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GROWTH AND MACROECONOMIC CONVERGENCE IN SOUTHERN AFRICA

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Abstract

This paper investigates convergence in real per capita GDP and macroeconomic policy and stability indicators within the Southern African Development Community (SADC). Empirical tests for the period 1992-2009 showed no evidence of absolute beta and sigma convergence in real per capita GDP among the SADC economies. Although, absence of convergence does not necessarily imply lack of economic growth, further empirical assessment of possible conditional beta convergence did not reveal any tendency of convergence to own steady states. On an individual level, however, ADF unit root test indicated that Botswana and South Africa's real per capita GDP converged to a common stochastic trend while the rest were characterized by a boundless drift.

With regard to the SADC macroeconomic convergence goals set for 2012, the findings indicate that most of the economies of the member states have shown a tendency of macroeconomic divergence in 2009 in monetary policy, fiscal policy, and foreign exchange reserve ratios. Since member countries are at varied levels of economic development, the goals themselves must be conditional on the level of convergence in economic structure and hence macroeconomic convergence may not be attainable. Furthermore, achieving the targets may be neither necessary nor sufficient to achieve good macroeconomic outcomes.

1. Introduction

This paper describes real per capita income and macroeconomic convergence in Southern African Development Community (SADC). SADC is one of the 9 regional economic communities (RECs) in Africa and currently includes 15 member states[i] (see end note) with total population of about 257.7 million and Gross Domestic Product of US$471.1 billion in 2009.

Convergence of economic growth and per capita incomes among nations has been a central theme in neoclassical growth theory and vast economic literature related to it for decades. Thus, traditionally, the analysis of convergence involved an analysis of whether poor countries are set on a convergence path, i.e. whether their real per capita incomes will eventually catch up with those of rich countries. However, since recent decades, increased emphasis on development strategies based on regional economic integration required strengthening of macroeconomic policy credibility, effectiveness and stability, leading to formulation of specific goal of macroeconomic convergence among the regional economic groupings.

The goal of macroeconomic policy convergence is typically defined with reference to price stability and to budget deficit consistent with debt-to-GDP ratios where the price stability allows to limit the distortionary effects of inflation (Tirelli, 2010). Presently, most RECs in Africa are characterized by significant differences in tariffs, inflation rates, exchange rates, debt-to-GDP ratios, monetary growth, lack of deepening of financial markets and institutions and other vital macroeconomic indicators required to foster economic integration. Weak macroeconomic and financial environments hinder deeper economic integration.

SADC has launched a number of initiatives in order to move towards economic integration in the sub-region. The community pursues a linear model of economic integration commencing with loose cooperation with successive deeper integration at later stages. The first major step in SADC economic integration involved the introduction of Free Trade Area in August 2008. This was to be followed by the Customs Union in 2010[ii], Common Market in 2015, Monetary Union in 2016 and single currency in 2018.

In order to deepen economic integration, in its Regional Indicative Strategic Development Plan (RISDP) launched in August 2004, SADC formulated a macroeconomic convergence framework based on four key macroeconomic indicators[iii]: The rate of inflation, the ratio of the budget deficit to GDP, the ratio of public and publicly guaranteed debt to GDP, taking account of the sustainability of such debt, and the balance and the structure of the current account. The macroeconomic convergence indicators were set for 2008, 2012, 2015 and 2018, with more challenging goals established for the later periods.

Macroeconomic stability indicators and policy convergence is not an end in itself; instead it is a strategy to promote deeper integration. Successful economic integration, by facilitating trade links and technological spillovers across borders, should generate convergence to similar per capita income and growth path among the member economies in the long run. Thus, macroeconomic policy strategies should be designed conditional on the actual degree of convergence in the economic structure (Tirelli, 2010). The analysis of the macroeconomic convergence should therefore serve as a signal of the degree of success of integration promotion strategy.

Economists have put increased emphasis on the analyses of the economic convergence hypotheses since the 1980s for four main reasons (Sala-I-Martin, 1995; Charles et al. 2009). First, the exercise helps to assess the validity of the alternative economic growth theories. The neoclassical (exogenous) growth model predicts that real per capita income converges to each country's steady state or common steady state, regardless of its initial level. Moreover, estimates of the speed of convergence across economies were thought to provide information on one of the key parameters of growth theory: the share of capital in production function. On the other hand, the endogenous growth theory, by emphasizing differences among countries in their initial endowments and the possibility of multiple equilibria, shows that there is no tendency for the income level to converge in the long run. Second and more importantly, the availability of comparable GDP data on large number of countries since mid 1980s allowed empirical economists to compare GDP figures across these countries and look at the evolution of these levels over time, a necessary feature for the study of convergence hypothesis.

Third, whether or not the neoclassical or endogenous growth model is validated, there is a potential for state intervention in the economic growth process, either in the form of regional economic groupings or national priorities. And finally, empirical evidences show that there were strong differences among countries in real per capita income and economic growth across countries during the past three decades particularly between the African economies and the emerging Asian economies. Investigating regional variations in economic performance has therefore become increasingly important in recent decades.

A number of studies have been conducted on macroeconomic convergence in SADC (Harvey, 2000; McCarthy and Du Plessis, 2001; SADC-CCBG[iv], 2002; Rossouw, 2006; Burgess, 2009; Zyuulu, 2009). While most of the studies attempt to assess the performance of the overall macroeconomic convergence targets, McCarthy and Du Plessis (2001); and SADC-CCBG[v] (2002) emphasize three distinct concepts of convergence: the long run economic convergence or "catch up"-growth, reflecting convergence in real income across countries or regions; convergence in indicators of macroeconomic stability (also referred to as macroeconomic convergence); and convergence in macroeconomic policy or the harmonisation of macroeconomic policies. This paper treats the latter two concepts of convergence as synonymous because convergence in two key indicators of macroeconomic stability, inflation and fiscal balance, simultaneously reflects convergence in or harmonization of monetary and fiscal policies, respectively. Therefore, in this paper we use the concept of convergence of indicators of macroeconomic stability and macroeconomic policy convergence interchangeably where the term macroeconomic convergence is used to emphasize convergence in both macroeconomic stability and policy indicators.

While both types of convergence are necessary, convergence in real income or "catch up"- growth remains to be at the centre of the regional integration arrangement. First, economic convergence should be achieved around a higher level of economic growth, which implies that SADC as a whole needs to grow faster so that it can in the long run catch up economically with the developed countries as a result of dynamic consequences of regional integration. Secondly, there exists inequality in SADC, with countries like Mauritius, Botswana, and South Africa far ahead of the rest in per capita income. Furthermore, South Africa dominates the region in terms of economic size and economic diversification. This regional inequality will require SADC to converge on the regional average per capita income (SADC-CCGB, 2002).

Therefore, this paper investigates two aspects of intra-regional convergence among the economies of the SADC member states for the period 1992-2009. The first concerns convergence among the economies of SADC member states to the regional average per capita income, i.e. "catch up"-growth within the regional block while the second involves investigation of macroeconomic convergence needed to foster deeper economic integration.

The remaining part of the paper is organized as follows: section 2 describes the theories of economic convergence. Section 3 conducts an econometric analysis of Real GDP per capita convergence in the sub region based on three concepts of convergence: beta convergence, sigma convergence and common stochastic trends. Section 4 scrutinizes the progress of macroeconomic convergence in relation to the goals set for 2008, 2012, 2015 and 2018, with comparative analysis of monetary policy convergence trends among the SADC and CMA economies, while section 5 concludes the paper.

2. Theoretical Framework

Two broad concepts of convergence[vi] can be discerned, namely beta convergence and sigma convergence. The former relates to convergence of per capita income through the "catch up"-growth process while the latter signifies the convergence of cross-sectional dispersion of per capita income (Barro and Sala-i-Martin, 1995). The primary definition of convergence used in the modern growth literatures is based on the relationship between initial income and subsequent growth. Two countries exhibit convergence if the poorer country with lower initial income grows faster than the other (β-convergence). Absolute convergence happens if countries' per capita income converges to a steady state value. Conditional convergence, on the other hand, allows each country to have a different level of per capita income towards which it is converging. This implies that each country is converging to its own steady state and that in the long run all the growth rates will be equalized. Absolute convergence implies a tendency towards the equalization of per capita incomes, i.e. "catch up" growth.

