

Does Macroeconomic Convergence Lead to Growth? The Case of Africa*

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Abstract:

This paper investigates the macroeconomic convergence in various African RECs and its relationship to economic growth. It is found that although, there is seemingly evidence of the tendency of macroeconomic convergence in the various African RECs, this does not lead to expected higher growth. The various African RECs displayed a stable macroeconomic environment in the recent years but there is very little growth associated with it. The paper attributed this little growth to many internal and external challenges being faced by the African continent.

JEL Classification:

Keywords: Regional Integration, Macroeconomic Convergence, Economic Growth

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I. Introduction

It is evident from the income convergence analysis that there is very little evidence that the countries in the various RECs are converging, except in UEMOA (Ben Hammouda et al. 2007). However, with some more stringent testing that is founded on economic growth theories, very slow pace of convergence of the per capita incomes could be seen. The implication of the limited speed of the per capita incomes convergence is that unless there was a major structural shift, it will take at least more than two decades for most RECs economies to converge and thus attain one of the expected outcomes of regional integration initiatives in Africa. Where poor countries in the continent are able to attain levels of development that overcome the disparities in per capita incomes.

But what is the evidence on the macroeconomic convergence front? The different RECs are faced with the reality that it cannot be able to achieve economic union status unless there is clear and sustainable macroeconomic convergence. In this paper, results are presented on the status of macroeconomic convergence in the different RECs under study. We have looked at the two main or primary criteria for macroeconomic convergence namely inflation for monetary policy and budget balance for fiscal balance. Monetary and fiscal policies in the different RECs are the key instruments that are at the disposal of the governments to steer their economies towards an economically integrated area. The macroeconomic anchors that indicate the movement towards attaining the macroeconomic convergence criteria include among other indicators inflation, fiscal balance, current account balance, and real exchange rate.

In this paper, the results from the analysis of the convergence of macroeconomic stability indicators for various RECs namely: SADC¹, COMESA², ECOWAS³, CEMAC⁴ and UEMOA⁵, are investigated. Evidence of macroeconomic convergence in the selected indicators of convergence could be an indication that policy coordination in the RECs is achieving desired macroeconomic outcomes. This would provide the necessary foundation for moving the REC through the various phases of integration towards monetary unions as argued in optimal currency area theories. The results on monetary and fiscal policy outcomes are captured by inflation and fiscal balance as a proportion of GDP.

This paper is structured as follow: Section 2 provides some empirical results on macroeconomic convergence in the African RECs based on their fiscal and monetary policies. Section 3 presents the link between achieving the target macroeconomic convergence and its relationship to prospect of economic growth in the African region. Section 4 concludes.

II. Evidences of Macroeconomic Convergence

This section presents some evidences of the seemingly macroeconomic convergence in the African RECs. The macroeconomic variables used as criteria are the inflation for monetary policy and fiscal balance for fiscal policy. The empirical analysis of macroeconomic convergence evidence for Africa is based on two important underpinnings. First, it is anticipated that true integration cannot take place unless economies of participating countries in an integration area harmoniously deal with economic shocks. Second, for the economies in

a given integration area to deal with economic shocks in a coordinated manner, it is necessary that macroeconomic policies among the involved countries are harmonized.

The econometric methodologies to evaluate macroeconomic convergence in this paper are described in Appendix 1. The series on inflation and fiscal balance are tested for convergence using first, the sigma convergence test or the analysis of cross-country dispersion; secondly, a unit root test on the difference of the series and regional mean are conducted; and finally, a cointegration test defined in Bernard and Darlauf (1995) was also used to test the macroeconomic convergence.

a. Monetary Policy

In investigating macroeconomic convergence in the different RECs, inflation was used to analyze convergence in monetary policy. Monetary policy is the central bank process of managing money supply to achieve specific goals—such as constraining inflation, maintaining an exchange rate, achieving full employment or economic growth. The results involving convergence in monetary policy from sigma tests, unit root test and cointegration analysis are presented in Appendices 2, 3 and 4, respectively.

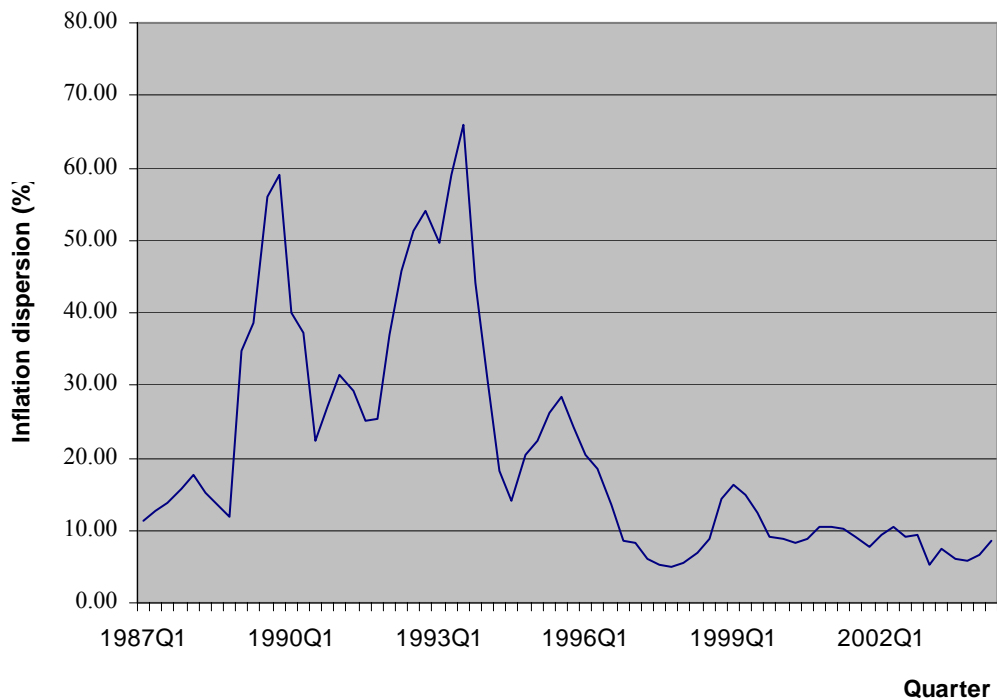
SADC

Figure 2.1 shows the plot of the standard deviation of inflation within the SADC countries⁶ from 1987Q1 to 2004Q2. Looking at the figure, the variability in inflation among the SADC countries, in general, has decreased over time, although the variation started with a low figure in the first quarter of 1987 and ended in a slightly lower figure in the fourth quarter of 2004. In between, particularly in the first half of the 90s, the variability in inflation is high and volatile reaching a maximum of around 66 % in quarter four of 1993. The dispersion in inflation reached the lowest point of 5 % in the fourth quarter of 1997. The variability of inflation from that reference period to the second quarter of 2004 is relatively low and stable. This shows somehow a tendency among SADC countries to have convergence in macroeconomic policy particularly in monetary policy.

Different statistical tests were undertaken to establish whether there is a robust convergence. First, the result of convergence test from the sigma test (Appendix 2) showed a significant negative coefficient of time when the standard deviation of inflation was regressed with time. This indicates a tendency of monetary policy convergence among SADC countries over time. Next, the unit root test was applied to each country data set and more than half of the countries in the set (Madagascar, Malawi, Namibia, Swaziland and Tanzania and Zambia) rejected the presence of unit root, which imply their convergence to the regional inflation mean⁷ (see Appendix 3, Table A3-1). The result, however, from pooled unit root test, showed that countries as a group have a tendency to converge to the regional mean value. The presence of unit root was rejected and these imply convergence to the regional inflation mean. SADC countries therefore show some evidence of convergence in their inflation, an indication of possible coordination with the desired results in monetary policies. Indeed, further analysis carried out to establish whether there is co-movement in the inflation rates of the SADC member countries through the cointegration analysis. Six countries were included in the test namely: Botswana, Lesotho, Mauritius, South African, Tanzania and Zambia. The results of

the cointegration tests showed that there is only partial convergence of monetary policies in SADC countries.

Figure 2.1 Dispersion (standard deviation) of inflation across SADC countries, 1987Q1-2004Q2.



