 [0.002] ***	6.898 [0.003] ***
Wu-Hausman F (2.31)	7.896 [0.001] ***	6.152 [0.002] ***	3.470 [0.003] ***
N	480	480	480

Notes: Robust standard errors are in parentheses and p-values are in brackets. The Durbin and Wu-Hausman statistics have as their null hypothesis that the variables are exogenous against the alternative that they are endogenous. *** Significant at the 1 percent level, ** significant at the 5 percent level, and * significant at the 10 percent level.

5.3 Two-stage least squares regression results

5.3.1 First-stage results

Table 4.2 presents the first-stage regression results of the change in the log of mean income ($\Delta \log Y_{it}$) in equation (4.3) and the change in the log of the Gini coefficient ($\Delta \log G_{it}$) in equation (4.4). When the change in the log of mean income is considered as the dependent variable, the results indicate that the second-period lagged value of mean income growth ($\Delta \log Y_{it-2}$) and per capita income growth ($\Delta \log PC_{it}$) are positive and statistically significant at the 1 percent level. In the regression with the change in the log of the Gini coefficient as the dependent variable, the second-period lagged values of the Gini coefficient ($\Delta \log G_{it-2}$) and globalisation index ($\Delta \log Glob_{it-2}$) are both positive and statistically significant at the 10 and 1 percent level respectively.

Table 5.2: First-stage regression results, 1981–2013

Dependent variable	$(\Delta \log Y_{it})$	$(\Delta \log G_{it})$
Constant	0.012 (0.003) ***	-0.001 (0.0004)
$\Delta \log Y_{it-2}$	0.375 (0.042) ***	0.004(0.0061)
$\Delta \log PC_{it}$	0.010 (0.002) ***	0.0001(0.0003)
$\Delta \log G_{it-2}$	0.0275 (0.248)	0.658(0.362)*
$\Delta \log Glob_{it-2}$	-0.0284(0.057)	0.021(0.008)***

Standard errors are presented in parentheses. *** Significant at 1 percent level, ** significant at 5 percent level, and * significant at 10 percent level.

The positive effect of globalisation on the Gini coefficient shows that an increase in globalisation raises income inequality in the SADC region. This finding is consistent with the literature, which shows that countries with underdeveloped financial sectors and lower levels of education seem to benefit less from globalisation (Samimi & Jenatabadi, 2014). Agenor (2004) finds that there is an inverted U-curve relationship between poverty and globalisation. His results show that the more integrated developing regions become, the less has been the effect of growth on poverty, due to offsetting increases in income inequality. McMillan, Rodrik and Verduzco-Gallo (2014) further show that increased globalisation since 1990 has resulted in productivity-reducing structural change in Latin American and the SSA countries, with labour shifting out of high-productivity sectors, such as manufacturing, into low-productivity sectors, such as agriculture and services.

5.3.2 Second-stage regression results

The fitted values of the regressions in Table 5.2 are used to estimate the second-stage regressions, as depicted in equation (4.5) of the previous chapter. The Sargan (1958) and Basmann (1960) tests, which have as their null hypothesis that the set of instruments in the first-stage regression results in Table 5.2 are valid instruments, are not significant at the 10 percent significance level for all the poverty measures in

Table 5.3 below. This suggests that the two-stage least squares procedure effectively controls for simultaneity bias, and that the estimates in Table 5.3 are consistent.

Table 5.3: Two-stage least squares regression results, 1981–2013

Dependent variable	$(\Delta \log HC_{it})$	$(\Delta \log PG_{it})$	$(\Delta \log SPG_{it})$
Constant	-0.0079(0.0057)	-0.008 (0.0074)	-0.009(0.009)
$\Delta \log \hat{Y}_{it}$	-1.072(0.157) ***	-1.588 (0.201) ***	-1.883(0.246) ***
$\Delta \log \hat{G}_{it}$	0.381(0.647)	1.484 (0.830) *	2.503 (1.016) **
R-squared	0.29	0.36	0.35
Sargan (score) $\chi^2(2)$	4.560 [0.110]	2.766 [0.251]	3.375 [0.185]
Basman $\chi^2(2)$	4.550 [0.112]	2.746 [0.253]	3.358 [0.187]
N	314	314	314

Notes: Robust standard errors are in parentheses, and the p-values of the Sargan and Basman tests for over-identifying restrictions are in brackets. The Sargan and Basman statistics have as their null hypothesis that the instruments are valid against the alternative that they are not valid. *** Significant at the 1 percent level, ** significant at the 5 percent level, and * significant at the 10 percent level.