The convergence debate centers around two influential growth models: the Solow-Swan neoclassical exogenous growth model and the most recent endogenous growth theory. According to the neoclassical theory, an economy converges towards steady state, in which output is constant and growth rate is zero, due to diminishing returns to investment in physical capital. Along the economy's transition to steady state, growth rate is inversely proportional to the capital-labour ratio, i.e. the lower the initial capital-labour ratio, the higher the growth rate will be. Thus countries with lower initial capital per capita tend to grow faster compared to those with higher initial capital per capita. In other words, if capital exhibits diminishing returns, an economy with lower capital-labor ratio exhibits a higher marginal product of capital and thus, grows faster compared to a similar economy with a higher capital-labor ratio where the differences across countries will tend to fade out over time, with per capita income and its growth rate gradually converging until reaching an identical long-run equilibrium level for both countries, respectively. This refers to the absolute or unconditional convergence hypothesis of the Solow-Swan growth model.

Nevertheless, many empirical studies have failed to find any significant correlation between the initial level of GDP per capita and GDP growth rates among a number of countries. The unsuccessful attempts to obtain unconditional convergence among economies stems from the most

important assumption of the neoclassical growth model that the long term growth is solely determined by the rate of technological change, which is considered to be exogenous and that countries are similar in all other respects except their per capita physical and human capital (Varblane and Vahter, 2005).

In reality countries are heterogonous in terms of factors relevant for growth and that their steady growth patterns can also be different. If we consider that the Solow growth model is based on Cobb-Douglas type of production function with constant returns to scale,

$$Y_t = K_t{}^{\alpha}(A_t L_t)^{1-\alpha} \qquad\qquad (1)$$

Where Y= output, K = capital, L = labour , A = Total Factor Productivity,

The steady state level of per capita income y* is given by:

$$y* = A_0 e^{gt}[(s/(n + g + \delta))]^{\alpha/1-\alpha} \qquad\qquad (2)$$

where s is the investment rate, δ is consumption of fixed capital, n and g are exponential growth rates of A_t and L_t respectively (Islam, 2003).

The model states that a country's steady state growth levels depend on a number of factors: A_0, s, n, g, δ, and α. Unconditional convergence occurs when all these factors are the same for all countries. This may occur in countries at similar initial levels of income and with similar economic, political and social structures leading to σ-convergence or club-convergence (Varblane and Vahter, 2005). In this paper, one of our methodological approaches is to test the validity of this hypothesis for SADC economies.

The neoclassical growth model also predicts that due to differences in factors determining economic growth path in different countries, an economy is likely to exhibit both a high initial income and a fast growth simply because its current income is much lower than its steady state income. For instance, higher values for technological change in the steady state equation tend to generate high steady state capital-labour ratio and income. When economies tend to converge faster to their own steady state, the further they are away from it, this process is referred to as conditional convergence.

Since mid 1980s, however, the alternative endogenous growth theory considered technology as endogenous growth factor that is subject to decision making process at individual firm level. As opposed to the assumption of diminishing returns by the exogenous growth model, the endogenous growth model states that the knowledge spillovers produce increasing returns to scale to capital accumulation and hence economic integration will produce increasing scale effects thereby fostering long term growth. The endogenous growth theory emphasizes variety of factors as essential components of growth including capital and knowledge accumulation, accumulation of human capital, social capability including human capital, infrastructure and institutional settings (Varblane and Vahter, 2005).

Other proponents of endogenous growth theory argue that since research and development and human capital accumulation are engines of growth, these could cause growing inequality among countries instead of convergence on global scene as poor countries have much less resources to invest in these areas (Romer, 1986).

Empirical evidence shows that whether the hypotheses of the previous growth models are valid or not, growth paths are influenced by state interventions of one or another form. One of such measures involves, among others, creating conducive macroeconomic climate to foster deeper regional economic integration. In this regard, member states of regional economic blocks are required to follow policies that are consistent with the objectives of macroeconomic convergence. Zyuulu (2009) argues that it often makes sense for countries to coordinate their economic policies to generate benefits that are not possible otherwise. He reiterates further that economic benefits may accrue to countries that coordinate tariff, fiscal and monetary policies, and liberalize labour and capital movements instead of attempting to secure short term advantages by setting own optimal policy targets. Furthermore, Viner (1950) in his Customs Union Issue emphasized the trade creation and trade diversion roles of regional economic integration while Balassa (1961) in his Theory of Economic Integration, reiterated that regional markets, with their free movement of economic factors across national borders, naturally generate demand for further economic integration, and economic unions ultimately lead to political unions.

However, macroeconomic policy harmonization must be conditional up on the level of actual structural convergence in the economy, i.e. the level of convergence of per capita income and economic growth across economies. This is the concern of the following section.

3. Real Per Capita GDP Convergence

3.1 Methodological Issues

Different methodologies have been used to test the convergence hypothesis. In line with Baumol (1986) and Baro and Sala-i-Martin (1992, 1995) the bulk of the tests of convergence hypothesis have involved fitting cross-country regressions. A negative correlation between growth rates and the initial per capita income in these regressions implies absolute convergence. Using the property of time series, as well as the combined time series and cross-section data, others propose the use of either time series unit root tests or panel unit root tests to investigate the convergence hypothesis (Charles et al. 2009).

Following Sala-i-Martin (1995), we specify the following regression equation to measure absolute β-convergence among the SADC economies.

$$G_{i,t;t+T} = \alpha - \beta \log(y_{i,t}) + u_{i,t} \qquad\qquad (3)$$

where

$G_{i,t;t+T} = \log\left(\frac{y_{i,t+T}}{y_{i,t}}\right)/T$ is economy i's growth rate of GDP between t and t+T and $log(y_{i,t})$ is the logarithm of economy i's real GDP per capita at time t, and $u_{i,t}$ is an error term for country i at time t. The data exhibits absolute β-convergence if β > 0 in equation (3) above so that the regression line between economic growth and the initial per capita income remains downward sloping.

The σ-convergence occurs when the dispersion of real per capita GDP levels among different economies tend to decrease over time. In other words, economies are said to be σ-converging if

$$\sigma_{t+T} < \sigma_t \qquad\qquad\qquad\qquad (4)$$

We use equations (3) and (4) to estimate real GDP per capita convergence in SADC member countries since the establishment of the development community in 1992. Convergence in real per capita income should be considered as a goal of the sub region because of the current huge disparities in per capita income levels between the poorer and richer members of the development community.

The concepts of σ-convergence and absolute β-convergence are related. From the sample variance of $log(y_{i,t})$ it can be seen that the relationship between σ_{t+T} and σ_t depend on β. In other words, if the GDP levels of two economies become more similar over time it means that the poorer economy has been growing faster than the richer one (Sala-i-Martin, 1995). A typical example is the Chinese economic growth since 1980. China started as a poorer country compared to Japan and Germany in 1980. However, due to its accelerated economic growth during the past three decades, its GDP level have become similar to that of Japan and Germany and in mid 2010 China overtook both Germany and Japan as the second largest economy in the world after the United States of America. Although China's real GDP per capita is still smaller than those of Japan and Germany, its economy converged in terms of absolute income. This resembles the case β-convergence leading to σ-convergence. We may therefore state that β-convergence is a necessary condition for the existence of σ-convergence, but it is not sufficient. This is because, if the growth rate in the former poorer country is so large compared to the former richer economy, then the dispersion between the per capita GDP levels of the two countries could remain unchanged in spite of β-convergence implying that the former poorer country is now much more richer. However, in real world data such theoretical distinctions between the two concepts are often not important. The concept of absolute convergence is unreliable if countries being analyzed are at varied levels of development. But for countries in the same region and at similar levels of economic and institutional development, the hypothesis of absolute convergence holds. In SADC, with the exception of countries such as South Africa, Mauritius and Botswana, the rest of the member states are at similar levels of economic and institutional development. Therefore, one would expect the presence of β and σ club convergence in the sub region. If this occurs, we may conclude that the less developed SADC member states are "catching up" with the more developed economies in the sub region. The hypothesis to be tested therefore is economic growth in poorer SADC member states was faster than their more advanced peers during the 1992-2009 period (i.e. β < 0 and significant).