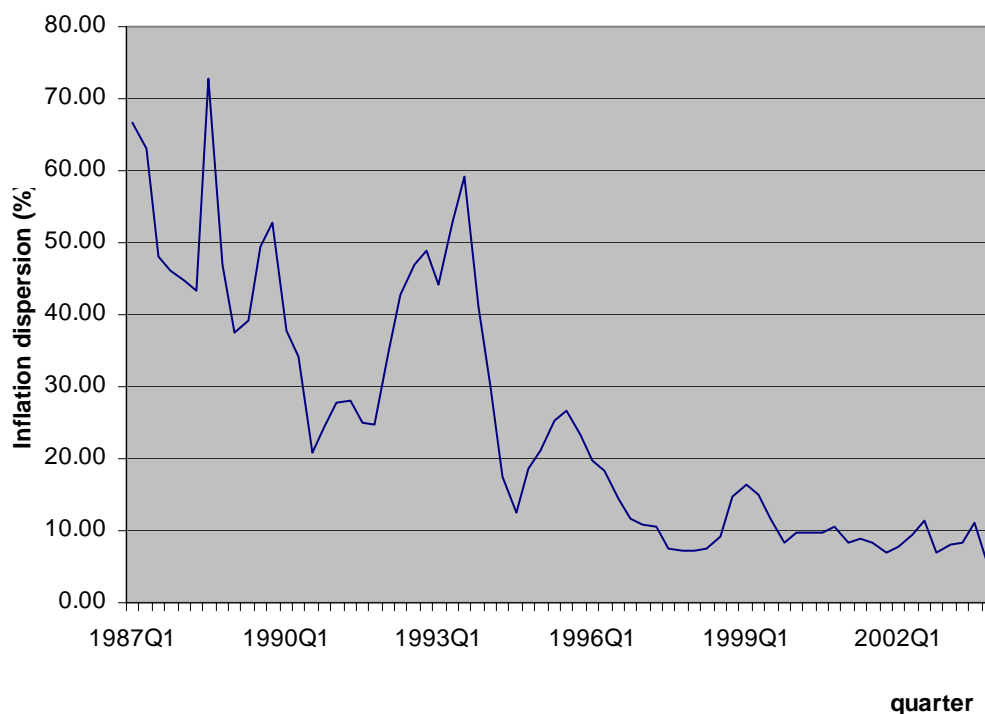
COMESA

Figure 2.2 shows the plot of the standard deviation of inflation across COMESA countries⁸ from 1987Q1 to 2002Q1. In this figure, the general decreasing trend in the variation of inflation across COMESA countries is very obvious. The figure shows the tendency of convergence in the inflation values within COMESA, indicating the realization of some convergence in monetary policies. The standard deviation across COMESA declined to around five percent in quarter four of 2003 from a high of 67 % in quarter one of 1987. Although from 1987 to 1995, the variability of the inflation within COMESA is highly volatile. From 1996 onwards, the variation in the inflation values within the COMESA countries are relatively low and stable.

The tendency of monetary convergence within COMESA is supported by the sigma test on the standard deviation of inflation. The test gave a negative significant coefficient of time implying that the differences in inflation within the COMESA region are diminishing over time (see Appendix 2). The unit root test on the pooled data also supports convergence on monetary policy as the results reject the presence of unit root. However, on individual country basis, only few countries namely: Egypt, Kenya, Malawi, Namibia, Swaziland and Zambia, supports the convergence in monetary policy. And lastly, on the cointegration test,

only four countries were included in the analysis—the countries that do not reject the presence of unit root. The cointegration test performed on these four countries (Burundi, Egypt, Mauritius and Uganda) showed that only at most two of these countries are showing co-movements.

Figure 2.2 Dispersion (standard deviation) of Inflation across COMESA countries, 1987Q1-2003Q4



ECOWAS

The plot of the dispersion in the inflation series (1988Q3-2004Q4) among the ECOWAS countries⁹ is shown in Figure 3.3. In the figure, a similar behavior with SADC and COMESA may be observed within the ECOWAS countries that is, a generally decreasing variation in inflation is observed. However, the standard deviation is generally more volatile from 1988Q3 to 1998Q3 with a maximum point of 37 %. The variability in inflation became narrow and stable in the late 90s up to 2004Q4 and fluctuates only within the range of 5 % to 12 %.

The sigma test supports the tendency of a monetary policy convergence within the ECOWAS countries (see Appendix 2). The result showed a significant negative coefficient of time, indicating that the differences of inflation within the ECOWAS are diminishing over time. The convergence in monetary policy within ECOWAS is further supported by the unit root test using the pooled panel data set, which implies that as a group the countries in ECOWAS are converging to the regional inflation mean (see Appendix 3, Table A3-6). On the basis of the results of the individual unit root test, most of the countries in ECOWAS also reflect their tendency to convergence into the regional mean (see Appendix 3, Table A3-3). Only three countries namely Cape Verde, Senegal and Togo did not reject the presence of unit root.

Lastly, the cointegration analysis included only four countries. These countries are Cape Verde, Guinea Bissau, Sierra Leone and Togo. The result of the cointegration test indicates only at most one co-movement among them.

CEMAC

Figure 3.4 shows the plot of the standard deviation of inflation from 1984Q2 to 2002Q2 within the CEMAC countries¹⁰. In this region, it is interesting to note that the dispersion in inflation is relatively low and stable compared to the other RECs under study. The variability of inflation within CEMAC fluctuates only between the highest point of 16 % and lowest point of 1.40 %. Apparently, CEMAC has a higher possibility of the realization of the REC objective of having convergence in the monetary policy.

The sigma test also support the tendency of convergence in the monetary policy within CEMAC (see Appendix 2), as the coefficient of time is significantly having a negative trend, that is the differences in inflation within CEMAC is decreasing over time. The unit root tests both on the pooled data and individual countries also confirmed that there is a tendency within CEMAC to have monetary policy convergence. The cointegration test for CEMAC countries was not conducted since all countries rejected the presence of unit root in the actual level of inflation.

Figure 2.3 Dispersion (standard deviation) of Inflation across ECOWAS countries, 1988Q3-2004Q4

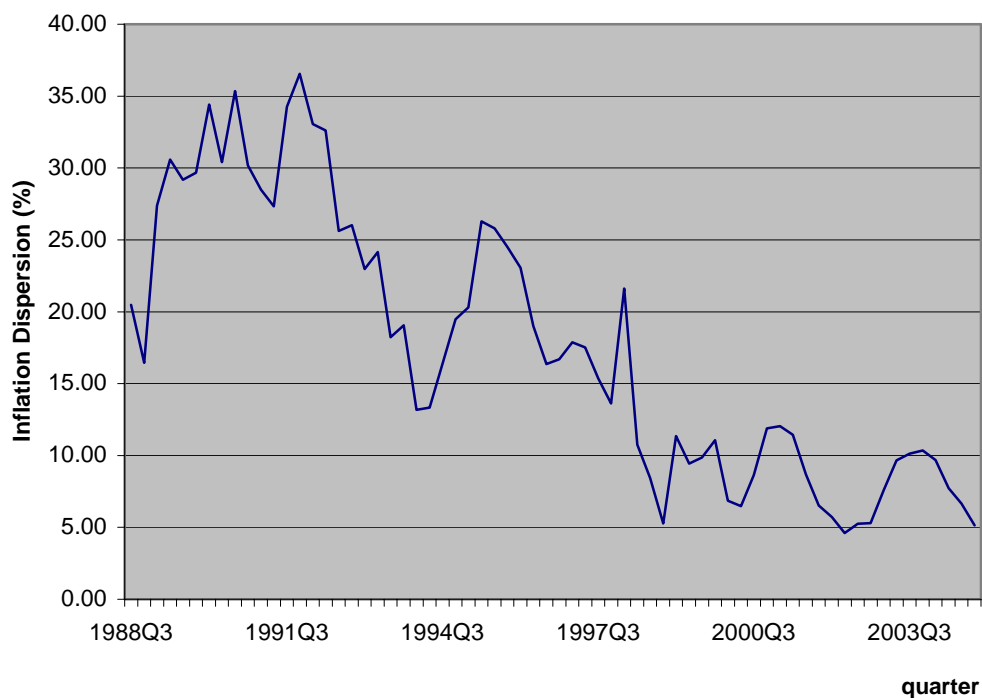
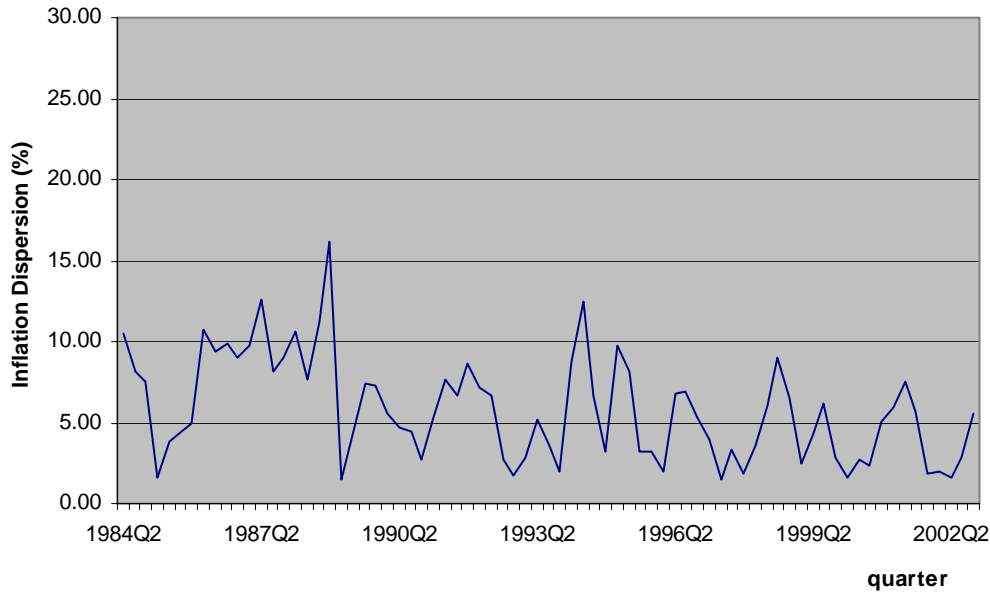