The results in Table 5.3 show that the effect of mean income growth on all three poverty measures is negative and statistically significant at the 1 percent level. More specifically, a one percentage point increase in mean income growth reduces the headcount index by 1.1 percentage points, the poverty gap by 1.6 percentage points and the squared poverty gap by 1.9 percentage points. The estimates show that economic growth is more effective in reducing the severity (squared poverty gap) and intensity (poverty gap) of poverty than the incidence (headcount index) of poverty.

As emphasised in Chapter 3, it is possible to reduce the headcount index by a significant amount without affecting other aspects of poverty, such as the intensity and severity. The relatively large growth elasticities in the poverty gap and squared poverty gap equations are therefore good news for policymakers in the SADC region who wish to address the intensity and severity of policy.

Economic growth is not, however, the only determinant of poverty. The results in Table 5.3 show that the Gini coefficient is statistically significant at the 5 percent level in the squared poverty gap regression. The estimate implies that a one percentage point increase in income inequality raises the severity of poverty by 2.5 percentage points. The elasticity for the poverty gap is 1.50, with a significance level of 10 percent, while the estimate of 0.4 for the headcount index is statistically insignificant. The more significant and larger estimate in the squared poverty gap equation should not surprise, since this index is specifically designed to measure income inequality among the poor.

An important finding of the first-stage regressions in Table 5.2 is that globalisation is positively related to income inequality which, in turn, affects the poverty gaps in Table 5.3. Chapter 6 will consider specific policy measures that can be used in the SADC region to counter the debilitating effect of increased globalisation on poverty.

It is informative to compare the results in Table 5.3 with those of Fosu (2009), who estimates poverty equations for a group of SSA countries over the period 1977 to 2004. For the headcount index, poverty gap and squared poverty gap he obtains growth (income distribution) elasticities of -1.14 (1.10), -1.682 (2.07) and -2.12 (2.85) respectively (see the results of specification 6, Fosu, 2009:735). These estimates are broadly consistent with the results obtained for the 15 SADC countries over the period 1981 to 2013 in Table 5.3.

5.4 Summary

This chapter investigated the effectiveness of mean income growth on poverty reduction when controlling for income inequality in the SADC region. In order to

estimate the mean income growth and income distribution elasticities of poverty, the study used the model originally developed by Bourguignon (2003) for a panel of 15 SADC countries from 1981 to 2013, and the updated dataset at the international poverty line of \$1.90 per day, at 2011 PPP.

To control for endogeneity bias, the two-stage least squares technique was used to estimate the three poverty-growth-inequality equations. The Sargan (1958) and Basman (1960) tests show that all the instruments in the first-stage regressions are valid. The second-stage regression results indicate that there is a statistically significant relationship between all three measures of poverty and mean income growth in the SADC region. The estimates show that economic growth is more effective in reducing the squared poverty gap and poverty gap than the headcount index of poverty, with growth elasticities of -1.9, -1.6 and -1.1 respectively. Furthermore, the empirical results show that, besides economic growth, there is another factor that affects poverty in the SADC region, namely the Gini coefficient. The results indicate that income distribution is a statistically significant determinant of the squared poverty gap and poverty gap. A one percentage point decrease in income inequality reduces the squared poverty gap and poverty gap by 2.5 and 1.5 percentage points respectively. With regard to the headcount index, the results show that the Gini coefficient is not statistically significant.