3.2 The Data

The data used in the analysis was obtained from the IMF World Economic Outlook Database April 2010 and the World Bank Key Development Indicators 2010. The analysis of both unconditional β-convergence and σ-convergence covers all 15 SADC member states except Zimbabwe. The latter was excluded due to lack of data. The real GDP growth rate (G_i) represents annual average real GDP growth rate between 1992 and 2009 for each country. Real GDP per capita (y_i) refers to the 1992 real per capita GDP for each member state under consideration leading to a cross sectional sample of 14 observations.

For the analysis of σ-convergence, we used a cross section of 8 X14 observations for selected years between 1992 and 2009 (see Table 2) containing real GDP per capita (y_i). In this section, we

employed two variants of real GDP figures for the whole of the SADC region: real per capita GDP at exchange rate and per capita GDP at purchasing power parity (PPP), while for the Common Monetary Area (CMA) countries only the former version of real GDP figures were used.

The data for the section dealing with the conditional beta convergence was obtained from the World Bank Key Development Indicators 2010. GDP per capita (GDPPC) is at constant 2000 prices. GDP growth (GDP Grth) refers to real average annual GDP growth rate for the period 1992-2009. Gross fixed capital formation (GFKF) is expressed as a ratio of GDP. Savings refers to gross domestic savings and is expressed as a percentage of GDP while Trade is also expressed as a percent of GDP. Pop Grth refers to the annual population growth rate.

In the section dealing with the common stochastic trend, we generated a new data series containing the time series of the deviation of real per capita income from the average regional real per capita income (Y_i-Y_B) for each of 12 SADC member states selected for the period 1992-2009.

3.3 Empirical Analysis

3.3.1 Econometric Modeling of Unconditional β-convergence in SADC

We used equation (3) to model unconditional β-convergence in SADC member states. Using data on real GDP growth rates and per capita income from the IMF World Economic Outlook Database April 2010, we calculated growth rates for each member states for the period 1992-2009 obtaining a cross section of 14 observations for the stated time period. This growth rate was used as a dependent variable in equation (3). Our explanatory variable is the log of per capita income in 1992 for the 14 member states. The model was estimated using Ordinary Least Squares (OLS) technique. The estimation results are presented in table 1 below.

Although the coefficient for the initial real per capita GDP, i.e. Real per capita GDP 1992, for the 14 SADC member states has a correct negative sign implying that the real GDP growth and initial level of per capita income are possibly negatively correlated, which is desirable for economic convergence, the coefficient is found to be insignificant at any level. As table 1 indicates β = -0.0824154 (S.E. = 0.1400) implying that there is no unconditional β-convergence among the SADC economies for the period 1992-2009. Poorer economies in the sub region have not grown fast enough to catch up with the most advanced economies in the sub region. Therefore, inequalities in the per capita income levels did not shrink among the member states and the hypothesis of club convergence does not hold in the SADC region.

Table 1: Unconditional β-convergence in SADC, 1992-2009

Dependent variable: Real GDP growth 2009/1992

*Number of observations: A cross section of 14* observations

Model	Coefficient	Std.Error	t-value	t-prob
Constant	1.94310	1.150	1.69	0.117
Real per capita GDP1992	-0.0824154	0.1400	-0.589	0.567

sigma = 0.507804	R^2 =	0.0280566	
F(1,12) = 0.3464 [0.567]	DW statistic =	1.65	

Source: Own estimation

However, it is important to note few exceptions. Botswana's economy has shown remarkable performance since independence in 1966. After three decades of high and sustained growth in real per capita income Botswana graduated into middle income country in 1997, catching up with South Africa and other middle income economies in the sub region. Currently, Botswana is classified as upper middle income economy. Seychelles, Mauritius, and Namibia have also achieved better growth performance and consequently achieved Upper Middle Income country status in the sub region; however, many of them still face major development challenges such as high unemployment, slow growth, low integration into the global economy and vulnerability to external shocks. The rest of SADC member states have failed to catch up after 18 years of SADC commitment for greater economic integration.

Nevertheless, as figure 4 indicates, in spite of the sharp decline in economic growth in all SADC member states since 2008 following the recent global financial and economic crises, low income countries such as Angola are the fastest growing economies in the sub region at present and will hopefully catch up with the rest of middle income economies very soon. The biggest challenge is for low income economies such as DRC which are currently at the bottom in the sub region in terms of the size of per capita income. These countries need to double their current economic growth to catch up with the more developed economies of the region in the foreseeable future.

Figure 1: Real GDP growth rates in SADC 1990-2009, percentage changes
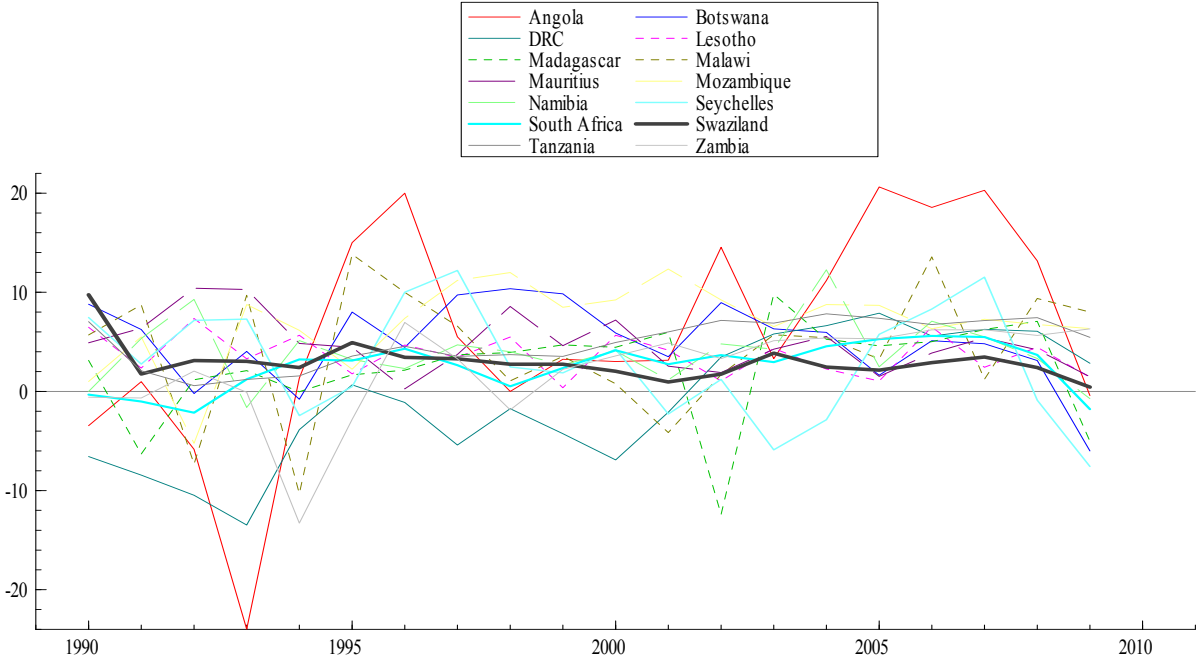
Source: Own Analysis

Economic growth in Common Monetary Area (CMA) countries showed some tendency of moving towards the South African level during 1994-2002, as shown by mean reversion in growth rates during the stated period, but remained increasingly volatile and divergent after 2002 until the onset of the global recession in 2008 where growth plunged in all countries. Common monetary policy did not guarantee sustained economic growth convergence in the CMA countries (See figure 2).