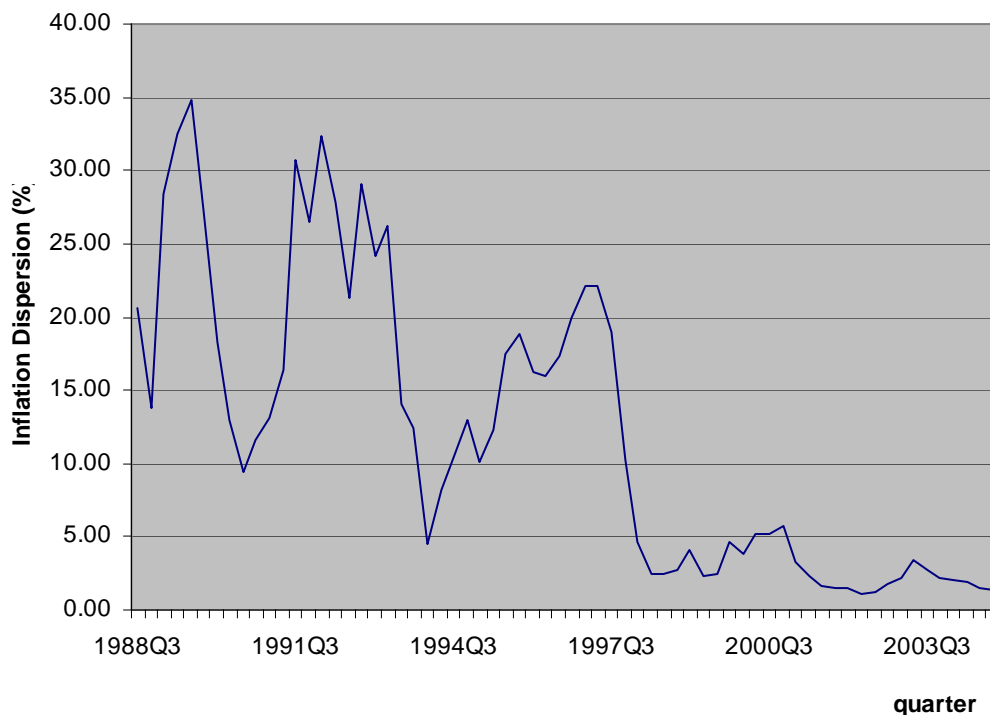
Figure 2.4 Dispersion (standard deviation) of Inflation across CEMAC countries, 1984Q2-2002Q4



UEMOA

Figure 3.5 shows the plot of the standard deviation of inflation from 1988Q3 to 2004Q4 within the UEMOA countries¹¹. From the figure, it may be observed that as in most RECs under study, the dispersion of inflation within UEMOA is highly volatile and unstable in the earlier period of the study that is from 1988Q3 to 1997Q4. However, the variability in UEMOA is relatively lower compared to SADC and COMESA but about a similar level with ECOWAS. From late 90s up to 2004Q4, the variability in inflation within CEMAC has decreased remarkably fluctuating only within the range of 1.4 % to about 5.1%. This observation is a clear evidence of monetary policy convergence within UEMOA countries. Again, this evidence is supported by the sigma test resulting to a significant negative trend in standard deviation over time. The unit root tests on both pooled panel data and on individual countries also confirmed the evidence of monetary convergence in UEMOA, as the results indicates convergence to their regional mean. Lastly, only two countries were included in the cointegration test and the result is not conclusive as it failed to reject any of the hypothesis statements.

Figure 2.5 Dispersion (standard deviation) of Inflation across UEMOA countries, 1988Q3-2004Q4



b. Fiscal Policy

Another interest in the study is to observe the convergence in the fiscal policies within different RECs. Fiscal policy is the government policy in setting the level of public expenditure and how that expenditure is funded. Convergence in fiscal policy is another measure of macroeconomic convergence. Fiscal balance¹² is used as test variable to capture the results for the convergence in the fiscal policies within the different RECs. The different statistical test such as the sigma tests, unit root test and cointegration analysis are presented in Appendices 2, 3 and 4, respectively.

Figures 2.6 – 2.10 show the plots of standard deviation of fiscal balance, 1985-2003, respectively for SADC, COMESA, ECOWAS, CEMAC and UEMOA. In general, the variability in the fiscal balance within each REC that is under study is not too wide, which is an indication of achieving a much faster convergence in fiscal policy. In most cases, the dispersion in the fiscal balance is below 10 %. For most RECs the standard deviation in the fiscal balance reached a maximum of only 15 % except for CEMAC whose highest point is around 24 % at the beginning of the reference period. The dispersion in the fiscal balance in SADC and COMESA reached a low of around three percent at the end of the reference period, that is 2003. This figure is comparatively lower than in ECOWAS, CEMAC and UEMOA, which standard deviation are at four percent, six percent and five percent, respectively.

The sigma tests on the standard deviation of fiscal balance indicate significant negative coefficient of time for SADC and ECOWAS, which implies the tendency of fiscal policy convergence. Although the sigma tests for COMESA, CEMAC and UEMOA do not give a significant negative coefficient, this do not imply that there is no tendency for fiscal policy within these RECS. The reason is that the dispersion in fiscal balance within these RECs is already low and stable. This evidence is supported by the unit root tests performed on the pooled panel and on the individual country. The unit root test performed in each REC reject the presence of unit root, which indicate the evidence of convergence to the regional mean value. Moreover, on the basis of unit root tests on the individual countries, all countries in COMESA, CEMAC and UEMOA reject the presence of unit root, which means that the countries are converging to their respective regional mean value. For SADC and ECOWAS, only one or two countries did not reject the presence of unit root.

Cointegration analysis was not conducted for COMESA, CEMAC and UEMOA. All countries in these RECs rejected the presence of unit root. This indicates that the levels of fiscal balance in all of these countries are relatively stable and have no tendency to fluctuate uncontrollably and to increase steady. For SADC and ECOWAS, cointegration analysis was conducted for only very few countries and there was no co-movements found. It is noted that even for SADC and ECOWAS, most countries have relatively stable values of fiscal balance.

