Sources of Economic Growth in the Southern African Development Community

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Abstract

As a means to combat poverty, many countries still pursue high and stable rates of economic growth. There are several sources of growth such as physical capital accumulation, human capital development and technological progress. In order to attain sustained economic growth, it is crucial that countries do not only accumulate a certain stock of factors of production, but demonstrate the ability to combine such factors in a manner that is efficient. The Southern African Development Community (SADC) continues to pursue high and stable economic growth as a way of fighting poverty and inequality. This study attempts to investigate the key sources of economic growth in the region using different panel data techniques. The findings reveal that the factors affecting economic growth in the region are: inflation, government expenditures, openness to trade, human capital, level of financial development, and political stability.

Key words: Convergence, Economic Growth, Fixed Effects, Difference GMM, System GMM, Seemingly Unrelated Regressions

JEL Classification: C33, E31, O43, O47, O55, J640

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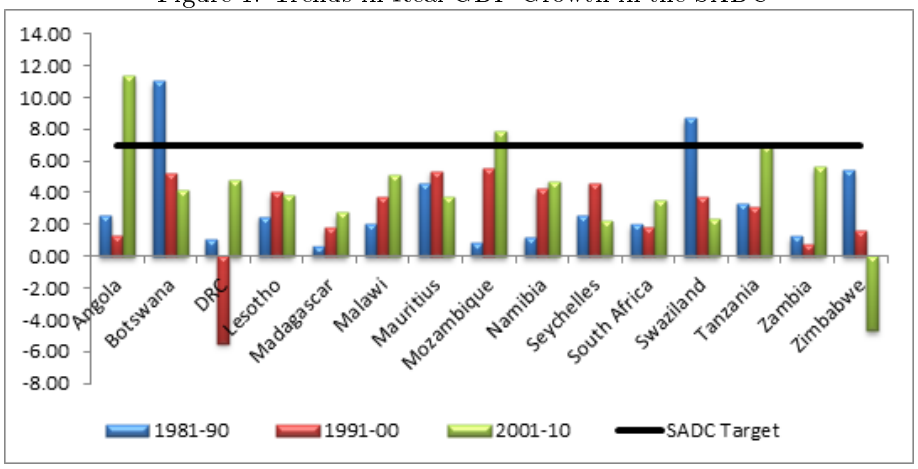
1 Introduction

Economic growth is generally a process through which economic inputs and resources, such as skilled labour, capital, and funding for new businesses, are converted into economic outcomes such as wage growth, job creation, or new businesses (Hall and Sobel, 2006). The economic outcome generated from any specific set of economic inputs depends on the institutions (political and economic rules of the game) under which an economy operates. The growth performance during the last four decades has been diverse among countries around the world. On the one hand, rapid growth rates were experienced by the Asian tigers between the 1965 and 1995 (De Gregorio and Lee, 1999). These Asian tigers experienced growth rates of around 6.0 per cent per year in per capita terms. On the other hand, many countries in Sub-Saharan Africa (SSA) and Latin America registered less than 1.0 per cent average growth rates in per capita income during the same period.

In the context of the Southern African Development Community (SADC), the patterns of growth can be examined along three regional groups, namely, the common monetary area (CMA), the Southern African Customs Union (SACU) and what can be called other-SADC . SADC consists of fifteen member states, namely, Angola, Botswana, Democratic Republic of Congo (DRC), Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa (SA), Swaziland, Tanzania, Zambia and Zimbabwe. The member states have differing levels of education, health provisions and other socio-economic development. However, according to Nel (2004) members of SADC are characterised by similar trade patterns. There is also evidence of intra-SADC trade albeit very shallow. The Article 5 of the SADC Treaty highlights that the overall objectives of SADC include the promotion of economic growth and socio-economic development that will eventually eradicate poverty, and promote and maintain peace, security and democracy, through regional cooperation and integration (SADC, 2011).

The macroeconomic convergence target for real GDP growth is 7.0 per cent. Figure 1 shows that on average the CMA saw a steady upward trend in real GDP growth rate which recorded 2.23, 4.78 and 5.67 per cent for the periods 1981-90, 1991-00 and 2001-10, respectively. The average trend reflects the patterns of economic growth in Lesotho, South Africa and Namibia which dampened the decadal decline registered in Swaziland. Similarly, SACU realised an increasing average decadal growth rate during the same period. For this bloc of countries, the average real GDP growth rate was 2.05, 4.53, and 4.99 per cent in 1981-90, 1991-00 and 2001-10, respectively. Even though Botswana and Swaziland realised average growth rates that hovered above the SADC convergence target during the 1981-90 decade, the two countries recorded steady declines in the growth rate of GDP from decade to decade as shown in Figure 1. The average GDP growth rate for the group Other-SADC plummeted from 3.89 per cent recorded for the 1981-90 decade to 3.58 per cent during the 1991-00 decade. This decline was attributable to a recession that was realised in DRC during the 1991-00 decade. However, the average GDP growth rate accelerated to

Figure 1: Trends in Real GDP Growth in the SADC



Source: IMF, 2014

4.53 per cent during the 2001-10 decade. This recovery was driven by average growth rates registered in Angola, Mozambique and Tanzania which surpassed the SADC convergence target. The Zimbabwean recession was overshadowed by the average growth rates realised in other countries in this grouping. The average growth rate for SADC as a whole followed an upward trend mimicking the trends observed in the CMA and SACU.

Figure 1 shows that disparities in the rate of growth is not unique to regional comparisons as discussed at the outset, but are evident even within SADC. This disparity in growth rates conjures a key issue on factors that drive economic growth. In fact, the key question is: what are the sources of economic growth? The paper investigates the sources of economic growth in SADC and makes some important inferences on how economic growth may affect employment and poverty in the region. The rest of the paper is structured as follows: after this introduction, section 2 synthesises both theoretical and empirical literature on the sources of economic growth. Section 3 outlines the methodological tools employed in the study, namely; fixed effects (FE) estimator, difference and system generalised method of moments (GMM) estimators and seemingly unrelated regression estimators (SURE). Section 4 provides the data analysis, focusing first on the entire SADC and then on the members of SADC without countries that are outliers. Section 6 concludes the paper and offers some policy recommendations.

2 Literature Review

2.1 Theory of Economic Growth

The literature on economics is replete with studies on the sources of economic growth. Classical economists such as Adam Smith, David Ricardo and Thomas Malthus expended much effort to comprehend the concept of economic growth. According to Adam Smith[1] countries become prosperous when they have good institutions that create favourable rules of the game – rules that encourage the creation of wealth. Since then, a vast variety of research has been carried out attempting to understand why some countries grow faster in the long run while others fail to. Neoclassical economists in the 1950s resuscitated research on economic growth. The models of Solow (1956) and Swan (1956) became pillars of the new growth theories. Application of these models culminated into a consensus on the understanding of drivers of growth by both classical and neoclassical economists. This understanding identifies technological progress as the sole lasting source of growth, given that the law of diminishing returns over time eliminates any growth that emanates from physical accumulation.