Figure 2: Real GDP growth in CMA countries in Southern Africa, percentage changes
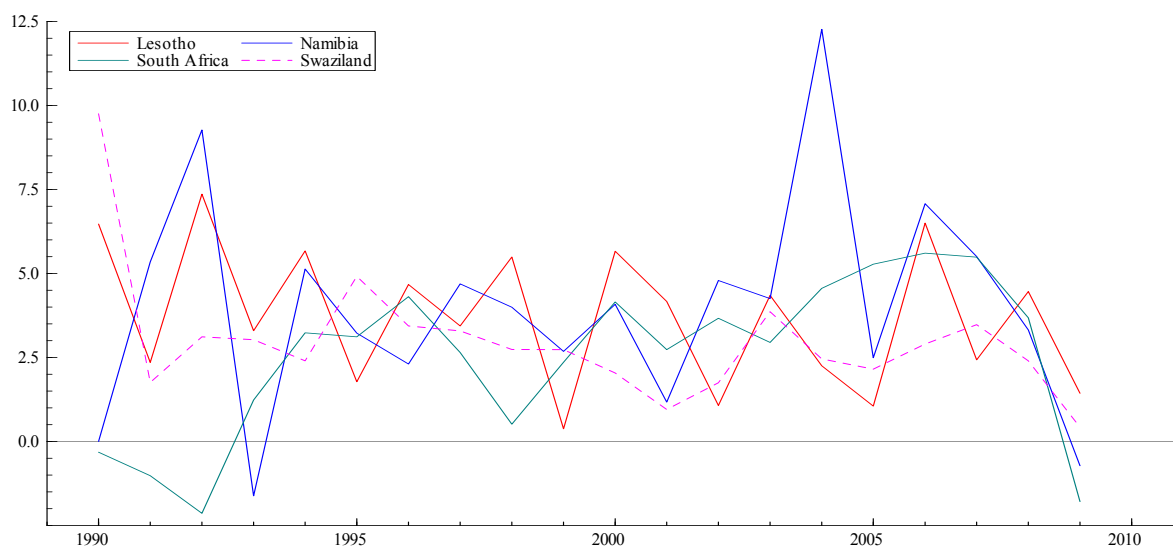
Source: Own Analysis

Divergences in CMA economic growth after 2002 were not accompanied by higher growth by poorer economies. Except Namibia, the growth in less developed CMA economies was mostly below that of the most developed economy in the sub region, South Africa, indicating the failure to catch up.

3.3.2 Sigma (σ)-convergence in SADC and CMA countries

To capture possible convergence in levels of real income in SADC member states, we computed standard deviations (σ) of real GDP per capita for the 14 member states for the period 1992-2009. The computed standard deviations of log real GDP per capita in 2009 was clearly greater than the dispersion in the initial level of real income in 1992 (see table 2).

SADC countries excluding Zimbabwe showed no σ-convergence between 1992 and 2009. The dispersion has instead increased from 1.0058 in 1992 to 1.8314 in 2009. We also used per capita GDP measured by purchasing power parity (PPP) for the purpose of comparison. Although dispersions in GDP per capita among the countries are lower when the PPP measures were used, the per capita GDP did not show any convergence under this approach either. This implies that the disparity in real income levels across SADC economies have indeed increased during this period. The same countries which were richer 18 years ago are richer today and the same countries which were poorer are poorer today. However, absence of sigma convergence does not necessarily mean the economies of these countries did not show any economic growth. For instance, Tirelli (2010) argues that we may not observe sigma convergence, if countries are converging to different steady states which are more dispersed than initial conditions, even if there is conditional beta convergence.

We attempted to assess the presence of club real GDP per capita convergence among CMA countries within SADC free trade area. Although the dispersion in real GDP per capita among the CMA countries is much lower compared to the dispersions in SADC per capita GDP, the income levels did not show any convergence during the stated period. Instead the dispersion increased from 0.3892 in 1992 to 0.3955 in 2009 (see table 2). The CMA is chosen to test the club convergence hypothesis to examine whether the monetary policy convergence in the four CMA member states ensures convergence in real per capita income. The result indicates that monetary policy convergence is not a sufficient condition for economic growth convergence.

Table 2: Sigma (σ) convergence in SADC and CMA countries 1992-2009

Year	σ convergence		
	SADC		CMA
	Real per capita GDP (Exchange rate)	Per capita GDP (PPP)	Real per capita GDP[§] (Exchange rate)
1992	1.0058	1.2229	0.3892
1996	1.6220	1.2620	0.3954
2000	1.4540	1.3186	0.4079
2001	1.6509	1.3184	0.4041
2003	1.8591	1.3192	0.4176
2005	1.9332	1.3201	0.4379
2007	1.8895	1.3370	0.4422
2009	1.8314	1.3016	0.3955

Source: Own computations with data from IMF World Economic Outlook Database, April 2010

§CMA countries include South Africa, Namibia, Swaziland and Lesotho. Namibia joined the group after independence in 1990. Hence convergence analysis after 1992 is more appropriate for this group.

Although the two concepts of convergence do not always show up together, in this case they did. Both measures of convergence show that there was neither economic growth nor real per capita income convergence in SADC free trade area during the 18 years period under investigation. Therefore, in SADC not only the cross country distribution of income did not shrink there was no mobility of different economies within the given distribution of the sub regional income.

The preceding results are in line with the previous global empirical evidence. Several studies suggest that GDP levels across the world economies have not converged over time contradicting the neoclassical growth model based on Cobb Douglas production function that predicts convergence. The predictions of this growth model are based on the crucial assumption that the only difference between countries is their initial level of capital stock.

However, countries differ not only in their initial level of capital stock, but in level of human capital, technology, savings, institutions and tastes. Accordingly, each country has its own steady state growth path. Absolute economic convergence holds only when these growth factors are the same across the economies, or when the steady state is held constant.   Some economists, therefore, model convergence conditional on other factors in addition to the initial level of GDP per capita, such as (1) the gross fixed capital formation, (2) the share of population with upper secondary education, (3) the share of labour force with upper secondary education, (4) openness of the economy measured by the ratio of export to GDP, (5) the inflation rate and so on. The convergence measure obtained using these control variables is known commonly as conditional β-convergence. This will be the concern of the next section.

3.3.3 Modelling conditional β-convergence in SADC

The Solow (1956) neoclassical model of growth predicts that an economy's growth rate is positively correlated with the distance that separates it from its own steady state. In other words, the model predicts β-convergence conditional on a number of other factors in addition to the initial GDP per capita. To test the neoclassical hypothesis of conditional β-convergence in SADC, we employ an extension of equation (3) with the inclusion of some control variables as well as individual and time specific effects:

$$G_{i,t;t+T} = \alpha - \beta \log(y_{i,t}) + \theta X_{i,t} + \eta_t + \lambda_i + \mathcal{E}_{i,t} \qquad (5)$$

Where, $X_{i,t}$ is the vector of control variables that make it possible to hold constant the steady state of the economy. These variables include Savings, POP Grth, Trade, and GFKF. The trade variable is included to measure the openness of the economy and is expressed as the ratio of total trade to GDP; (detailed description of the variables used is provided in section 3.2) while η_t and λ_i refer to time specific and individual effects respectively, and $\mathcal{E}_{i,t}$ refers to serially uncorrelated disturbance terms.