Figure 2.6 Dispersion (standard deviation) of fiscal balance across SADC countries, 1985-2003

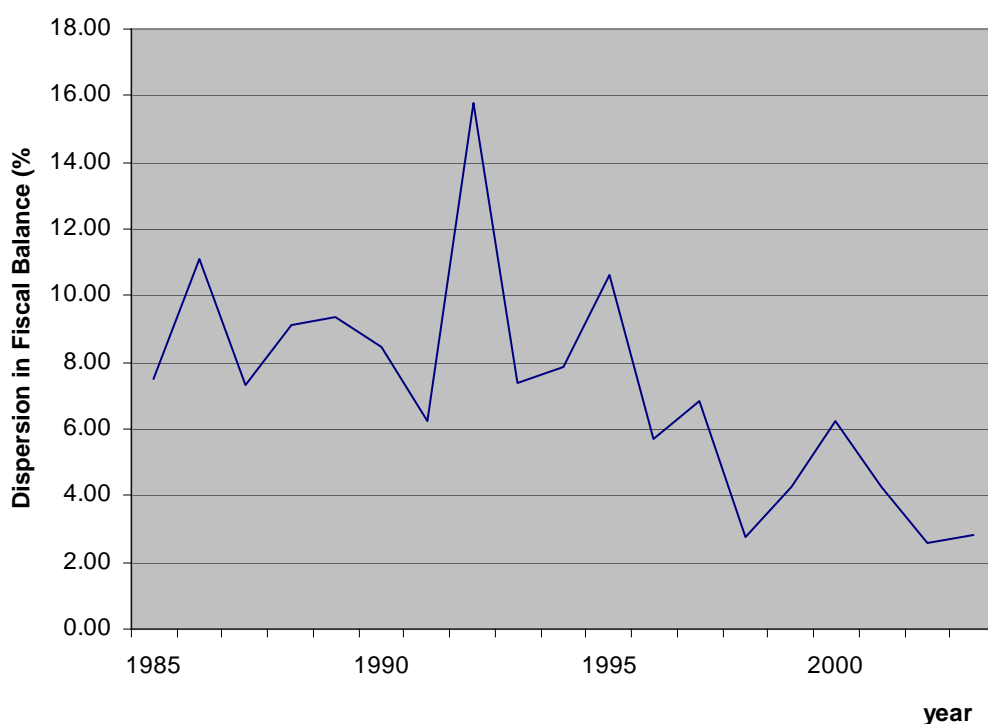


Figure 2.7 Dispersion (standard deviation) of fiscal balance across COMESA countries, 1985-2003

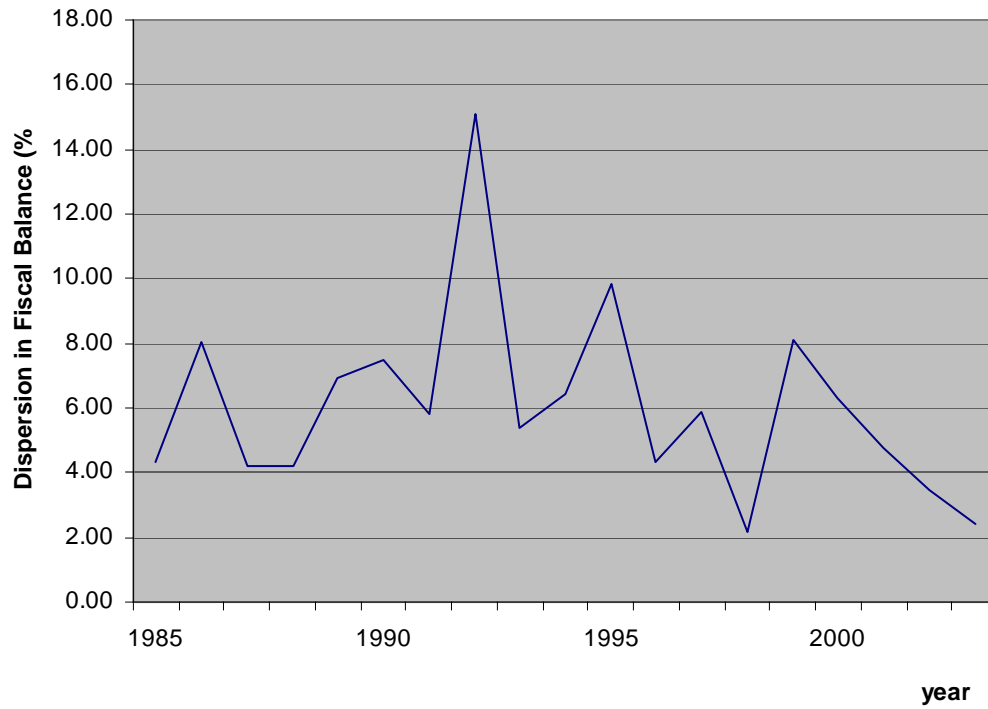


Figure 2.8 Dispersion (standard deviation) of fiscal balance across ECOWAS countries, 1985-2003

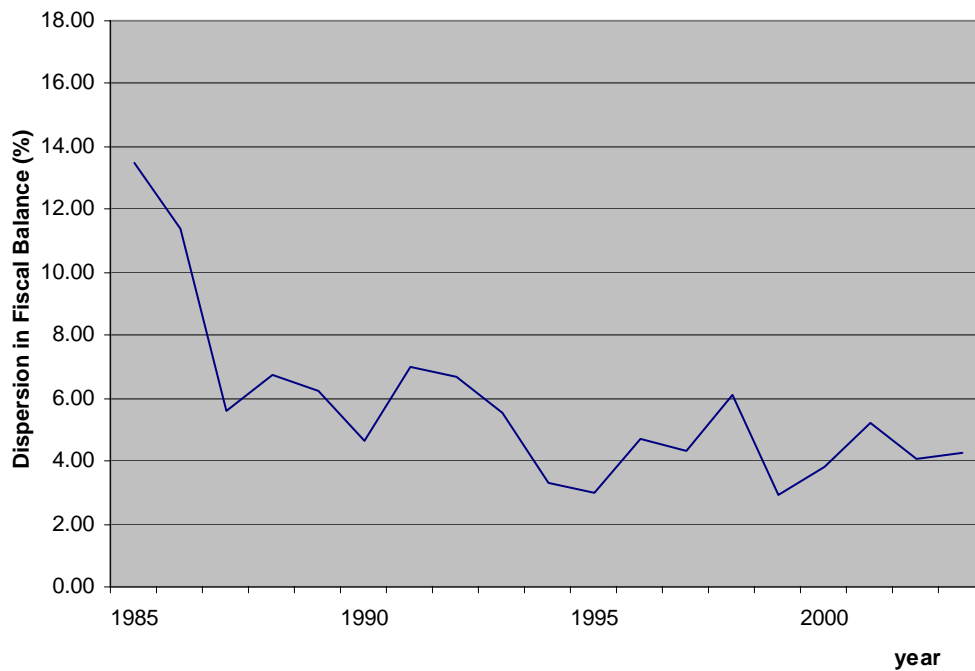


Figure 2.9 Dispersion (standard deviation) of fiscal balance across CEMAC countries, 1985-2003