The modelling framework assumes that the production possibilities of an economy are described as:

$$Y = f(K, L, A) \tag{1}$$

Where K, L and A represent inputs, namely; capital, labour and technological progress. The production function has two key properties. First, it is able to exhibit constant returns to scale, in the sense that if labour and capital are increased by a factor of α[2], output should be able to respond by the same α. Second, the production function obeys the law of diminishing returns to capital. Furthermore, technical progress is exogenous and, capital and labour are substitutable. A common specification of the neoclassical production function is a Cobb-Douglas function defined as:

$$Y = AK^{\lambda}L^{1-\lambda} \tag{2}$$

In this case, λ represents the proportion of national income for owners of capital, and $1 - \lambda$ is the fraction due to workers. In order to account for unemployment, equation (2) is defined in terms of output per capita. Of course output per capita and output per worker coincide if the population is equal to the labour force. If labour L is separated into the total number of workers N and skill quality β, then output per worker can be obtained by dividing equation (2) by N:

$$y = Ak^{\lambda}\beta^{1-\lambda} \tag{3}$$

[1] In his book entitled *An Inquiry into the Nature and Causes of the Wealth of Nations* - Published in 1776

[2] This assumption is anchored on the principle of replication

Where y and k denote output per worker and capital per worker, respectively. Equation (3) identifies sources of growth in output per worker. In other words, policymakers can increase output per worker by increasing all or one of the following: investment in physical capital, or the amount of skilled labour in the economy through education or technological progress. The dynamics of this framework have several implications. The first one arises due to diminishing returns to capital which means that the rate of economic growth due to capital accumulation will slowly approach zero. Even though the economy will be richer, it will have become stagnant. The second implication is due to differences in the capital stocks across countries. Hence, poorer countries with smaller stocks of capital will realise higher marginal products of capital than their richer counterparts. Diminishing returns would imply that a unit increase in the stock of capital, in both a rich and poor country, will result in faster output growth in the poor country than in the rich one. It is easy to realise that the poor country will gradually catch up with its rich counterpart over time. This is termed the absolute convergence hypothesis. The third implication involves the differences in the savings rates. The absolute convergence hypothesis assumes identical savings rates between both the poor and rich country. However, if the savings rates differ between the two countries, then the poor country will only catch up with the rich one, if the savings rate in the poor country exceeds that of the rich country. This is referred to as the conditional convergence hypothesis. Sala-i-Martin (1995) distinguishes enduring and short-lived sources of growth. He concludes that countries can be able to achieve enduring growth rates over time if their main source of growth is "productivity improvements" manifested by increases in technological progress. He points out that this happens "because knowledge has no frontiers." However, rapid growth dependent on high savings and investment rates which are attained through capital accumulation or increasing skill levels would decelerate and eventually cease.

The neo-classical models provided a basis for what is currently understood as endogenous growth which emerged from the pioneering work of Romer in 1986.Unlike the neo-classical models which assume diminishing returns to capital, the endogenous growth model assumes increasing returns to capital. Endogenous growth models identify the rate of accumulation of physical and human capital, and technological progress as determinants of long-run economic growth (Arrow, 1962). Investment in human capital (e.g. expenditures on education, training, and research and development) could have a positive impact on economic growth. This outcome is possible if high skills and training are accompanied by the process of innovation, which leads to a faster rate of technological progress. Hence, investment in education may not only make contribution to growth via improvements in the quality of the workforce, but also via innovation driven by research and development. On the empirical front, most studies use the share of investment to GDP as a proxy for physical capital and level of formal education (e.g. school enrolment ratio) as a proxy for human capital (Romer, 1986) and, technological progress is often represented by expenditures on research and development. Endogenous growth models identify good policies as key drivers of long-run economic growth. Unlike their neo-classical predeces-

sors, endogenous growth theorists predict that convergence between poor and rich countries is not feasible due to the assumption of increasing returns to scale.

There are two other strands of the literature on the economics of growth, namely; the cumulative causation theory (Myrdal, 1957, and Kaldor, 1970) and the new economic geography theory (Krugman, 1991). Both theories attach a significant weight to initial conditions. For example, the cumulative causation theory argues that initial conditions affect economic growth over time, creating inequalities between countries. Such inequalities cannot disappear unless deliberate policy interventions are put in place. Petrakos and Arvanitidis (2008: 13) highlight that the new geography theory vividly associates economic growth with "compound effects of increasing returns to scale, imperfect competition and non-zero transportation costs." Hence, the process of economic growth can be self-reinforcing due to spatial distribution of economic activities. There are cases where economic activities may cluster in certain locations where demand is high leading to both backward and forward linkages of firms and scale economies.

2.2 Empirical Evidence on the Sources of Growth

There is vast empirical literature on sources of economic growth (see Temple, 1999; Ahn and Hemmings, 2000 - for surveys). Growth accounting studies provide contrasting results on the sources of economic growth. For example, Young (1994) found that in Singapore economic growth during the period 1960-1970 was a result of accumulation of physical and human capital rather than technological progress. On the contrary, Bosworth and Collins (1998) found that in China technological progress appeared to have accounted for more growth than accumulation of physical and human capital during the period 1960-1970. The stark contrast indicated the complexity of the process of economic growth. Consequently, according to Bloch and Tang (2004: 245) the neo-classical approach remained limited to provide "practical guidance for sustained economic development." They argue that neo-classical growth accounting focuses on what they call "proximate determinants" of growth, that is, accumulation of capital and total factor productivity or technological progress without any reference to the sources of technological progress itself. Consequently, the literature distinguishes between proximate and deep determinants of economic growth.

The deep determinants of economic growth are institutions, openness to trade and geography. Easterly (2001) argued that *institutional quality* is crucial for economic growth such that poor institutions inhibit growth even if factors such as foreign aid, debt forgiveness, family planning, infrastructural development, education and foreign investment are abundant. This finding built on North and Thomas (1973) who pointed out that lack of institutions such as protection of property rights impede investment in both forms of capital and impairs economic growth. There is also cross-country evidence of a positive association between property rights and economic growth (Hall and Jones, 1999; Rodrik, 1999). Furthermore, Knack (2002) indicates that well-defined property rights encourage technological progress and innovation and boost efficiency gains. There is evidence that socio-cultural institutions such as trust and eth-