If the estimated β in equation (5) is positive and significant then, the data exhibits conditional β convergence. We used a balanced panel data with N =198 for 11 SADC member states. Madagascar, Seychelles, Zambia and Zimbabwe were excluded for lack of consistent panel observations for the period under consideration. The estimation result is reported in Table 3 below:

Table 3: Conditional β-convergence in SADC, 1992-2009

Dependent variable: Real GDP growth

Number of observations (N) = 198 (balanced panel)

Model	Coefficient	Std.Error	t-value	t-prob
lnGDPPC	-0.642773	0.4434	-1.45	0.149
Savings	0.0192426	0.007920	2.43	0.016
Pop Grth	-0.0234204	0.02589	-0.905	0.367
GFKF	0.0122432	0.007380	1.66	0.099
Trade	-0.00603376	0.003687	-1.64	0.104
Constant	5.43570	3.005	1.81	0.072
T1995	0.531059	0.2902	1.83	0.069
T1996	0.680200	0.2984	2.28	0.024
T1997	0.747342	0.2896	2.58	0.011
T1998	0.641071	0.2887	2.22	0.028
T2000	0.553791	0.2957	1.87	0.063
T2002	0.703528	0.3006	2.34	0.020
T2003	0.934680	0.2986	3.13	0.002
T2004	1.15565	0.3020	3.83	0.000
T2005	0.710941	0.3053	2.33	0.021
T2006	1.28266	0.3109	4.13	0.000
T2007	1.20143	0.3194	3.76	0.000
T2008	1.17633	0.3228	3.64	0.000
I2	-2.33040	0.9997	-2.33	0.021
I4	-1.37893	0.8277	-1.67	0.098

sigma	0.6710268	sigma^2		0.4502769
R^2	0.4147812			
RSS	74.295689635	TSS		126.95368517

Table 4: Diagnostic Tests

Wald (joint):   Chi^2(5) =   15.06 [0.010] *

Wald (dummy):   Chi^2(28) =   119.4 [0.000] **

Wald (time):   Chi^2(17) =   47.33 [0.000] **

AR(1) test: N(0,1) =   0.5848 [0.559]

AR(2) test: N(0,1) =   0.8877 [0.375]

Source: Own estimation

The panel data was estimated using the Generalized Least Squares (GLS) utilizing the OLS residuals. Only significant individual and time dummies are reported in the table. The estimation result does not support the hypothesis of conditional β-convergence in SADC during the period under consideration. Thus there is no evidence that countries in the region have exhibited convergence to their own steady growth path since the adoption of regional integration agenda in 1992. Lower savings rates, lower fixed investment and declining population growth in some member states may have contributed to lack of momentum in economic growth in the region during this period.

The estimated model is robust. The Wald joint significant test, the test for time and individual dummies are significant at 5% and 1% respectively. The findings of this paper are in line with the results of the previous studies on economies with similar characteristics. A previous study conducted for COMESA using similar control variables to test for conditional β convergence did not observe any tendency by the economies of the region to converge towards their own steady states.

The endogenous growth model states that because of differences in growth factors and endowments there may not be convergence in income levels. With regard to this, two lines of argument have been forwarded by proponents of endogenous growth theory. First, since research and development (R&D) and human capital creation are the most important engines of growth, as poor countries invest less in these due to lack of resources they clearly lag behind in economic growth leading to more divergences in global income levels. Secondly, even if they have resources to invest in them in order to make use of new technologies these countries need not only technological absorption capability but also the social capability which includes human capital as well as infrastructure and institutional settings.

3.3.4 Convergence to a Common Stochastic Trend

In previous sections we attempted to test convergence in real per capita income on the basis of the negative cross-section correlation between initial income and growth as well as the dispersion in income levels across economies between the initial and the current period. However, convergence can also be tested by directly examining the time series properties of various income series where convergence is analyzed as a dynamic stochastic process. This involves the use of either time series unit root or panel unit root tests for stationarity or test for cointegration of various macroeconomic time series across economies.

Convergence between two series requires that their difference cannot be characterized by a boundless drift. If variables are non-stationary, this statement implies that two series converge when they share a common stochastic trend. This, in turn, means that there is convergence if the difference between the GDP of two countries evolves towards a stationary process (Carmignani, 2006). In other words, if a linear combination of two nonstationary time series is stationary, then the series are cointegrated of first order or follow an I(1) process. Likewise if there is a common stochastic trend in a time series, then the series is cointegrated and vice versa.

In line with Tirelli (2010) the implementation of the econometric tests associated with this notion of income convergence is based on the following equation

$$(ln\ Y_{i;t} - ln\ Y_{B,t}) = \theta\ (ln\ Y_{i;t-1} - ln\ Y_{B,t-1}) + \varepsilon_t \tag{6}$$

where Y_B denotes the benchmark per capita income level, which in our case would be measured by the regional average real per capita income; $Y_{i;t}$ real per capita income of country i at time period t, and ε_t is a covariance stationary random error term. Let $x_t = lnY_{i,t} - lnY_{B,t}$ then equation (6) can be expressed as an autoregressive (AR) (p), process, $x_t = \theta x_{t-1} + \varepsilon_t$, where p= 1 and the convergence test amounts to a unit root test on, x_{t-1}, i.e. ($\theta = 0$). We perform the Augmented Dickey-Fuller (ADF)[vii] unit root test based on the following equation

$$\Delta x_t = \mu + \beta t + \theta x_{t-1} + \sum_{i=1}^{n} \alpha_i \Delta x_{ti} + \varepsilon_t \tag{7}$$

Where μ is a drift, β is a trend coefficient and α is the coefficient of augmented lagged differences in per capita income deviation entered to ensure serially uncorrelated residuals. We conducted ADF test using equation (7) on the log of real per capita income deviation series for 12 SADC economies. Angola, DRC and Zimbabwe were excluded because the time series data were unreliable and could lead to biased benchmark per capita income. The result is reported in table 5 below.

Table 5: Unit root test for log of real per capita GDP deviations from the regional average in 12 SADC member states in levels, with a constant and trend, 1992-2009

Member State	ADF t-statistics	t-value, constant	t-value, trend	ADF-critical value 95% CI**	Null hypothesis: Unit root
Botswana	-3.844*	3.634	3.004	-3.735	Rejected
Lesotho	-1.849	1.777	-1.214	-3.735	Not rejected
Madagascar	-3.318	-0.437	-1.225	-3.735	Not rejected
Malawi	-1.186	0.937	-0.543	-3.735	Not Rejected
Mauritius	-1.322	2.100	0.754	-3.735	Not rejected
Mozambique	-1.573	0.878	-0.492	-3.735	Not Rejected
Namibia	-1.947	2.578	1.066	-3.735	Not rejected
Seychelles	-3.254	2.981	-2.783	-3.735	Not rejected
South Africa	-4.002*	4.226	3.626	-3.735	Rejected
Swaziland	-3.370	3.041	-2.916	-3.735	Not rejected
Tanzania	-3.608	3.826	3.319	-3.735	Not rejected
Zambia	-2.381	1.811	-1.643	-3.735	Not Rejected

Source: Own Computations
**CI: confidence interval; * significance at 5% level.

The lag truncation, p, used in the ADF test was set at p =1, based on a general-to-specific procedure beginning at p = 4; the remaining serial correlation in the errors is expected to be not significant to bias the test. Table 5 reports real per capita GDP convergence behaviour of each of the 12 SADC member economies investigated. The result indicates that except for Botswana and South Africa, the unit root test did not reject the null hypothesis of boundlessly drifting differences between the log of national real per capita GDP and the log of average real per capita GDP for the 12 SADC economies. This implies that the real per capita income of Botswana and South Africa tended to converge to the real regional average per capita GDP during the period 1992-2009. Botswana's economic growth was anchored by higher savings and fixed investment rates during the period under consideration while South Africa's improved performance was associated more with

increased openness of the economy following democratization in 1994 and higher initial income levels.

The differences of log real per capita GDP from the log real regional average per capita GDP for most of the other 12 economies has unit roots indicating that the series for these countries did not converge to common stochastic trends or were not cointegrated. All the three approaches used, beta convergence, sigma convergence, and convergence to common stochastic trends indicate that there was no convergence among the SADC economies to regional average real GDP per capita for the period 1992-2009 and hence most regional economies were not characterized by "catch up"- growth within the region.