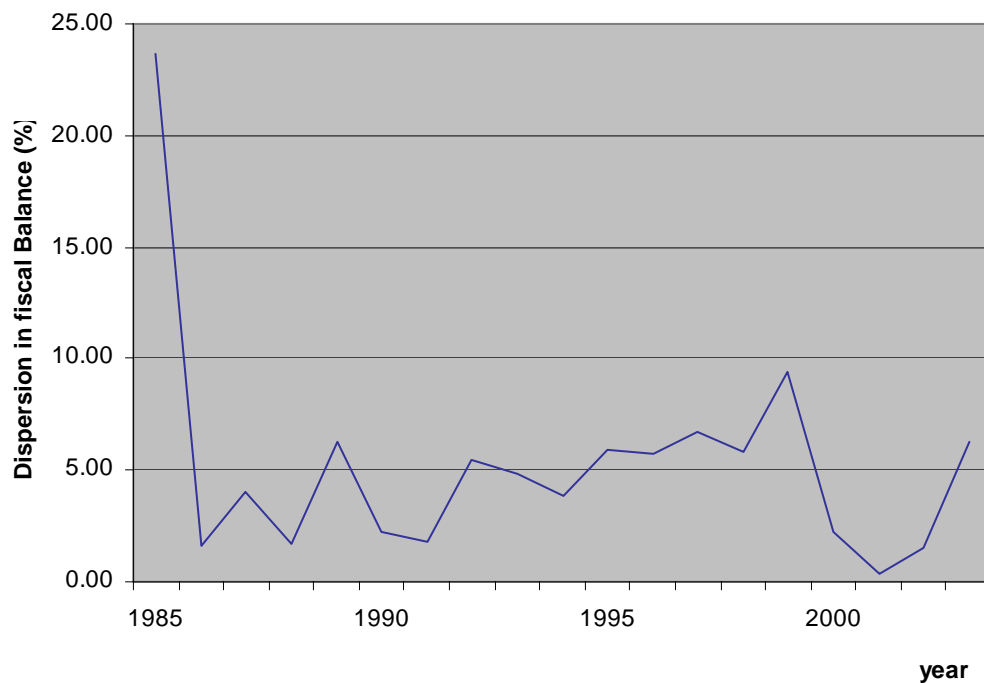
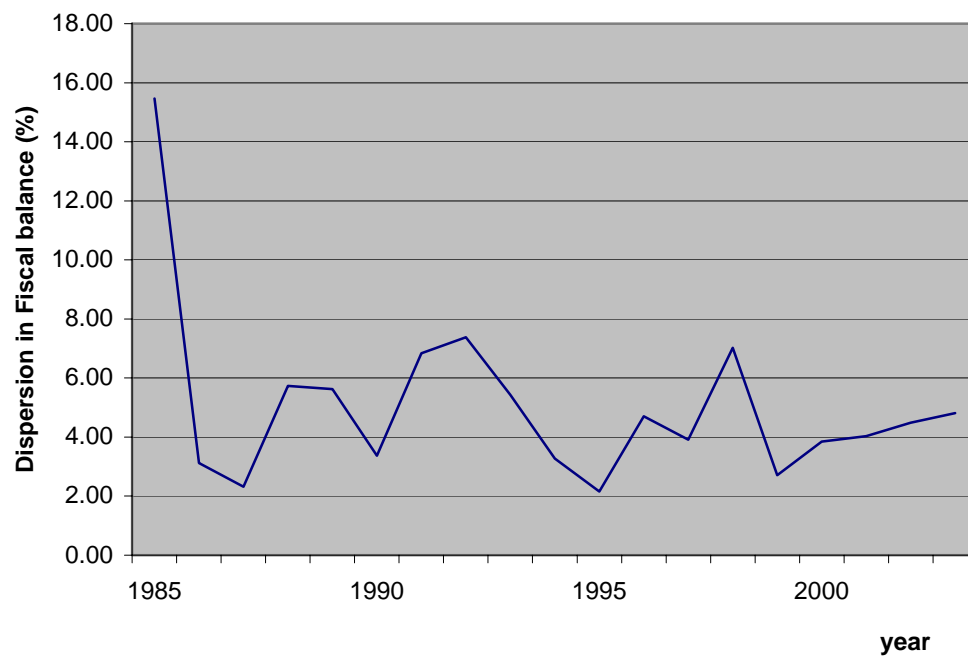


Figure 2.10 Dispersion (standard deviation) of fiscal balance across UEMOA countries, 1985-2003



III. Macroeconomic Convergence vs. Economic Growth

The previous section gave evidences of the seemingly tendency of macroeconomic convergence in the various African RECs. The convergence is observed both in the macroeconomic policy and fiscal policy. Firstly, the dispersion of inflation rates across all African RECs achieved a single digit of a level below 10 percent. Likewise, the fiscal balance dispersion across all African RECs is on the decline, approaching around 5 percent level. The other tools used in investigating convergence also shown that both inflation and fiscal balance are converging to the regional mean of each of the RECs.

Empirical evidence showed that good management of macroeconomic environment both monetary and fiscal policies, facilitates high levels of private and government savings, encourages private investment and attract foreign direct investments. The interplay of sound macroeconomic policies, high level of household savings, government savings and foreign direct investment eventually leads to high level and sustained economic growth as demonstrated in the experiences of the East Asian emerging economies (World Bank 1993).

However, unlike the East Asian countries, the controlled and stable macroeconomic environment in the African RECs does not seem to lead to high economic growth. Table 3.1 shows the five-year averages of GDP growth in various African countries members of various RECs under study. The figures indicate that only very few countries showed impressive growth in the last ten years (1996-2005). These countries include Angola and Sudan of COMESA; Mozambique and Botswana of SADC (also Angola)---growth in Mauritius seemed to have slowed down; Equatorial Guinea of CEMAC; and a relatively good performance by Mali of UEMOA.

There are a good number of explanations on why African regional integration failed to improve economic growth in the region despite its efforts to promote economic and political cooperation. Firstly, economic growth is related to the high accumulation of the factors of production and an efficient technology mix. Even though the macroeconomic environment seems right, the African countries has not been successful in attracting significant inflow of development aid and foreign direct investments (see Ben Hammouda et al. 2007) which is essential in the formation of capital. Moreover, most African countries lack efficient technology to increase and diversified production. As demonstrated in Ben Hammouda et al. (2006), most African countries do not have diversified production mix and most rely on the traditional primary products. Other factors could be attributed to low household and government savings, which could have led to the improvement of domestic investment.

Finally, aside from the many internal factors that might have contributed to slow growth in the continent, Africa has also failed to expand its share of the global trade. Africa's share in the total trade in 2005 is only around 3 percent. Unfortunately, given this minimal contribution to the global trade, the intra-Africa trade is also marginal (see Ben Hammouda et al. 2007).

Table 3.1. Five-year GDP Growth in Sub-Saharan Africa (In Percent)

	1981-85	1986-90	1991-95	1996-2000	2000-2005
Angola	1.46	3.28	-3.78	6.43	10.55
Benin	4.66	0.89	4.25	5.35	4.08
Botswana	10.01	11.87	4.06	8.35	5.84
Burkina Faso	4.18	2.64	3.84	4.32	5.10
Burundi	5.35	3.73	-2.40	-1.34	2.20
Cameroon	9.40	-2.22	-1.86	4.75	3.66
Cape Verde	8.62	3.50	5.23	6.40	4.98
Central African Republic	2.29	0.04	1.09	2.38	-0.68
Chad	9.18	1.94	2.44	2.74	13.76
Comoros	4.29	1.62	0.89	1.47	2.79
Congo, Dem. Rep.	1.86	0.01	-7.12	-3.91	4.04
Congo, Rep.	10.57	-0.26	0.70	2.52	4.40
Cote d'Ivoire	0.32	1.18	1.51	3.21	0.11
Djibouti	-3.07	-0.43	2.98
Equatorial Guinea	..	1.36	7.05	33.03	10.94
Eritrea	12.51	1.17	3.67
Ethiopia	-1.30	4.86	0.46	4.76	5.17
Gabon	2.56	1.73	3.13	1.76	1.74
Gambia	3.23	4.10	2.11	4.50	3.92
Ghana	-0.25	4.81	4.28	4.32	5.04
Guinea	..	4.50	3.74	4.18	3.08
Guinea-Bissau	6.45	3.78	3.18	1.06	-0.12
Kenya	2.53	5.64	1.61	2.16	3.60
Lesotho	3.09	5.86	3.96	3.01	2.83
Liberia	-1.88	-16.48	-21.66	39.34	-3.36
Madagascar	-1.55	2.75	-0.28	3.84	2.60
Malawi	2.17	2.32	3.52	3.92	2.73
Mali	-2.25	3.86	2.99	5.19	6.39
Mauritania	0.92	2.47	3.26	2.61	4.04
Mauritius	4.33	7.39	5.13	5.38	4.15
Mozambique	-4.62	5.62	2.68	8.00	8.87
Namibia	-0.19	2.68	4.96	3.51	4.40
Niger	-2.32	2.60	0.81	2.92	3.99
Nigeria	-2.75	5.42	2.49	3.08	5.66
Rwanda	2.68	1.50	-3.95	9.80	5.40
Sao Tome and Principe	..	1.83	1.64	2.10	3.82