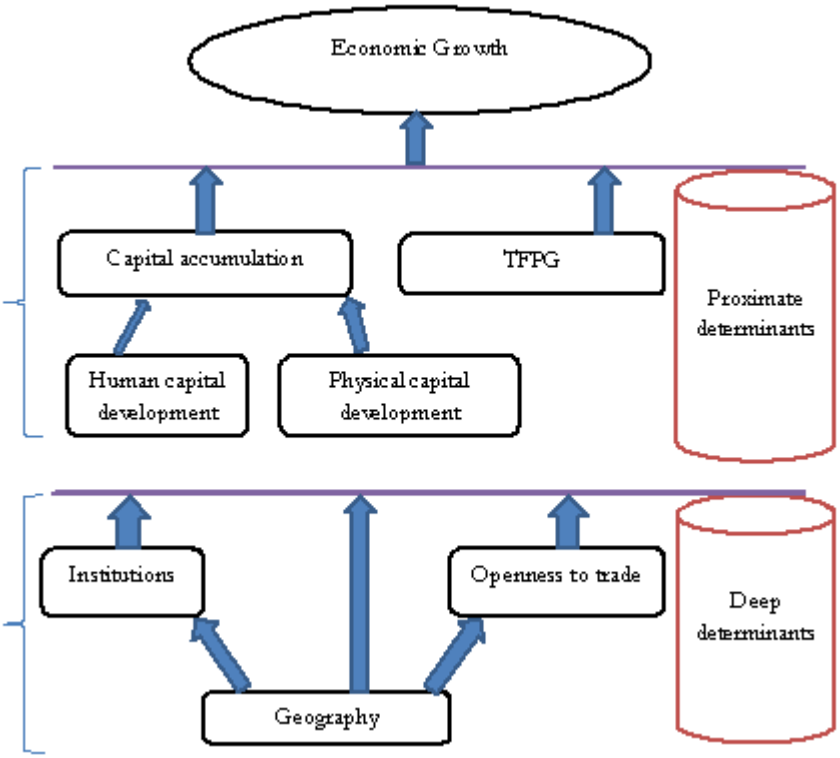
nic diversity (Easterly and Levine, 1997), political institutions such as type of regime (democracy), stability of government, political violence and volatility (Bunetti, 1997) and macroeconomic policies (Barro and Sal-i-Martin, 1995) affect economic growth in one way or another. Moreover, a number of studies confirm that presence of a causal relationship between good institutions and per capita income with causality running from the former to the latter (Acemoglu *et al.*, 2001, 2002, 2003). Tang *et al.* (2003) underscores that good quality institutions accelerate technical change and enhance long run economic growth rate.

Geography is another deep determinant of economic growth. Bloch and Tang (2004: 248) highlight that the impact on economic growth is felt in several ways such as "health, population growth, food productivity, resources endowment and mobility of factors of production." For example, on the one hand, there is empirical evidence that latitude (Hall and Jones, 1999) and winter frost (Masters and McMillan, 2001) stimulate economic while tropical climate (Gallup *et al.*, 1999) and adverse disease ecology (Acemoglu *et al.*, 2001) inhibit economic growth, on the other hand. Areas where diseases such as malaria are rife may lose much of the labour force in death. In addition, Sachs and Warner (2001) observe that resource rich countries grew slower than their resource-poorer counterparts between 1900 because they are plagued by the Dutch disease and the high probability of civil conflicts. Moreover, proximity to coastal waters provides an inexpensive highway to global markets and boosts economic growth, while landlocked states lack such propinquity with deleterious effects on their economic growth. Frankel and Romer (1999) discover that trade is low in landlocked countries than in countries with access to coastal waters. This results shows that geography can also affect economic growth through trade openness.

The third deep determinant of economic growth is *openness to trade*. Bloch and Tang (2004) propound that trade enhances per capita income growth directly through comparative advantage. In an indirect manner, trade openness bolsters economic growth by improving efficiency through technology transfer, economies of scale and international competitiveness. In addition, there are close links between capital flows such as FDI and trade openness. Lensink and Morrissey (2006) find that FDI contributes positively to economic growth. A number of studies explore the various factors that have a bearing on trade openness which may retard its impact on economic growth. For example, trade distortions tend to decelerate economic growth (Edwards, 1998), export orientation boosts economic growth (Balasubramanyam *et al.*, 1996) and trade protectionist policies reduce and hurt labour and total factor productivity (Lee, 1996).

In the context of Africa, the following sets of factors have been identified in the literature to have impact on economic growth in Africa. The first set of factors is classified under macro-economic fundamentals. These include inflation (Grier and Tullock, 1989; Fischer, 1991; Seleteng *et al*, 2013; and most recently Bittencourt *et al*, 2015), the degree of openness to international trade (Knight *et al.*, 1993; Frankel and Romer, 1999), the extent of financial development (Mck-

Figure 2: Structure of the Sources of Economic Growth



Source: Authors

innon, 1973; King and Levine, 1992) and fiscal policies (Easterly and Rebelo, 1993). The second set of factors comprise countries' institutional environment such as political stability, civil liberties and ethnic fractionalisation (Easterly and Levine, 1997; Kormendi and Meguire, 1985). The third set includes geographic factors such as access to the sea, tropical climate and natural resource abundance (Sachs and Warner, 1997).

3 Empirical Analysis

3.1 Methodology

Since $T > N$, the empirical strategy used is based on panel time-series analysis. Panel time-series allows us to deal with important econometric issues such as heterogeneity, endogeneity bias and cross-sectional dependence. Panel time-series methodologies have several advantages. First, it allows us to specifically analyse the SADC case, amid all its idiosyncrasies and differences inherent within, without necessarily treating it as an outlier or as a dummy, and therefore enables us to get a clear picture of the region. Second, the issue of statistical endogeneity (unobserved individual effects which are nested in the error term might be correlated with the regressors), and heterogeneity of intercepts are dealt with by the two-way Fixed Effects (FE) with robust standard error estimator, which provides consistent estimates in dynamic models when $T \to \infty$. Third, economic endogeneity (reverse causality) may be present, for instance, higher growth might generate lower inflation, or vice versa (Kocherlakota, 1996). We therefore use the Generalised Method of Moments (GMM) to deal with this problem.

Four panel data methodologies are used and then compared in the analysis. In particular, the Fixed Effects (FE) model specification acknowledges cross-section heterogeneity and assumes a different intercept for each country included in the sample. It can be argued that there is reverse causality or economic endogeneity, implying that higher growth actually generates higher inflation and not the inverse (Bittencourt, 2012). Therefore, Generalised Method of Moments (GMM) deals with the endogeneity problem in the dataset. Countries in the SADC region are striving towards common goals and therefore are likely to pursue similar macroeconomic policies, implying that there is between-country dependence. The Seemingly Unrelated Regressions Estimators (SURE) model deals with cross-country dependence. Before the regressions are run, unit root tests are performed in order to determine the order of integration of the variables. The estimated heterogeneous dynamic equation is therefore as follows:

$$Gr = \alpha_i + \beta_i Infl_{it} + \gamma_i Gfcf + \delta_i Pse + \eta_i Gov_{it} + \varepsilon_i Open_{it} + \rho_i M2_{it} + \varphi_i Inst_{it} + \theta_i Gr + \nu_{it} \tag{4}$$

whereby Gr denotes growth rates of real GDP, $Infl$ are the inflation rates, $Gfcf$ shares of gross fixed capital formation to GDP, Pse is the public spending on education as share of GDP, Gov is the share of final government consumption expenditure to GDP, $Open$ is a measure of trade openness, $M2$ is the share of

liquid liabilities to GDP and *Inst* is the institutional variable which proxies level of democracy.

3.1.1 Fixed Effects Estimator

First, the Chow (1960) F-test was used to test for fixed effects. We tested the null of no individual effects $H_0 : \mu_1 = \mu_2 = \ldots = \mu_{N-1} = 0$ against the alternative that individual effects are not all equal to zero. In this case, F=1.59 leading to a rejection of the null at all levels of significance. Therefore, the conclusion is that countries in the SADC region are not homogenous and hence these differences have to be controlled for. Second, to decide between using a fixed or random effects model, a Hausman (1978) test was used. The null hypothesis is that the preferred model is random effects versus the alternative of fixed effects. The null hypothesis was rejected at all levels of significant hence the preferred method is fixed effects in this case (see Table 1a in the Appendix).