From these results, it can be inferred that mean income growth is an effective tool to reduce poverty in the SADC region. According to Kakwani and Pernia (2000), growth is highly pro-poor when the income elasticity is greater than 1 (see Appendix B). Since the growth elasticities are greater than 1 for all the poverty measures in this study, it can be concluded that economic growth is inclusive in the SADC region. At the same time, a more equal distribution of income is also effective in reducing extreme poverty in the SADC. An important result of the first-stage regressions is that globalisation leads to a more unequal distribution of income, which raises poverty. A major challenge facing policymakers is how to counter the negative effect of rapid globalisation on income inequality and poverty in the SADC region. The next chapter outlines some policy suggestions.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

The aim of this study was to assess the effectiveness of economic growth in reducing poverty in 15 SADC countries over the period 1981 to 2013, using three different measures of poverty, namely the headcount index, the poverty gap and the squared poverty gap. The pooled OLS method was used to estimate the benchmark poverty model. However, the diagnostic tests reveal that the benchmark model suffers from simultaneity bias due to reverse causality from poverty to mean income growth and income inequality. Alternatively, the two-stage least squares procedure was used to address the simultaneity bias prevalent in the benchmark estimates.

The following variables were identified as plausible instruments in the first-stage regressions: the second-period lag of the Gini coefficient, the second-period lag of mean income growth, per capita income growth, and the second-period lag of a constructed globalisation index. The two-stage least squares results reveal that economic growth is an effective instrument to reduce the three measures of poverty in the SADC region. A one percentage point increase in economic growth leads to a 1.1, 1.6, and 1.9 percentage point decline in the headcount index, poverty gap and squared poverty gap respectively. These results imply that growth-promoting policies will not only be effective in reducing poverty in general, but specifically to address the severity and intensity of poverty, as measured by the poverty gap indices. Economic growth is therefore highly pro-poor for all three measures of poverty, with the largest gains attributed to the squared poverty gap and the poverty gap.

In addition, the study reports that a one percentage point increase in the Gini coefficient (income inequality) leads to a 1.5 percentage point increase in the poverty gap and a 2.5 percentage point increase in the squared poverty gap. For the headcount poverty index, the Gini coefficient is statistically insignificant. Thus, although economic growth is an effective poverty-reduction strategy in the SADC region, policymakers should also design and implement direct measures to create a more equitable distribution of income.

In this context, Dollar and Kraay (2002) find that globalisation can increase or decrease inequality within a country. With regard to the SADC region, the results show that globalisation has a positive and significant impact on inequality. This may be due to the faster pace of technological change associated with increased globalisation over time. Highly skilled individuals at the upper end of the income distribution may have experienced an increase in the demand for their labour relative to low-skilled workers at the lower end of the income distribution.

Countering the adverse effects of globalisation on poverty would require productivity-enhancing structural change, with labour moving out of traditional sectors, such as agriculture, into modern dynamic sectors, such as manufacturing (see McMillan *et al.*, 2014). From the results in McMillan *et al.* (2014), productivity-enhancing structural change could be achieved through currency undervaluation and a more flexible labour market. Furthermore, the mechanisation of the agricultural sector and the use of fertiliser would increase the productivity and income in the primary sector and release a surplus of labour, which can be employed in the industrial sector (Todaro & Stephan, 2012).

Finally, investment in human capital, for instance by providing the poor with education, training and development, may reduce income inequality and poverty. This is a “win-win” strategy, because it helps the poor to gain the skills needed to produce more output and earn higher wages (Bruno, Ravallion & Squire, 1998; Ravallion, 2001; World Bank, 2000). A more educated labour force will also allow the economy to absorb new technologies from abroad and reap the benefits of globalisation.

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APPENDICES

APPENDIX A: List of SADC countries

- Angola
- Botswana
- DR Congo
- Lesotho
- Madagascar
- Malawi
- Mauritius
- Mozambique
- Namibia
- Seychelles
- South Africa
- Swaziland
- Tanzania
- Zambia
- Zimbabwe

APPENDIX B: Growth elasticity of poverty

Growth and poverty	Pro-poor growth index (PGI)
Growth is anti-poor	$PGI < 0$
Growth is weakly pro-poor	$0 < PGI < 0.33$
Growth is moderately pro-poor	$0.33 < PGI < 0.66$
Growth is pro-poor	$0.66 < PGI < 1$
Growth is highly pro-poor	$1 \leq PGI$

Source: Kakwani and Pernia (2000)