Senegal	3.23	3.22	1.53	4.42	4.73
Seychelles	0.92	5.56	2.90	6.40	-2.30
Sierra Leone	0.87	1.09	-5.05	-3.54	13.94
South Africa	1.40	1.68	0.89	2.80	3.75
Sudan	0.83	4.55	5.13	6.31	6.26
Swaziland	2.61	10.26	2.88	3.31	2.20
Tanzania	..	5.40	1.80	4.08	6.85
Togo	-0.24	2.51	0.61	4.52	2.49
Uganda	0.70	5.09	7.05	6.55	5.61
Zambia	0.53	1.64	-1.28	2.84	4.79
Zimbabwe	4.36	4.60	1.39	0.89	-5.56

Source: World Development Indicators, CD-ROM (2007)

IV. Conclusion

This paper investigates the macroeconomic convergence in various African RECs and its relationship to economic growth. It is found that although, there is seemingly evidence of the tendency of macroeconomic convergence in the various African RECs, this does not lead to expected higher growth. The various African RECs displayed a stable macroeconomic environment in the recent years but there is very little growth associated with it. The paper attributed this little growth to many internal and external challenges being faced by the African continent.

References

- Ben Hammouda, H., S. Karingi, A. Njuguna, and M. Sadni-Jallab (2006), "Africa's (mis)fortunes in global trade and the continent's diversification regimes", *Journal of World Investment and Trade* 7(4), 587-616.
- Ben Hammouda, H., S. Karingi, A. Njuguna, and M. Sadni-Jallab (2007), Why Doesn't Regional Integration Improve Income Convergence in Africa?, Paper prepared for the African Economic Conference, 15-17 November 2007, United Nations Conference Centre, Addis Ababa, Ethiopia.
- Bernard, A. and S. Darlauf (1995), "Convergence in international output", *Journal of Applied Econometrics* 10(2), pp. 97-108.
- World Bank (1993), *The East Asian Miracle*, Oxford University Press.

Appendix 1: Methodology for Analyzing Macroeconomic Convergence.

a. Analysis of cross-country dispersion

Define the standard deviation of x across countries in the region at time t as σ_t . Then one way to assess convergence is to see whether σ decreases over time. A formal test involves estimating the regression:

$$\sigma_t = \alpha + \phi T_t + \varepsilon_t \quad (\text{a.1})$$

where T is a time trend, ε is a disturbance, and α and ϕ is the parameters to be estimated. Convergence requires the estimated ϕ to be significantly negative. Equation (a.1) can be estimated using OLS. Henceforth this methodology to test convergence will be referred to as **sigma test or sigma convergence**. Sigma convergence states that the dispersion of a series under consideration across a group of economies tends to fall over time. In other words, a group of economies are converging in the sense of sigma, σ (standard deviation) if $\sigma_{t+T} < \sigma_t$, where σ_t is the time t standard deviation of $\log(y_{i,t})$ across i .

b. Unit root testing

Let x_m be the regional average of variable x . Then, define the time varying process $\delta_{it} \equiv x_{it} - x_{mt}$. In practice δ is the time varying difference between x in country i at time t and some regional reference value of x at the same time. A second way to assess convergence is to see whether this time varying difference exhibits any tendency to die over time. Formally, this requires estimating the following equation:

$$\delta_{it} = \alpha + \phi \delta_{it-1} + \varepsilon_t \quad (\text{a.2})$$

and test the null hypothesis $H_0 : \phi = 1$. This is a standard test for a unit root. Rejection of the null implies that the series x is converging towards the reference value.

The unit root test can be run either country by country or for the pooled panel. In the first case, the test indicates whether each specific country is converging to the reference value. In the second case, the test indicates whether the group as a whole is converging towards the reference value. In this second case it is possible to keep individual heterogeneity into account by specifying the null as $H_0 : \phi_i = 1$ for all i against the alternative $H_1 : \phi_i < 1, i = 1, 2, \dots, M_1; \phi_i = 1, i = M_1 + 1, M_2 + 2, \dots, P$ (where P is the total number of countries in the region).

Even though it is obvious to define the reference value as the regional average, one can think of different references, i.e. the lowest (or highest, depending whether convergence to the top or to the bottom is desirable) value in the region, the average of the three lowest (or highest) values in the region, the target level established by convergence criteria.

The actual procedures for unit root testing are the DGLS unit root test and the panel unit root test of Im, Pesaran and Shin. Henceforth, this approach to testing convergence will be referred to as **unit root test**.

c. Analysis of cointegration

A third notion of convergence holds that two (or more) series converge if they share a common stochastic trend; that is, if they are cointegrated. Therefore, the test of convergence amounts to testing for cointegration in the equation:

$$x_{i,t} = \beta_0 + \beta_1 x_{-i1,t} + \beta_2 x_{-i2,t} + \dots + \beta_k x_{-ik,t} + \varepsilon_t \quad (\text{a.3})$$

where $-i,n$ ($n = 1 \dots k$) denotes the countries other than i . Equation (a.3) will include only those countries for which the series x is integrated of order 1. The determination of the order of integration will be done using the same DGLS unit root test applied for **unit root test** methodology.

A finding of $p-1$ cointegrating vectors, where p is the total number of countries (series) in the equation, will denote *full convergence*. A finding of less than $p-1$ cointegrating vectors will denote *partial convergence*; that is, some of the countries are converging and some are not. If no cointegrating vector is identified, then this will be evidence that countries are not converging at all.

The test of cointegration will follow Johansen procedure. Henceforth, this way of estimating convergence will be referred to as **cointegration test**.

Appendix 2. Sigma Convergence Tests

Table A2.1: Sigma tests results for macroeconomic variables

Series	SADC	COMESA	ECOWAS	CEMAC	UEMOA
1. Inflation (Quarterly)					
Coeff. of time	-0.429*** (5.445)	-0.759*** (-12.723)	-0.422*** (-13.710)	-0.067*** (-4.420)	-0.410*** (-10.178)
R-squared	0.304	0.710	0.746	0.211	0.618
DW	0.250	0.586	0.567	1.261	0.534
2. Fiscal Balance (Annual)					
Coeff. of time	-0.372*** (-3.437)	-0.121 (0.976)	-0.328*** (-3.898)	-0.234 (-1.117)	-0.179 (-1.490)
R-squared	0.410	0.053	0.472	0.068	0.115
DW	2.295	2.168	1.019	1.493	1.618

***Significant at 1%; **significant at 5%; *significant at 10%

Appendix 3: Unit root tests

Table A3-1: Unit Root Tests for SADC Individual country series deviation from regional mean.

	Inflation (Quarterly: 1987Q1-2004Q2)		Fiscal Balance ^b (Annual:1985-2003)	
	Intercept	Trend and Intercept	Intercept	Trend and Intercept
Angola	-	-	-2.538**	-
Botswana	-0.960	-1.279	-1.383	-
Congo, D.R.	-	-	-	-
Lesotho	-1.019	-0.991	-4.310***	-
Madagascar	-2.617***	-2.974*	-1.421	-
Malawi	-3.140***	-3.351**	-3.260***	-
Mauritius	-1.487	-2.653	-1.984**	-
Mozambique	-	-	-2.078**	-
Namibia	-3.623***	-3.676**	-2.642**	-
South Africa	-1.128	-1.234	-2.524**	-
Swaziland	-2.235**	-2.429	-	-
Tanzania	-0.509	-4.746***	-1.993**	-
Zambia	-2.176**	-2.511	-3.308***	-
Zimbabwe	-	-	-3.434***	-

^aAutomatic selection of lag length based on Schwarz Information Criterion.

^bTest critical values were calculated for 20 observations and may not be accurate for this particular series.

(-) means insufficient data.

***Significant at 1%; **significant at 5%; *significant at 10% . See MacKinnon (1996) for asymptotic critical values.

Table A3-2: Unit root tests for COMESA individual country series deviation from regional mean.