The results of the present study are in line with the previous empirical findings on economic convergence in Southern and Eastern Africa. Charles et al. (2009) investigated the possible presence of stochastic convergence of real per capita GDP for a set of Eastern and Southern African countries that are all members of COMESA trade agreement. Using the panel unit root test technique, they found that there was no stochastic convergence in real per capita GDP in COMESA economies. They made further attempts to identify the possible club convergences within the COMESA trade agreements using the following criteria: (1) the membership to another regional agreement, (2) the economic structure (dependence on oil production), and (3) the degree of global economic development. Two interesting results emerged from the latter analysis: first, they did not find any evidence of absolute and conditional β convergence for the countries belonging to the regional economic agreement and economic structure criterion. Secondly, they found a tendency of absolute per capita GDP convergence for two clubs within COMESA: (a) among better developed economies- Seychelles, Mauritius, Egypt and Libya and (b) among the least developed countries (LDCs). This implies that most of the COMESA member countries were converging to the bottom and were still held in vicious circle of poverty.

4. Macroeconomic Convergence

4.1 Macroeconomic convergence goals and achievements

The SADC macroeconomic convergence programme established specific goals for four key macroeconomic indicators with two more supplementary criteria for the years 2008, 2012, 2015 and 2018. Accordingly, the inflation rate goal was single digit in 2008, and 5% or less for 2012 and 2015, and 3% for 2018. The budget deficit was set to be 5% or less of GDP in 2008, and 3% of GDP as anchor with range of 1% for 2012, 2015, and 2018. The government foreign and domestic debt and the debt guaranteed by government was set to be less than 60% of GDP for the four target years. The current account balance was set to be 9% of GDP while the foreign exchange reserve was set to be 3 months of import cover for 2008 and 6 months of import cover for 2012, 2015 and 2018 (See table 6 below).

There are two instances where adherence to convergence targets may not be desirable: First, the need for macroeconomic stability does not require an absolute stance on policy harmonization (convergence of macroeconomic policy). Policies must be designed to address national development needs and since circumstances may differ policies may at times have to diverge.

Second, in the event of asymmetric external shocks in the region, member states may require a fair degree of flexibility in policy implementation (SADC-CCBG, 2002).

Table 6: Macroeconomic convergence criteria and goals for SADC

Criterion	2008	2012	2015	2018
Inflation rate	Single digit	5%	5%	3%
Budget deficit	5% or less of GDP	3% of GDP as anchor, with range of 1%	3% of GDP as anchor, with range of 1%	3% of GDP as anchor, with range of 1%
Gov't foreign and domestic debt & debt guaranteed by gov't	Less than 60% of GDP	Less than 60% of GDP	Less than 60% of GDP	Less than 60% of GDP
Current account balance % of GDP	Less than 9% of GDP	Less than 9% of GDP	Less than 9% of GDP	Less than 3% of GDP
Foreign Reserves	3 months' import cover	More than 6 months' import cover	More than 6 months' import cover	More than 6 months' import cover
Central bank credit to government	Less than 10% of the previous year's tax income	Less than 10% of the previous year's tax income	Less than 5% of the previous year's tax income	Less than 5% of the previous year's tax income

Source: Zyuulu (2009) and Rossouw (2006)

One of the key macroeconomic convergence issues in SADC is the convergence in inflation rate or monetary policy. Out of the 15 SADC member states, only Mauritius and Mozambique have attained the inflation target of less than 5% set for 2012 in 2009. The overwhelming majority of member states were characterized by monetary policy divergence in 2009 (See table 6). Five of the member states, i.e. Angola, DRC, Seychelles, Tanzania and Zambia failed to achieve in 2009 even the inflation target of single digit set for 2008 as the rate in these countries remained well above the 10% level primarily due to the impacts of global financial and economic crises.

Regarding the fiscal policy indicator, about six member states, i.e. Mauritius, Swaziland, DRC, Madagascar, Seychelles, and South Africa attained budget deficit of less than 4% with the latter four achieving the target of 3%. However, more than 50% of the member states showed divergence in fiscal policies as they failed to achieve in 2009 the convergence goal set for 2012.

Similar trends were observed for foreign exchange reserve indicator. Only 6 of the 15 member states attained the foreign exchange reserve level equivalent to six months or greater of import cover in 2009. These include Angola, Botswana, Mozambique, South Africa and Tanzania. Member states such as DRC, Malawi, Seychelles and Zimbabwe faced severe foreign exchange shortages in 2009 with serious implications on the stability of their exchange rates and on the convergence goal.

Lack of reliable data on domestic and external government and government guaranteed debt in member states makes the assessment of the progress with regard to this particular convergence criterion difficult. However, the limited existing information indicates that debt levels in most member states with the exception of Zimbabwe have showed a tendency of borrowing policy convergence.

Most member states performed better regarding the current account target. The current account deficit in 9 of the 15 member states was below the 9% of GDP goal in 2009. The current account positions of several member states were worsened following a sharp decline in foreign demand for commodities. However, global economic recovery and revival in commodity prices since mid 2009 significantly improved the export performance of most member states leading to far better than expected performance in current account deficit.

The two worst performers in current account balance are Zimbabwe with the deficit of 31.10 percent of GDP followed by Seychelles with 23.14 percent. The two best performers with regard to this indicator are two small CMA countries, i.e. Lesotho and Namibia with the current account deficit of 1.5 percent and 2.19 percent of GDP respectively.

Table 7: Achievement by 2009 of the macroeconomic convergence goals set for 2012 for SADC member states

Country	Inflation rate (5%)	Budget deficit (3% of GDP as anchor, with a range of 1%)	Government debt (<60% of GDP)	Current account balance (<9% of GDP)	Foreign Exchange reserve (> 6 months' of import cover)
Angola	14.0	-7.7	32.3*	-3.8	13
Botswana	8.1	-11.0	17.9**	-5.11	31
DRC	46.2	-1.6	-	-13.13	< 1
Lesotho	7.7	-6.8	-	-1.5	5
Madagascar	8.9	-2.3	33.3*	-16.76	5.1
Malawi	8.4	-5.4	72.5*	-7.87	< 2

Mauritius	2.5	-3.4	60.0*	-8.15	4.8
Mozambique	3.2	-5.7	26.1**	-11.91	6.9
Namibia	9.1	-6.0	19.3*	-2.19	4
Seychelles	31.8	+2.6	43.9**	-23.14	<2
South Africa	7.1	-1.2	35.7**	-3.98	6
Swaziland	7.6	-3.5	13.0*	-6.25	4
Tanzania	12.1	-4.7	24.8**	-9.42	6
Zambia	13.4	-4.4	31.5**	-3.29	3.6
Zimbabwe	5.1a	n.a.	304.3**	-30.10	< 1

Sources: IMF World Economic Outlook Database April 2010, African Statistical Yearbook 2010, www.sadcbankers.org, and CIA World Factbook

a. According to the ADB report. The IMF data does not contain information on Zimbabwe.

* Domestic + external public debt. Data for Madagascar is for 2008, ** Domestic public debt

Inflation rates in many member states in 2009 remained above the goal set for 2012. The rates in DRC and Seychelles reached 8 and 5 times that of the 2012 target creating greater divergence in sub regional monetary policy outlook. On the other hand, with the exception of Zimbabwe and Malawi most SADC member states met the debt target of 60 of GDP[viii].

The recent trends of macroeconomic policy divergence in the SADC region have been driven primarily by the global financial and economic crises which were preceded by sharp rises in commodity and food prices. However, lack of political commitment and weaknesses in economic structures such as heavy dependence on commodity exports and high level of unemployment have contributed to slow macroeconomic policy alignments in the sub-region.