Consider the following two-way error component regression model:

$$y_{it} = \alpha + X_{it}^{'}\beta + \mu_{it} \tag{5}$$

$\mu_{it} = \mu_i + \lambda_t + \nu_{it}$
where μ_i =Unobserved individual effects
λ_t =Unobserved time effects
ν_{it} =Stochastic disturbance term
i =1,2,...,N
t =1,2,...,T

If μ_i and λ_t are assumed to be fixed parameters to be estimated and $\nu_{it} \sim IID(0, \sigma_\nu^2)$ then (5) represents a two-way fixed effects (FE) error component model. Note further that the X_{it} are assumed independent of the stochastic disturbance term (ν_{it}) for all i and t. Since $T > N$, FE is the appropriate estimator to use in this case. Furthermore, as already discussed, the FE estimator reduces statistical endogeneity and when $T \to \infty$, FE reduces the Nickell Bias[3]. The choice of a two-way fixed effects estimator is informed by the fact that countries are different and hence this caters for cross-sectional heterogeneity. In addition, there were periods of high inflation episodes observed in the SADC region during our sample period, hence the time-effects takes this into account through the use of time dummy variables.

3.1.2 Difference and System GMM Estimators

Difference and system generalised method of moments (DIF-GMM and SYS-GMM) for dynamic panels have gained much popularity in recent years. This is due to the fact that these estimators are able to circumvent several modelling concerns such as endogeneity of regressors, which lead to problems of inconsistent and biased estimates. Research papers that propose the use of generalised

[3]When $T \to \infty$the bias tends to zero, i.e. Judson and Owen (1999) argue that when $T \to 30$, the FE estimator provides the best alternative in dynamic thin panels

method of moment estimators include Holtz-Eakin, Newey and Rosen (1988), Arellano and Bond (1991), Arellano and Bover (1995); and Blundell and Bond (1998). A recurring debate in the literature is that, growth, inflation and investment are three endogenous variables (Temple, 2000). Therefore, to investigate this, the Hausman (1978) test for endogeneity is conducted and it confirms endogeneity in the model, as we reject the null hypothesis of exogeneity of the regressors with a Hausman test statistic of 18.57. Consequently, the use of DIF-GMM and SYS-GMM is necessary since these estimators are designed to deal with the endogeneity problem, and also to fit linear models with a dynamic dependent variable, additional control variables and fixed effects (Roodman, 2009). Other studies such as Cukierman *et al.* (1993) use several indicators as instruments, including central bank independence and turnover of central bank governors. However, due to data unavailability of such indicators in the SADC region, our DIF-GMM and SYS-GMM methods uses lagged values of Gr, $Infl$ and $Gfcf$ as instruments. In particular, since growth, inflation and investment are assumed to be endogenous, they are instrumented with their first lags. Consider the following data generating process:

$$y_{it} = \alpha y_{i,t-1} + X_{it}^{'}\beta + \varepsilon_{it} \tag{6}$$

where $\varepsilon_{it} = \mu_i + \nu_{it}$
$E[\mu_i] = E[\nu_{it}] = E[\mu_i \nu_{it}] = 0$

Cross-sectional units are indexed by i and time is indexed by t. A vector of control variables is represented by X and this may include lagged values for both dependent variable and controls. The fixed effects and idiosyncratic shocks are represented by $\mu_i$and ν_{it}, respectively. The panel has $(N \times T)$ dimension and may be unbalanced. When $y_{i,t-1}$ is subtracted from both sides of equation (6), we get an equivalent equation of growth presented as:

$$\triangle y_{it} = (\alpha - 1) y_{i,t-1} + X_{it}^{'}\beta + \varepsilon_{it} \tag{7}$$

In DIF-GMM, estimation occurs after the data is differenced once in order to eliminate the fixed effects, while the SYS-GMM augments the DIF-GMM by estimating both in differences and in levels (Roodman, 2009). Therefore, SYS-GMM augments the DIF-GMM by making an assumption that first differences of instrument variables are uncorrelated with FE and thus allows for the introduction of more instruments, thereby improving efficiency. Therefore, the extra moment conditions embedded within the SYS-GMM estimators render it to be a better estimator. When using these two estimators, caution needs to be exercised with respect to the number of instruments used. In particular, numerous instruments can overfit the endogenous variables and therefore the results will not be robust. This paper uses the Sargan (1958) test (an equivalent of Hansen (1982) test) to test for over-identification of restrictions.

3.1.3 Seemingly Unrelated Regression Estimators (SURE)

This estimator was proposed by Zellner (1962) and this allows for cross-sectional dependence and therefore captures efficiency due to the correlation of the disturbances across country-specific equations. As discussed earlier, countries in the SADC region are striving towards common goals and therefore are likely to pursue similar macroeconomic policies, implying that there might be *cross-country dependence* in the sample. The reason for the interdependence emanates from the fact that over the years countries experience increasing economic and financial integration, which implies strong interdependence among countries (Baltagi, 2008).

The presence of cross-sectional dependence implies that FE estimators are still consistent although inefficient; hence the standard errors are biased. Therefore, Seemingly Unrelated Regressions Estimator (SURE) deals with cross-country dependence. The SURE is based on large-sample properties of large T and small N datasets in which $T \to \infty$. Hoyos and Sarafidis (2009) point out that panel data sets usually exhibit cross-sectional dependence, which usually arise due to the presence of common shocks and unobserved components that become part of the error term.

Therefore, testing for cross-sectional dependence is important in estimating panel data models. For this paper, the sample is, $T = 33$ and $N = 13$ ($T > N$) and the approapriate test is the Breusch-Pagan (1980) Lagrange Multiplier (LM) test. In this case the null hypothesis of no cross-sectional dependence was rejected for the CMA, SACU and SADC regions, indicating that there is indeed cross-sectional dependence in these regions and this warrants the use of a SURE models (See Tables 7 and 8). As highlighted by Bittencourt (2012) the SURE estimates different country time series, which are then weighted by the covariance matrix of disturbances. Therefore, this methodology disaggregates the analysis further, in order to allow for a more in-depth view of the effects of the several variables on growth in the region.

3.2 The Data

The dataset used is obtained from the World Bank Development Indicators (WDI), IMF International Financial Statistics (IFS) and Polity IV database, for the period 1980 to 2012. The growth variable used in the analysis is the growth rate of real GDP. The control variables are standard in the growth literature as discussed in Durlauf *et al.* (2005) and Levine and Renelt (1992) who used Leamer's extreme bounds analysis to analyse growth accounting regressions. Levine and Renelt (1992) found that inflation, investment's share of GDP, initial level of GDP, secondary-school enrolment rate, average annual rate of population growth and trade are robust in the growth regressions. We follow their work and use a set of variables that control for factors associated with economic growth. These control variables are rather standard in growth literature and their description is presented in table 1.