Country	Elliot-Rothenberg-Stock DF-GLS test-Statistics ^a			
	Inflation (Quarterly 1987Q1-2003Q4)		Fiscal Balance ^b (Annual:1985-2003)	
	Intercept	Trend and Intercept	Intercept	Trend and Intercept
Angola	-	-	-2.613**	-
Burundi	-1.196	-2.379	-3.189***	-
Comoros	-	-	-5.245***	-
DRC	-	-	-	-
Egypt	-3.135***	-3.201**	-	-
Ethiopia	-0.667	-2.386	-2.749***	-
Kenya	-2.579**	-3.496**	-3.063***	-
Madagascar	-1.476	-2.275	-1.726*	-
Malawi	-2.532**	-3.262**	-3.404***	-
Mauritius	-1.536	-3.504**	-2.064**	-
Namibia	-3.003***	-3.937***	-2.974***	-
Rwanda	-1.576	-3.524**	-	-
Seychelles	-0.262	-2.567	-	-
Sudan	-	-	-	-
Swaziland	-1.901**	-3.756***	-	-
Uganda	-0.084	-0.774	-2.808***	-

Zambia	-2.113**	-2.419	-3.212***	-
Zimbabwe	-	-	-2.336**	-

^aAutomatic selection of lag length based on Schwarz Information Criterion.

^bTest critical values were calculated for 20 observations and may not be accurate for this particular series.

(-) means insufficient data.

***Significant at 1%; **significant at 5%; *significant at 10% . See MacKinnon (1996) for asymptotic critical values.

Table A3-3: Unit Root Tests for ECOWAS Individual country series deviation from regional mean.

Country	Elliot-Rothenberg-Stock DF-GLS test-Statistics ^a					
	Per Capita Income (Annual: 1980-2003)		Inflation (Quarterly:1988Q3- 2004Q4)		Fiscal Balance ^b (Annual:1985-2002)	
	Intercept	Trend and Intercept	Intercept	Trend and Intercept	Intercept	Trend and Intercept
Benin	-0.189	-	-	-	-	-
Burkina Faso	-0.921	-	-2.646**	-4.393***	-	-
Cape Verde	1.816	-	-1.085	-1.935	-3.29***	-
Cote d'Ivoire	-0.789	-	-2.151**	-3.543**	-1.86*	-
Gambia	-1.693*	-	-1.831*	-2.473	-1.03	-
Ghana	-1.495	-	-4.179***	-4.256***	-1.99**	-
Guinea-Bissau	-1.188	-	-1.623*	-3.973***	4.120***	-
Guinea	-	-	-	-	-	-
Liberia	-0.682	-	-	-	-	-
Mali	-0.424	-	-1.861*	-2.421	-3.96***	-
Niger	-0.968	-	-2.010**	-4.239***	-3.68***	-
Nigeria	-1.750*	-	-2.762***	-3.224**	-	-
Senegal	-1.608*	-	-1.096	-4.622***	-5.06***	-
Sierra Leone	-0.118	-	-1.882*	-2.306	-2.37**	-
Togo	-2.079**	-	-1.420	-2.412	-2.61**	-

^aAutomatic selection of lag length based on Schwarz Information Criterion.

^bTest critical values were calculated for 20 observations and may not be accurate for this particular series.

(-) means insufficient data.

***Significant at 1%; **significant at 5%; *significant at 10% . See MacKinnon (1996) for asymptotic critical values.

Table A3-4: Unit Root Tests for CEMAC Individual country series deviation from regional mean.

Country	Elliot-Rothenberg-Stock DF-GLS test-Statistics ^a			
	Inflation (Quarterly: 1984Q2-2002Q4)		Fiscal Balance ^b (Annual:1985-2003)	
	Intercept	Trend and Intercept	Intercept	Trend and Intercept
Cameroon	-3.405***	-4.668***	-4.320***	-
CAR	-2.301**	-3.444**	-	-
Chad	-2.813***	-3.432**	-	-
Congo, Rep	-	-	-2.932***	-
Eq. Guinea	-	-	-	-
Gabon	-5.326***	-4.839***	-3.177***	-

^aAutomatic selection of lag length based on Schwarz Information Criterion.

^bTest critical values were calculated for 20 observations and may not be accurate for this particular series. (-) means insufficient data.

***Significant at 1%; **significant at 5%; *significant at 10% . See MacKinnon (1996) for asymptotic critical values.

Table A3-5: Unit Root Tests for UEMOA Individual country series deviation from regional mean.

Country	Elliot-Rothenberg-Stock DF-GLS test-Statistics ^a			
	Inflation (Quarterly: 1988Q3-2004Q4)		Fiscal Balance ^b (Annual:1985-2003)	
	Intercept	Trend + Intercept	Intercept	Trend + Intercept
Benin	-	-	-	-
Burkina Faso	-2.281**	-3.986***	-	-
Côte d'Ivoire	-2.036**	-2.969*	-3.188***	-
Guinea Bissau	-1.489	-3.787***	-3.978***	-
Mali	-2.087**	-3.835***	-2.659**	-
Niger	-0.868	-3.074*	-4.037***	-
Senegal	-1.810*	-3.249***	-3.921***	-
Togo	-2.811***	-3.914***	-2.670**	-

^aAutomatic selection of lag length based on Schwarz Information Criterion.

^bTest critical values were calculated for 20 observations and may not be accurate for this particular series. (-) means insufficient data.

***Significant at 1%; **significant at 5%; *significant at 10% . See MacKinnon (1996) for asymptotic critical values.

Table A3-6. Unit Root test results on pooled observations (series deviation from regional mean)

Series	Im, Pesaran and Shin W-Stat (Ind'l unit root process) ^a				
	SADC	COMESA	ECOWAS	CEMAC	UEMOA
1. Inflation					
Intercept	-2.498*** (0.006)	-5.668*** (0.000)	-3.253*** (0.000)	-7.090*** (0.000)	-3.113*** (0.001)
Intercept + Trend	-4.616*** (0.000)	-5.005*** (0.000)	-5.938*** (0.000)	-7.381*** (0.000)	-5.693*** (0.000)
2. Fiscal Balance					
Intercept	-4.260*** (0.000)	-4.921*** (0.000)	-6.410*** (0.000)	-10.192*** (0.000)	-6.547*** (0.000)
Intercept + Trend	-3.746*** (0.000)	-6.219*** (0.000)	-4.930*** (0.000)	-8.335*** (0.000)	-8.054*** (0.000)

^aAutomatic selection of lag length based on Schwarz Information Criterion.

Values in the parentheses are probabilities.

***Significant at 1%; **significant at 5%; *significant at 10%

APPENDIX 4. COINTEGRATION TEST

Table A4-1: Cointegration test on SADC countries:

a. Unit root test on actual values

Country	Elliot-Rothenberg-Stock DF-GLS test-Statistics ^a			
	Inflation (Quarterly: 1987Q1-2004Q2)		Fiscal Balance ^b (Annual: 1985-2003)	
	Intercept	Trend and Intercept	Intercept	Trend and Intercept
Angola	-	-	-2.604**	-
Botswana	-1.286	-1.732	-1.560	-
Congo, D.R.	-	-	-	-
Lesotho	-1.437	-1.283	-2.792***	-
Madagascar	-2.122**	-2.191	-2.283**	-
Malawi	-3.331***	-3.490**	-3.563***	-
Mauritius	-1.327	-1.821	-1.680*	-
Mozambique	-	-	-2.080**	-
Namibia	-4.246***	-4.160***	-2.051**	-
South Africa	0.642	-2.444	-1.654*	-
Swaziland	-3.504***	-3.997***	-	-
Tanzania	-1.075	-2.515	-2.299**	-
Zambia	-2.056	-2.434	-3.712***	-
Zimbabwe	-	-	-3.706***	-

^aAutomatic selection of lag length based on Schwarz Information Criterion.

^bTest critical values were calculated for 20 observations and may not be accurate for this particular series.

(-) means insufficient data.

***Significant at 1%; **significant at 5%; *significant at 10%

See MacKinnon (1996) for asymptotic critical values.

Table A4-1a: Cointegration analysis on per capita income of SADC countries¹

a. SACU

Included observations: 22 after adjustments

Trend assumption: Linear deterministic trend

Series: BOTSWANA LESOTHO NAMIBIA SWAZILAND

Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.615491	45.02579	47.85613	0.0900
At most 1	0.503526	23.99843	29.79707	0.2005
At most 2	0.304201	8.593487	15.49471	0.4043
At most 3	0.027533	0.614220	3.841466	0.4332

¹ Cointegration analysis on per capita income for all SADC countries is not possible due to insufficient data. Therefore, we use the sub-group of SACU and non-SACU countries.