4.2 An econometric analysis of monetary policy convergence

A unit root test was conducted for the period beginning with the establishment of SADC in 1992 and ending in 2009 to see whether inflation rates in member states converged to the sub regional mean. Except Angola, DRC, Malawi, Mozambique and Zambia, the rates for the rest of SADC member states have unit root indicating that inflation rates did not converge towards the SADC mean rate during the period under consideration. SADC member states have shown a tendency for long term monetary policy divergence between 1992 and 2009 (See table 8). The absence of long term convergence in monetary policy is a reflection of much deeper structural divergence in the

economies of the member states. On the other hand, the common monetary policy in CMA countries ensured convergence in inflation rates since 1980.

Table 8: Unit root test for inflation rates in SADC member states in levels, with constant but no trend, 1992-2009

Member State	t- statistics	ADF-critical value 1%	ADF-critical value 5%	Null hypothesis: Unit root
Angola	-41.02***	-4.887	-3.829	Rejected
Botswana	-2.59	-4.887	-3.829	Not rejected
DRC	-58.37***	-4.732	-3.761	Rejected
Lesotho	-2.247	-4.732	-3.761	Not rejected
Madagascar	-2.213	-4.732	-3.761	Not rejected
Malawi	-6.724***	-4.732	-3.761	Rejected
Mauritius	-2.562	-4.732	-3.761	Not rejected
Mozambique	-9.117***	-4.887	-3.829	Rejected
Namibia	-2.88	-4.887	-3.829	Not rejected
Seychelles	-2.297	-4.732	-3.761	Not rejected
South Africa	-2.103	-4.732	-3.761	Not rejected
Swaziland	-2.787	-4.732	-3.761	Not rejected
Tanzania	-1.31	-4.732	-3.761	Not rejected
Zambia	-6.055***	-4.732	-3.761	Rejected

Source: Own computations

***, indicate significance at 1%. Lag length for Angola, Botswana, Mozambique, Namibia, 4, while for DRC, Lesotho, Madagascar, Malawi, Mauritius, Seychelles, South Africa, Swaziland, Tanzania and Zambia 2.

To validate the unit root hypothesis, we conducted graphical analysis of the inflation rates for the 14 SADC member states for which data is available[ix]. As figure 4 clearly indicates, inflation rates (smoothened by taking natural logs) followed highly volatile trends for most of the SADC member states. High levels of volatility were observed for countries such as Seychelles and Mauritius.

Figure 4: Monetary policy convergence - SADC Inflation rates 1980-2009
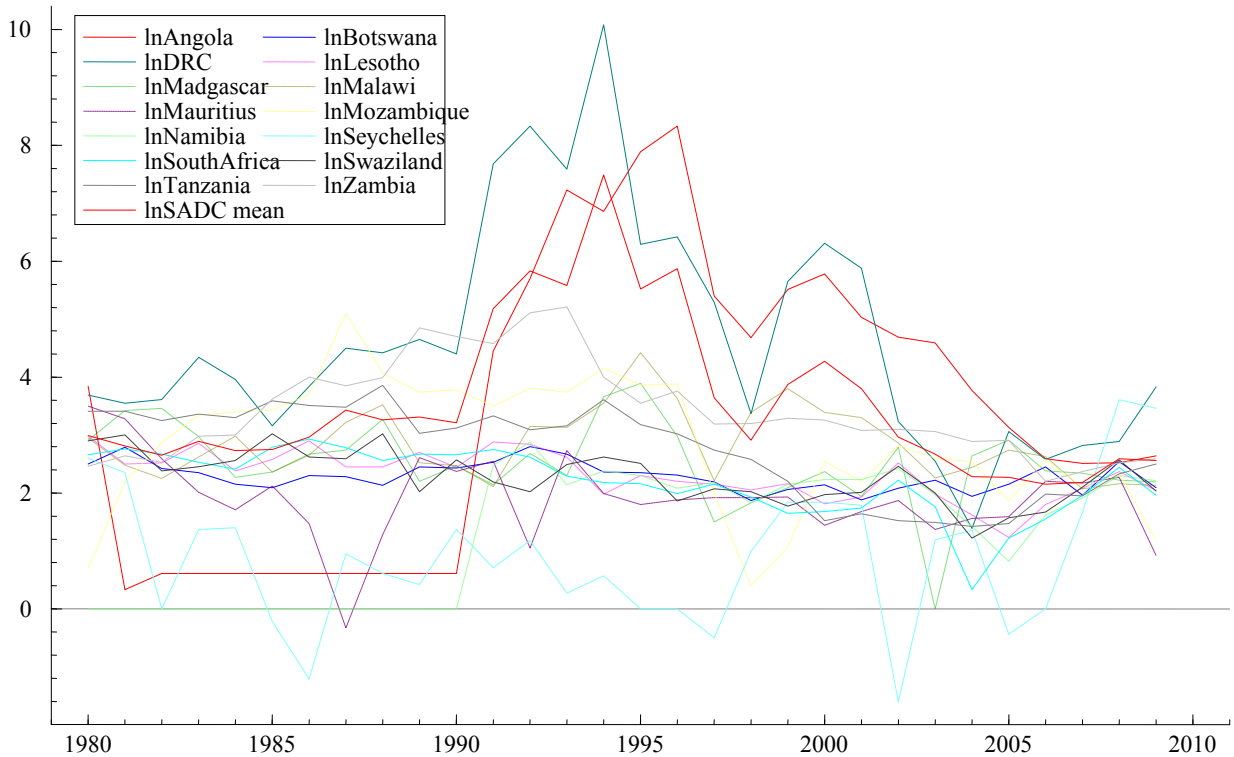
Source: Own analysis

Most SADC member states were also characterized by rising inflation rates between 1980 and mid 1990s. Inflation rates began to decline after mid 1990s due to improved monetary and fiscal policy measures but the rates did not converge to the sub regional mean. However, in the middle of the graph, a group of about 4 countries depict a tendency towards monetary policy convergence among themselves. These countries are South Africa, Namibia, Swaziland and Lesotho comprising a Common Monetary Area in the region.

Figure 5: CMA inflation rates 1980-2009
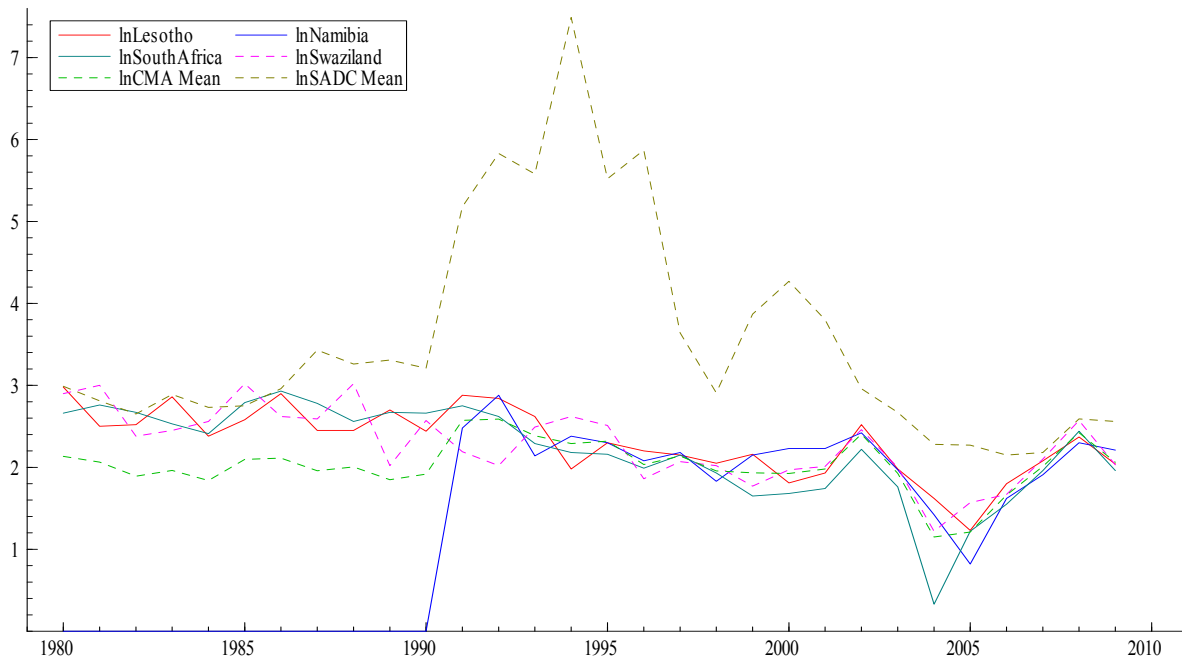
Source: Own Analysis

Inflation rates in CMA countries have not only showed a consistent tendency of convergence towards the CMA mean inflation rate, but also have consistently remained below the SADC mean rate for nearly three decades. This indicates that monetary policy alignment guarantees lower and stable inflation in member countries. The divergence in the graph for the period 1980-1990 for Namibia is due to our assumption of zero inflation rates before the Namibian independences in 1990. However, after 1990 Namibian rates immediately converged to the CMA mean inflation due to the country's adoption of the common monetary policy.