Table 1: Variable Description

Variable	Acronym	Description	Source	Expected Sign
Real GDP growth	GR	Real GDP growth (annual %)	WDI	n/a
Inflation	INFL	Consumer price inflation (annual % changes in CPI)	WDI	+/-
Investment	GFCF	Gross fixed capital formation (% of GDP)	WDI	+
Openness	OPEN	(Imports + Exports) of goods and services (% of GDP)	WDI	+
Government	GOV	General government final consumption expenditure (% of GDP)	WDI	+/-
Money Supply	M2	Money and quasi money(M2) [as % of GDP]	IFS	+
Credit	PSC	Private sector credit extension (as % of GDP)	IFS	+
Democracy	INST	Institutional variable [-10,+10] with a +10 a full consolidated demogracy		
Human capital	EI	Secondary school enrolment (% of corresponding population age group)	WDI	+
Public spending on education	PSE	Public spending on education, total (% of GDP)	WDI	+
Population growth	POPGR	Population growth (annual %)	WDI	+/-
Urbanisation	UPOPSHR	Urban population (% of total)	WDI	+/-

The coefficients of these variables are expected to exhibit expected signs consistent with literature based on a priori expectations. Inflation (INFL) – a negative relationship is expected between inflation and growth (Fischer, 1993); the ratio of gross fixed capital formation to GDP (INV)- a Solow determinant and it is expected that investment positively affects growth (Bond et al, 2010); a measure of openness to trade - ratio of imports and exports to GDP (OPEN)– it is expected that more open economies in terms of trade display faster growth rates, mainly because higher exports imply an increased inflow of foreign exchange into the country and also imports of intermediate materials may be growth enhancing (Wacziarg and Welch, 2008). Moreover, a measure of conditional convergence, namely, lagged real GDP (Y1) is included as part of the explanatory variables; a measure of financial development, namely, the ratio of private sector credit extension to GDP (PSCE) or ratio of liquid liabilities to GDP (M2)– it is expected that wider access to finance increases economic activity (Levine *et al*, 2000).

We account for institutions by using an institutional variable representing a measure of the level of democracy (INST) – and it is expected that more democratic countries tend to grow faster (Papaioannou and Siourounis, 2008). Moreover, Durlauf *et al,* (2005) in their chapter in the Handbook of Economic Growth list different group of variables that have already been regressed against growth and these include, among others, a measure of the size of the govern-

ment, measured as final government consumption expenditure as a share of GDP (Gov); public spending on education(Pse); school enrolment ratios - for both primary and secondary school enrolments (El); urbanisation - share of urban population to total population ($Upopshr$); and population growth ($Popgr$). These variables were considered as part of the explanatory variable set. The number of countries included in the sample amounts to fifteen ($T = 33$) and ($N = 15$) therefore $NT = 495$.

Table 2: The Correlation Matrix, SADC, 1980-20112

	GR	INFL	GFCF	GOV	PSE	INST	M2	OPEN	POPGR
GR	1								
INFL	-0.13***	1							
GFCF	0.20***	-0.11***	1						
GOV	0.03	-0.09*	0.37***	1					
PSE	0.002	-0.04	0.14***	0.19***	1				
INST	0.15***	-0.05	0.22***	0.12***	0.58***	1			
M2	-0.05	0.001	0.24***	0.14***	0.65***	0.40***	1		
OPEN	0.21***	-0.04	0.45***	0.40***	0.17***	0.08	0.21***	1	
POPGR	0.08*	0.001	-0.17***	-0.07	-0.58***	-0.36***	-0.55***	-0.27***	1

*/**/*** denotes significance at 1%,5% and 10%, respectively.

Table 2 presents the correlation matrix of the variables used, and inflation and growth depict a negative and statistically significant correlation to each other, Fischer (1993). Other control variables (with an exception of M2) have the expected signs. Investment is positively and significantly correlated to economic growth (Bond *et al*, 2010), as well as openness to trade (Papaioannou and Siourounis, 2008). Moreover, population growth is also positively and significantly correlated to economic growth.

Government consumption and secondary school enrolment are positively correlated to economic growth, however, not statistically significant. A measure of financial development is negatively correlated with growth, however, not statistically significant either. In a nutshell, this initial inspection of data, with all its known caveats, confirms the a priori expectations with an exception of a measure of financial development.

3.3 Unit Root Testing

Consider the following data generating process:

$$y_{it} = \alpha + \rho y_{it-1} + \varepsilon_{it} \tag{8}$$

We use the Im, Pesaran and Shin (2003) (IPS) unit root test as well as the Levin, Lin and Chu (2002) (LLS) specification to test for the presence of a unit root in the panel. The Levin, Lin and Chu (2002) (LLC) specification assumes a common unit root process, i.e. common ρ for all cross-sections (assumes parameter homogeneity) as opposed to the IPS test, which assumes individual unit root processes, i.e., individual ρ_i's for every cross-section (allows for heterogenous parameters). Since LLC does not consider a possible heterogeneity bias

present in the data, IPS generally would be the preferred test. However, LLC unit root test results confirm IPS test results, i.e. all variables are stationary, with the exception of M2 and INST, which are stationary in first differences. Therefore, the first differences of M2 and INST variable are used in the model, whereas the rest of the variables are used in levels. Results for unit root tests are reported in Table 3.

Table 3: Panel Unit Root Tests

	GR	INFL	GOV	OPEN	GFCF	M2	INST
IPS W-stat							
Levels	-4.67***	-3.64***	-1.97***	-1.57*	-1.85***	0.18	0.38
[P-value]	[0.00]	[0.00]	[0.02]	[0.06]	[0.03]	[0.57]	[0.35]
Differences	-12.71***	-14.05***	-11.82***	-13.31***	-11.96***	-10.24***	-5.86***
[P-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
LLC t*-stat							
Levels	-3.19***	-3.44**	-1.34*	-1.76**	-1.39*	-1.56*	-1.43*
[P-value]	[0.00]	[0.02]	[0.09]	[0.04]	[0.08]	[0.06]	[0.08]
Differences	-6.80***	-10.82***	-10.09***	-11.21***	-9.42***	-9.27***	-4.77***
[P-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]

***/**/* denotes significance at 1%, 5% and 10%, respectively. [P-values] are in square brackets. All the variables are expressed in logarithmic form except for the *inst* which ranges from -10 to +10.Due to space, unit root results on other variables such as *PVT, PSE, EL, POPGR* and *UPOPSHR* are not reported here. All these are I(1) with an exception of *POPGR*.

4 Emprirical Results

4.1 Fixed Effects

First, all the coefficients of the initial level of income are negative and statistically significant indicating that there is conditional convergence in the SADC region. Moreover, INFL estimates are negative and statistically significant against GROWTH, which suggests that inflation is detrimental to economic growth and inflation generally distorted the pace of overall economic activity in the SADC region during the period under review. For instance, dynamic inflation estimate in Model A indicates that an increase by 1 percentage point in the inflation rate leasds to a decline by about 0.2 percentage points in the annual economic growth rate.

Second, GOV variable (proxy for the size of the government) depicts negative, but statistically insignificant effect on growth. This shows that government spending may be detrimental to economic growth if such spending is channelled towards unproductive sectors (Barro, 1998). The variable proxying trade openness (OPEN) is positive and stastically significant in all the models indicating that more open economies can indeed grow faster via increased flows of goods, capital, people and ideas (Wacziarg and Welch, 2008). This result regarding openness is important amid the objective of SADC to achieve regional integration, or trade openness, combined with economic growth and development.