Although macroeconomic convergence is necessary to promote deeper regional integration, it may not be desirable given different level of economic development by the member states. For instance, Harvey (2000) argues that macroeconomic policy convergence is *not necessary* for establishing an FTA, but *is necessary* for sustaining an FTA over time. Furthermore, according to Burgess (2009) the SADC macroeconomic targets for 2012 are ambitious and, in some cases, warrant further evaluation, given that achieving the targets may be neither necessary nor sufficient to achieve good macroeconomic results.

4.4 Challenges for economic convergence in SADC

Several factors limit the achievement of both macroeconomic and economic growth convergence in SADC sub region. These include low savings and investment in most of the member states, shortage of high level skills, high level of unemployment, lack of well developed financial markets and institutions with the exception of South Africa, and inadequate and unreliable development supports provided from the international community to the poorer members of the sub region.

In addition to this, as Zyuulu (2009), points out lack of sustained political commitment, irregular growth of national economies, insignificant production and manufacturing capability, inadequate and sub standard transport system and other infrastructure, insignificant trade among the member states, and impediments to free mobility of goods and factors of production across borders, significantly hamper achievements of macroeconomic convergence in the sub region.

Last but not least, multiplicity of membership to a number of trade agreements in the continent hampers deepening trade and financial relations between the economies thereby dampening the impetus for greater regional integration.

However, there are opportunities for deeper integration in the sub region. The recent recovery in commodity prices will not only boost the current account positions of resource rich member states but will also improve their fiscal as well as foreign exchange reserve positions. It will also generate more resources for investment to speed up economic recovery and growth. In addition to this, increased partnerships with nontraditional bilateral donors such as China and other BRIC countries, as well as Middle East countries and Middle East Multilateral Development Funds, are expected to boost trade, investment and economic growth in the sub region. If these are backed by sustained political commitment by the member states, deeper SADC economic integration can be achieved with in the stipulated time period.

5. Conclusion and recommendation

This paper attempted to analyze the real per capita GDP convergence in SADC member states using the concepts of beta and sigma convergence, and convergence to common stochastic trends for the period 1992-2009. To identify the possible converge of economic growth and real GDP per capita among the SADC economies, we estimated absolute and conditional β- convergence and calculated descriptive statistics of standard deviations in real per capita GDP across member states to measure σ-convergence. We found no evidence of economic growth and real GDP per capita convergence in the sub region. Real per capita GDP inequality among SADC member countries have in fact increased during the period.

We made further attempt to identify possible club convergence within SADC free trade area using Common Monetary Area criterion, including South Africa, Lesotho, Namibia and Swaziland. The result indicates that the real per capita GDP level of the CMA economies did not converge to the South African real GDP per capita level during the period of 18 years.

However, on the level of individual countries, the real per capita GDP of South Africa and Botswana converged to common stochastic trends, i.e. converged to the regional average real per capita GDP. This is not surprising as the two countries particularly Botswana performed well in

terms of economic growth during the past two decades and is among the 5 Upper Middle Income economies in the region. South Africa had the advantage higher initial income with improved growth performance following the democratization in 1994.

The crucial implications of the above results are that the establishment of regional trading block did not enhance economic performance in the poorer member states in SADC during the past 18 years. Poor member states failed to catch up with the more developed countries within the region. The same countries that were richer 18 years ago are richer today and the poorer countries remained largely poorer. This is not to suggest that regional trade agreements and economic blocks do not promote economic performance and help poor countries to catch up. It is rather the way member countries implement those agreements that matter most. First of all, there is duplication of membership among the several African Regional Economic Communities. Most of SADC states are members of one or more of other RECs in the continent. Multiplicity of membership to a number of trade agreements hampers deepening trade and financial relations between the economies and hence reduces the benefits of regional economic cooperation.

We also reviewed the progress regarding the SADC macroeconomic convergence goals set for 2012. The findings indicate that most of the economies of member states have shown a tendency of macroeconomic divergence in 2009 in respect of three of the five key macroeconomic convergence goals set for 2012. More specifically, in 2009, the majority of the economies were characterized by divergences in monetary policy, fiscal policy, and foreign exchange reserve ratios in respect of the 2012 convergence goals.

Most member states performed better in terms of the public debt/GDP ratio and current account deficits goals. Although data for the former macroeconomic indicator was incomplete, only two out of the 15 member states failed to achieve the government debt and debt guaranteed by government to GDP ratio of less than 60 percent in 2009. With regard to the current account deficit, 9 out of the 15 member states achieved the 2012 goal of less than 9 percent of GDP in 2009. Macroeconomic convergence is not necessary to establish a free trade area but is necessary to sustain it and achieve deeper integration. But the goals themselves must be conditional on the level of convergence in economic structure and therefore macroeconomic convergence may not always be desirable. Furthermore achieving the targets may be neither necessary nor sufficient to achieve good macroeconomic results.

Macroeconomic policies and stability indicators are not the only obstacle to convergence in real income and catch up growth. Low savings and investment, shortages of high level skills, high level of unemployment, inadequate and sub standard infrastructure, insignificant production and manufacturing capability, and inadequate and unreliable development support from donor agencies to poorer member states all contribute to slow economic growth and lack of convergence in real per capita GDP. Regional economies need to urgently address these challenges in order to achieve deeper economic integration and catch up with the more developed economies in the sub region and the rest of the world.

End Notes[1]

i. SADC member states include Angola, Botswana, DRC, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe

ii. The 2010 target for Customs Union has been deemed unachievable and has subsequently been postponed indefinitely.

iii. Some analysts add foreign exchange reserve while others add central bank credit to the government of less than 10% of the previous year tax income, as the fifth macroeconomic convergence indicator.

iv. SADC Committee of Central Bank Governors

v. SADC Committee of Central Bank Governors

vi. Islam (2003) proposed 7 dichotomous classifications of the concept of convergence. These include: (1) Convergence within an economy vs. convergence across economies; (2) Convergences in terms of growth rates vs. convergence in terms of income levels; (3) Beta (β) convergence vs. Sigma (σ) convergence ; (4) Unconditional (absolute) convergence vs. conditional convergence ; (5) Global convergence vs. local or club-convergence; (6) Income convergence vs. total factor productivity convergence; and (7) Deterministic convergence vs. stochastic convergence.

vii. The ADF test assumes that the disturbance terms are uncorrelated and have constant variance

viii. For most member states complete information on both foreign and domestic public debt and debt guaranteed by government is not available. This is available only for six countries: Angola, Madagascar, Malawi, Mauritius, Namibia and Swaziland, while no information is available for Botswana and Lesotho. Data on the remaining 7 countries covers only external public debt.

ix. Zimbabwe is excluded because no time series data is available on inflation and other macroeconomic indicators for the entire period except for the past three-four years.

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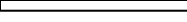
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