Table 4: FE Models[4]

Dependent Variable: GROWTH				
	Model A	Model B	Model C	Model D
Constant	3.03	2.79	3.05	2.99
	(1.15)	*(1.02)*	*(1.16)*	*(1.14)*
Y1	-0.20*	-0.19*	-0.19*	-0.20*
	(-1.77)	*(-1.63)*	*(-1.74)*	*(-1.76)*
INFL	-0.18***	-0.19***	-0.18***	-0.18***
	(-3.22)	*(-3.44)*	*(-3.15)*	*(-3.24)*
GOV	-0.11	-0.13	-0.12	-0.11
	(-0.57)	*(-0.63)*	*(-0.61)*	*(-0.56)*
OPEN	0.74***	0.79***	0.72***	0.74***
	(4.55)	*(4.74)*	*(4.34)*	*(4.55)*
INV	0.11	0.10	0.11	0.11
	(0.71)	*(0.62)*	*(0.71)*	*(0.67)*
M2	0.12	0.12	0.10	0.08
	(0.41)	*(0.38)*	*(0.36)*	*(0.28)*
INST	-0.01	-0.01	-0.01	-0.01
	(-0.45)	*(-0.41)*	*(-0.42)*	*(-0.33)*
PSE	0.12	0.12		
	(0.37)	*(0.37)*		
POPGR		-0.02	0.64	-0.04
		(-0.13)	*(1.07)*	*(-0.28)*
EL				0.92*
				(1.67)
F*test	6.30	6.83	6.10	7.24
[*P*-value]	[0.00]	[0.00]	[0.00]	[0.00]
# of Obs	393	390	393	390

*/**/*** denotes significance at 10,5 and 1 per cent levels, respectively. All variables are in logarithms with an exception of INST which ranges from -10 to +10. Variables: *INST, M2, PVT, LEI,* and *PSE* are I(1) hence they are used in first differences across the models.T-ratios are in italics and in parenthesis.

Third, a proxy for physicall capital, INV presents a positive but statistically insignificant effects on GROWTH (Bond *et al*, 2010). In addition, the ratio of liquid liabilities, M2, amid information asymmetries and lack of experience by smaller entrepreneurs in terms of how to make better use of finance, in general present negative and not statistically significant estimates on growth. Regressions were also estimated using PVTas a proxy for financial development and the results are essentially similar (See Table 4(a) in the Appendix).

The variables for level of democracy (INST), population growth (POPGR), both proxies for human capital -private spending on education (PSE) and secondary school enrolment ratio (EL) have the expected signs but statistically insignificant. Finally, the F* tests indicate that there is evidence of country fixed effects

4.2 Generalised Methods of Moments (GMM)

The resuls from the difference and system GMM models, which takes care of endogeneity among the variables, exactly mimics the results of the FE models. Coefficients for initial level of income, inflation, government expenditures and openness to international trade, all depict the correct signs and are statistically significant at all levels. The results depict that openness to trade has a significant impact on economic growth across the SADC region. The significance in the openness indicator suggests that a 1.0 per cent increase in average growth

[4]Using M2 as a proxy for financial development

rate of the trade sector raises real GDP growth by about 0.6 per cent to 0.7 per cent across all the four GMM models estimated. The coefficient of financial development variable as proxied by M2 was found to be statistically insignificant. The estimations were also carried out using private sector credit extension as a proxy for financial development and the results are similar (See Table 4(b) in the Appendix).

There is evidence that a faster growing government sector (proxied by government expenditures to GDP ratio) is associated with slower economic growth. A 1.0 per cent increase in the annual growth rate of the government expenditures to GDP ration depressing annual economic growth rate by about 0.46 per cent to 0.56 per cent. Higher inflation is also found to affect economic growth detrimentally, with a 1.0 per cent increase in inflation rate retarding economic growth rate by about 0.19 per cent to 0.21 per cent.There is also evidence of conditional convergence in the region, meaning that poorer countries in the SADC region are likely to grow faster and catch up with richer countries in the region.

Table 5: Dynamic Difference GMM Models[5]

Dependent Variable: GROWTH				
	Model A	Model B	Model C	Model D
GROWTH (-1)	0.01	0.02	0.01	0.03
	(0.11)	*(0.20)*	*(0.05)*	*(0.20)*
Y1	-0.54***	-0.53***	-0.54***	-0.53***
	(-2.96)	*(-2.99)*	*(-2.80)*	*(-2.88)*
INFL	-0.19***	-0.21***	-0.20***	-0.21***
	(-2.66)	*(-2.96)*	*(-2.63)*	*(-2.91)*
GOV	-0.55***	-0.46***	-0.56***	-0.47
	(-3.24)	*(-2.50)*	*(-3.39)*	*(-2.66)*
OPEN	0.72**	0.61***	0.71***	0.60**
	(2.21)	*(2.02)*	*(2.00)*	*(1.83)*
INV	0.22	0.24	0.22	0.25
	(1.12)	*(1.35)*	*(1.05)*	*(1.27)*
M2	0.09	0.08	0.10	0.08
	(0.24)	*(0.21)*	*(0.25)*	*(0.22)*
INST	0.001	-0.003	-0.001	-0.005
	(0.04)	*(-0.09)*	*(-0.02)*	*(-0.15)*
PSE	0.05	0.09		
	(0.11)	*(0.21)*		
POPGR		-0.10		-0.10
		(-0.67)		*(-0.65)*
EL			0.08	0.18
			(0.08)	*(0.20)*
Wald chi-square	85.50	68.40	87.74	74.09
[*P*-value]	[0.00]	[0.00]	[0.00]	[0.00]
# of Obs	303	303	303	303

Note: See note on Table 4.

Contrary to the DIF-GMM results, the SYS-GMM models depict that coefficient for GOV still has the correct sign although not statistically significant. In addition, POPGR and EL are now statistically significant and have the expected signs, meaning that investing in human capital has positive implications on economic growth in the SADC region, as suggested by economic theory. In

[5]Using M2 as proxy for financial development

a similar fashion, PVT was used and the results are more or less the same.

Table 6: Dynamic System-GMM Models[6]

Dependent Variable: GROWTH				
	Model A	Model B	Model C	Model D
Y1	-0.07***	-0.05***	-0.07***	-0.05***
	(-4.58)	*(-3.20)*	*(-4.51)*	*(-3.20)*
INFL	-0.06*	-0.11***	-0.07**	-0.11***
	(-1.73)	*(-2.81)*	*(-1.90)*	*(-2.80)*
GOV	-0.09	-0.11	-0.09	-0.10
	(-0.93)	*(-1.12)*	*(-0.87)*	*(-1.05)*
OPEN	0.06	0.14*	0.07	0.15*
	(0.68)	*(1.65)*	*(0.83)*	*(1.66)*
INV	0.007	0.02	-0.02	-0.0002
	(0.08)	*(0.22)*	*(-0.15)*	*(-0.00)*
M2	0.20	0.16	0.15	0.12
	(0.24)	*(0.67)*	*(0.61)*	*(0.48)*
INST	0.01	0.01	0.01	0.01
	(0.44)	*(0.51)*	*(0.48)*	*(0.52)*
PSE	0.18	0.10		
	(0.59)	*(0.33)*		
POPGR		0.20***		0.18***
		(2.74)		*(2.41)*
EL			1.39***	1.21***
			(2.72)	*(2.33)*
AR (1)	-6.58	-6.82	-6.07	-6.25
[*P*-value]	[0.00]	[0.00]	[0.00]	[0.00]
Sargan Test chi-square	556.36	435.00	427.91	416.98
[*P*-value]	[0.00]	[0.00]	[0.00]	[0.00]
# of Obs	346	346	346	345

Note: See note on Table 4

The second-order serial correlation test developed by Arellano and Bond (1991) depicts that there is no second-order serial correlation present, both in DIF-GMM and SYS-GMM models. In addition, the Sargan (1958) test for over-identification of restrictions was used and the results indicate that the restrictions are not over-indentified and therefore the results are robust and not weakened by many instruments.

4.3 Seemingly Unrelated Regression Estimators (SURE)

When we disaggregate the analysis further and make use of the SUR estimator that takes into account any between-country dependence present in the data, the findings are mixed. Table 6 shows that there is no β-convergence for most of the countries in the CMA region, except Namibia. This implies that countries in the region, except Namibia, are not growing faster enough to catch up with the bigger country, namely, South Africa. Moreover, the salient feature of the results is that spending on physical capital, the high extent of finan-

[6] Using M2 as proxy for financial development

cial development, and faster population growth rate have the expected signs, for most countries in the CMA region. Investment has a positive impact on economic growth for Lesotho, South Africa and Swaziland, meaning that these countries' economic growth depends also to higher spending on physical capital. In Namibia, we observe a positive significant association between inflation and growth. This positive significant association can potentially be interpreted that despite increases in inflation, Namibia still managed to register positive growth rates, although these growth rates may still be below its potential growth rates. Public spending on education and the government spending seems to have depicted expected positive impact on economic growth only in Namibia.

Table 7: SURE Results for CMA

Dependent variable: GROWTH				
	Lesotho	Namibia	South Africa	Swaziland
Y1	0.54	0.34***	1.63	-0.12
INFL	0.72	1.12***	-1.04**	0.25
GOV	0.74	4.09***	-6.96**	-1.01
OPEN	-3.77***	-3.12***	-5.18	0.16
GFCF	1.53***	-1.87***	3.86***	1.79**
M2	3.68***	1.67	8.52**	-1.14
INST	0.26***	-	1.04	-
PSE	-2.48***	10.21***	-11.89***	0.27
POPGR	-2.39***	-2.49***	-1.59	0.65*
Breusch-Pagan test of independence: Chi-Square (6) = 11.9, P-value = 0.0642				

Note: See note on Table 4.

In a nutshell, the results in the SADC region are mixed. There seems to be β-convergence in Angola, Mozambique, Seychelles and Zimbabwe. Inflation is detrimental to economic growth in countries such as Angola, Seychelles, South Africa and Swaziland. In the rest of the other countries, inflation has a positive impact on economic growth. Government spending can both affect economic growth positively or negatively depending on whether such spending is channeled towards productive sectors or not. In a country such as South Africa, government spending has a positive effect on growth, whereas in a country such as Mauritius, the impact is negative. The rest of the findings are self-explanatory. SURE results for SACU and other SADC countries are available in the Appendix 8(a) and 8(b), and as expected, the findings are mixed.

Table 8: SURE Results for Entire SADC Countries

Dependent Variable: GROWTH									
	Y1	INFL	GOV	OPEN	GFCF	M2	INST	PSE	POPGR
AGO	-2.50***	-1.74***	-1.45	15.64***	5.39	-10.76***	7.32***	-39.08***	-12.11***
BWA	0.02	-0.06	-2.68	-1.11	4.17	-0.34	-	-5.26	2.22
DRC	-0.31	0.06	0.62**	1.17***	0.72***	0.44***	0.73***	-0.55	-0.71
LSO	1.31***	0.78***	-0.79	-4.43***	-0.68	3.39***	-	-3.91***	0.80
MDG	-0.44	-0.44	1.01	6.88***	-2.77***	0.19	-	-0.55	-9.70
MWI	1.57***	3.21***	2.29***	-15.45***	6.13***	5.12***	1.48***	7.69***	0.48***
MAU	0.18	-0.15	-8.48***	2.96***	1.87	-9.42***	-	3.07***	0.57***
MOZ	-0.16**	-0.16	-0.43	2.13***	-0.46***	-1.44***	-	1.54***	-0.92***
NAM	-0.06	1.49***	7.51***	-4.94***	0.47	0.03	-	6.95***	-5.41***
SYC	-0.61***	-0.42***	3.02***	-1.78**	4.94***	-8.95***	-	5.64***	-1.24***
SA	-3.25	-4.62**	20.65**	-10.05**	18.53***	40.81***	2.05***	-31.36**	2.04
SWA	0.88***	-12.16***	-15.88***	0.55	14.21***	-18.92***	3.75***	26.11***	14.21***
TZN	0.01	1.31***	5.72***	3.61***	-0.28	-0.50	-	12.44***	-29.68***
ZMB	1.03***	2.66***	-6.95***	-13.74***	9.46***	-3.59***	-0.49***	-10.92***	21.81***
ZWE	-1.08***	2.27***	2.09***	6.02***	-5.50***	1.46	0.72***	-3.25***	6.15***
Breusch-Pagan test of independence: Chi-Square (15) = 33.32, P-value = 0.0042									

Note: AGO-Angola, BWA-Botswana, DRC-Democratic Republic of Congo, LSO-Lesotho, MDG-Madagascar, MAU-Mauritius, MOZ-Mozambique, NAM-Namibia, SYC-Seychelles, SA-South Africa, SWA-Swaziland, TZN-Tanzania, ZMB- Zambia, and ZWE- Zimbabwe. */**/*** denotes significance at 10,5 and 1 per cent levels, respectively. All variables are in logarithms with an exception of INST which ranges from -10 to +10. Variables: INST, *M2*, and *PSE* are I(1) hence they are used in first differences.

5 Conclusion and Policy Recommendations

Several conclusions can be drawn from the empirical results. On the positive side, there is evidence of conditional convergence among the SADC countries, meaning that poorer countries tend to be growing faster and catching up with richer countries in the region. Furthermore, there is evidence that countries that are more open to international trade are likely to experience higher economic growth. The development of the financial sector also significantly promotes countries' growth rates. Human capital is also found to significantly influence economic growth in the region. On the negative side, factors such as inflation, government spending towards unproductive sectors, and political instability are found to retard economic growth in the region. However, caution has to be taken when interpreting these results because the macroeconomic policies and levels of economic development in respective countries are different.

The policymakers need to keep in mind that low inflation in the SADC region is a precondition for economic activity, and also that high inflation affects mostly the welfare of the poor. Therefore, low inflation is not just a necessary condition for economic activity, but also a sufficient condition for macro-economic stability. On the international trade front, policymakers in the SADC region should focus their efforts to ease restrictions on international trade, design strategic trade policies, and intensify efforts in trade negotiations to enable better access for exports. On the human capital front, policymakers in the region should continue to promote education policies (such as Free Primary and Secondary Education) and enhance the quality of the existing human capital stock.

The quality of the evidence presented is, to a certain extent, robust because we avoid using averages and take advantage of panel time-series analysis, which deals with important empirical issues, such as heterogeneity bias in dynamic panels and endogeneity in relatively thin panels. Essentially, this analysis is important because it allows us to specifically study the SADC region.Therefore, the analysis conducted here represents a step forward in terms of achieving insightful estimates, and in improving our knowledge on the subject in Sub-Saharan Africa.

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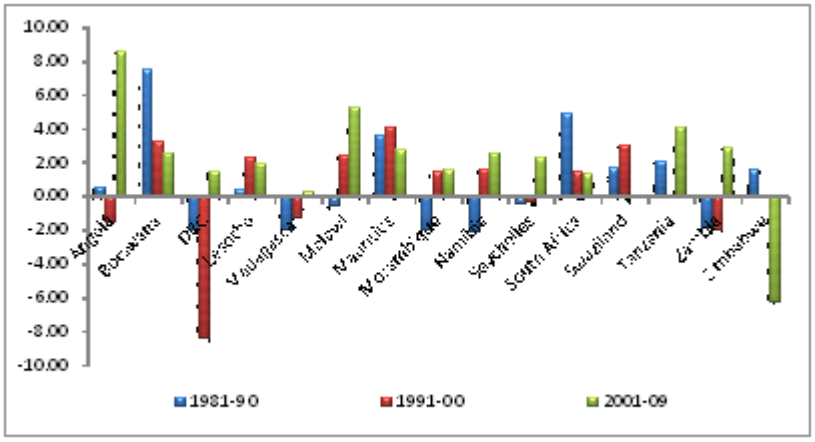
6 Appendix

Appendix 1: GDP per capita growth



Source: IMF 2014

Table 1a: Hausman fixed versus random

	Coefficients			
	(b) fixed	(B) random	(b-B) Difference	Sqrt(diag(V_b-V_b)) S.E.
linfl	-0.1645377	-0.1506016	-0139361	-
lgov	-0.0246287	-0.1190631	0.0944344	0.0528856
lopen	0.509149	0.5485584	-0.0394095	0.0528856
lgfcf	0.1278662	0.1079211	0.019945	-
lpopgr	0.0849156	0.115459	-.0305434	0.0677153

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test Ho: difference in coefficients not systematic
chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 39.07
Prob>chi2 = 0.0000
(V_b-V_B is not positive definite)

Table 4(a): FE Models (using *PVT* as a proxy for financial development)

Dependent Variable: GROWTH				
	Model A	Model B	Model C	Model D
Constant	2.99	2.72	3.01	2.89
	(1.14)	*(1.00)*	*(1.14)*	*(1.05)*
Y1	-0.20*	-0.19*	-0.19*	-0.19*
	(-1.76)	*(-1.62)*	*(-1.73)*	*(-1.62)*
INFL	-0.18***	-0.19***	-0.18***	-0.20***
	(-3.24)	*(-3.50)*	*(-3.21)*	*(-3.48)*
GOV	-0.11	-0.13	-0.12	-0.14
	(-0.56)	*(-0.62)*	*(-0.61)*	*(-0.68)*
OPEN	0.74***	0.79***	0.72***	0.76***
	(4.55)	*(4.75)*	*(4.36)*	*(4.51)*
INV	0.11	0.10	0.11	0.11
	(0.67)	*(0.62)*	*(0.71)*	*(0.68)*
PVT	0.12	0.01	-0.01	-0.03
	(0.12)	*(0.05)*	*(-0.05)*	*(-0.15)*
INST	-0.01	-0.01	-0.01	-0.01
	(-0.50)	*(-0.40)*	*(-0.43)*	*(-0.34)*
PSE	0.10	0.10		
	(0.31)	*(0.32)*		
POPGR		-0.01		-0.03
		(-0.11)		*(-0.25)*
EL			0.66	0.94*
			(1.08)	*(1.70)*
F test	6.34	6.81	6.11	7.18
[*P*-value]	[0.00]	[0.00]	[0.00]	[0.00]
# of Obs	393	390	393	390

*/**/*** denotes significance at 10,5 and 1 per cent levels, respectively. All variables are in logarithms with an exception of INST which ranges from -10 to +10. Variables: *INST, M2, PVT, LEI,* and *PSE* are I(1) hence they are used in first differences across the models.T-ratios are in italics and in parenthesis.

Table 4(b): Dynamic Difference GMM Models (using *PVT* as a proxy for financial development)

Dependent Variable: GROWTH				
	Model A	Model B	Model C	Model D
GROWTH (-1)	0.02	0.02	0.02	0.02
	(0.16)	*(0.24)*	*(0.18)*	*(0.25)*
Y1	-0.53***	-0.53***	-0.53***	-0.53***
	(-2.82)	*(-2.92)*	*(-2.66)*	*(-2.78)*
INFL	-0.21***	-0.21***	-0.21***	-0.21***
	(-3.03)	*(-3.30)*	*(-3.01)*	*(-3.03)*
GOV	-0.59***	-0.49***	-0.59***	-0.51
	(-3.25)	*(-2.51)*	*(-3.34)*	*(-2.63)*
OPEN	0.73**	0.63***	0.73***	0.63**
	(2.29)	*(2.13)*	*(2.03)*	*(1.91)*
INV	0.22	0.25	0.22	0.24
	(1.13)	*(1.34)*	*(1.06)*	*(1.26)*
PVT	-0.07	-0.05	-0.06	-0.06
	(-0.56)	*(-0.48)*	*(-0.49)*	*(0.45)*
INST	0.006	0.001	0.0004	-0.003
	(0.17)	*(0.03)*	*(0.01)*	*(-0.08)*
PSE	-0.002	0.06		
	(0.00)	*(0.12)*		
POPGR		-0.09		-0.09
		(-0.62)		*(-0.59)*
EL			0.10	0.19
			(0.11)	*(0.22)*
Wald chi-square	64.85	64.57	51.37	42.70
[*P*-value]	[0.00]	[0.00]	[0.00]	[0.00]
# of Obs	303	303	303	303

*/**/*** denotes significance at 10,5 and 1 per cent levels, respectively. All variables are in logarithms with an exception of INST which ranges from -10 to +10. Variables: *INST, M2, PVT, LEI,* and *PSE* are I(1) hence they are used in first differences across the models.T-ratios are in italics and in parenthesis.

Table 8(a): SURE results for SACU

Dependent variable: GROWTH					
	Botswana	Lesotho	Namibia	South Africa	Swaziland
Y1	-0.33	0.62**	0.33***	1.75**	-0.12
INFL	-1.15***	0.60	1.07***	-1.15***	0.22
GOV	0.93	0.57	4.07***	-7.41**	-0.91
OPEN	0.24	3.98***	-3.104***	-5.78**	0.13
GFCF	2.31***	1.54***	-1.87***	4.47 ***	1.77**
M2	-0.24	3.55***	1.55	8.34***	-1.16
INST	-0.31	-0.25***	-	1.27	-
PSE	-5.68	-2.59***	10.07***	12.71***	0.42
POPGR	0.21	-2.34***	-2.47***	-1.65	0.66**
Breusch-Pagan test of independence: chi-square (10) = 14.316, P-value = 0.0491					

*/**/*** denotes significance at 10,5 and 1 per cent levels, respectively. All variables are in logarithms with an exception of INST which ranges from -10 to +10. Variables: INST, *M2* and *PSE* are I(1) hence they are used in first differences.