Trace test indicates no cointegration at the 0.05 level
 * denotes rejection of the hypothesis at the 0.05 level
 **MacKinnon-Haug-Michelis (1999) p-values

b. Non-SACU

Included observations: 22 after adjustments
 Trend assumption: Linear deterministic trend
 Series: ANGOLA DRC MADAGASCAR MAURITIUS MOZAMBIQUE ZAMBIA
 ZIMBABWE
 Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.999605	372.9000	125.6154	0.0000
At most 1 *	0.987230	200.4701	95.75366	0.0000
At most 2 *	0.859424	104.5354	69.81889	0.0000
At most 3 *	0.767418	61.37130	47.85613	0.0017
At most 4	0.495655	29.28405	29.79707	0.0572
At most 5	0.440905	14.22516	15.49471	0.0770
At most 6	0.063085	1.433578	3.841466	0.2312

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level
 * denotes rejection of the hypothesis at the 0.05 level
 **MacKinnon-Haug-Michelis (1999) p-values

Table A4-1b: Cointegration analysis on inflation of SADC countries

Included observations: 67 after adjustments
 Trend assumption: Linear deterministic trend
 Series: BOTSWANA LESOTHO MAURITIUS SER01 TANZANIA ZAMBIA
 Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.467772	125.5677	95.75366	0.0001
At most 1 *	0.391108	83.31191	69.81889	0.0029
At most 2 *	0.319774	50.07220	47.85613	0.0305
At most 3	0.225815	24.25512	29.79707	0.1899
At most 4	0.095763	7.106877	15.49471	0.5652
At most 5	0.005394	0.362394	3.841466	0.5472

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
 * denotes rejection of the hypothesis at the 0.05 level
 **MacKinnon-Haug-Michelis (1999) p-values

Table A4-1c: Cointegration analysis on fiscal balance of SADC countries

Included observations: 17 after adjustments
 Trend assumption: Linear deterministic trend
 Series: BOTSWANA MAURITIUS S_AFRICA
 Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.554320	21.82771	29.79707	0.3082
At most 1	0.273232	8.089105	15.49471	0.4559
At most 2	0.145024	2.663597	3.841466	0.1027

Trace test indicates no cointegration at the 0.05 level
 * denotes rejection of the hypothesis at the 0.05 level
 **MacKinnon-Haug-Michelis (1999) p-values

Table A4-2: Cointegration test on COMESA countries

a. Unit root tests on Actual Values

Country	Elliot-Rothenberg-Stock DF-GLS test-Statistics ^a			
	Inflation (Quarterly 1987Q1-2003Q4)		Fiscal Balance ^b (Annual: 1985-2003)	
	Intercept	Trend and Intercept	Intercept	Trend and Intercept
Angola	-	-	-2.602**	-
Burundi	-1.197	-1.589	-3.357***	-
Comoros	-	-	-4.745***	-
DRC	-4.611***	-4.665***	-	-
Egypt	0.159	-2.14	-	-
Ethiopia	-2.217**	-2.517	-3.025***	-
Kenya	-2.909***	-3.127**	-2.806***	-
Madagascar	-2.066**	-2.143	-2.283**	-
Malawi	-3.309***	-3.486**	-3.686***	-
Mauritius	-1.305	-1.866	-1.684*	-
Namibia	-4.175***	-3.203**	-2.054**	-
Rwanda	-3.406***	-3.525**	-	-
Seychelles	-3.118***	-2.493	-	-
Sudan	-	-	-	-
Swaziland	-3.606***	-4.001***	-	-

Uganda	-0.054	-0.840	-4.171***	
Zambia	-2.040**	-2.411**	-3.529***	-
Zimbabwe	-	-	-2.992***	-

^aAutomatic selection of lag length (maxlag=4 (annual series);=11(quarterly series) based on Schwarz Information Criterion.

^bTest critical values were calculated for 20 observations and may not be accurate for this particular series.

(-) means insufficient data.

***Significant at 1%; **significant at 5%; *significant at 10%

Table A4-2b: Cointegration analysis on inflation of COMESA countries

Included observations: 66 after adjustments

Trend assumption: Linear deterministic trend

Series: BURUNDI EGYPT MAURITIUS UGANDA

Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.415465	66.92641	47.85613	0.0003
At most 1 *	0.240070	31.48844	29.79707	0.0316
At most 2	0.115791	13.36950	15.49471	0.1019
At most 3 *	0.076428	5.247421	3.841466	0.0220

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Note: The test is not possible for fiscal balance as all the series rejected the presence of unit root.

Table A4-3: Cointegration Tests for ECOWAS countries

a. Unit root tests on actual values

Country	Elliot-Rothenberg-Stock DF-GLS test-Statistics ^a			
	Inflation (Quarterly:1988Q3-2004Q4)		Fiscal Balance ^b (Annual:1985-2002)	
	Intercept	Trend and Intercept	Intercept	Trend and Intercept
Benin	-		-	-
Burkina Faso	-3.886***		-	-
Cape Verde	-1.185		-3.40***	-
Cote d'Ivoire	-3.526***		-1.41	-
Gambia the	-2.034**		-2.09**	-
Ghana	-3.856***		-2.11**	-
Guinea-Bissau	-1.395		-4.09***	-
Guinea	-		-	-
Liberia	-		-	-
Mali	-2.913***		-1.86*	-
Niger	-3.012***		-3.34***	-
Nigeria	-2.219**		-	-
Senegal	-2.853***		-4.02***	-
Sierra Leone	-1.804*		-2.13**	-
Togo	-1.864*		-2.274**	-

^a Automatic selection of lag length based on Schwarz Information Criterion.

^b Test critical values were calculated for 20 observations and may not be accurate for this particular series.

(-) means insufficient data.

***Significant at 1%; **significant at 5%; *significant at 10% . See MacKinnon (1996) for asymptotic critical values.

Table A4-3b: Cointegration analysis on Inflation of ECOWAS countries

Included observations: 63 after adjustments
Trend assumption: Linear deterministic trend
Series: CAPE_VERDE GUINEABISS S_LEONE TOGO
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.353902	55.22179	47.85613	0.0087
At most 1	0.270783	27.70317	29.79707	0.0856
At most 2	0.093787	7.808803	15.49471	0.4861
At most 3	0.025147	1.604498	3.841466	0.2053

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table A4-3c: Cointegration analysis on fiscal balance of ECOWAS countries

Included observations: 17 after adjustments

Trend assumption: Linear deterministic trend

Series: CIV MALI

Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.471591	12.71034	15.49471	0.1259
At most 1	0.103971	1.866303	3.841466	0.1719

Trace test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table A4-4: Cointegration results for CEMAC countries

a. Unit Root test on actual values

Country	Elliot-Rothenberg-Stock DF-GLS test-statistics ^a	
	Inflation (Quarterly: 1984Q2-2002Q4)	Fiscal Balance ^b (Annual: 1985-2003)
	Intercept	Intercept
Cameroon	-2.311**	-2.180**
CAR	-3.624***	-
Chad	-1.759*	-
Congo	-	-2.802***
Gabon	-3.718***	-3.330***

^aAutomatic selection of lag length based on Schwarz Information Criterion.

^bTest critical values were calculated for 20 observations and may not be accurate for this particular series.

(-) means insufficient data.

***Significant at 1%; **significant at 5%; *significant at 10% . See MacKinnon (1996) for asymptotic critical values.

Note: No cointegration test for inflation and fiscal balance series. The presence of unit root is rejected in all countries except Chad (based on 5% critical value).

Table A4-5: Cointegration Tests for UEMOA countries

a. Unit Root test on actual values

Country	Elliot-Rothenberg-Stock DF-GLS test-Statistics ^a			
	Inflation (Quarterly: 1984Q2-2002Q4)		Fiscal Balance ^b (Annual:1985-2003)	
	Intercept	Trend and Intercept	Intercept	Trend and Intercept
Benin	-	-	-	-
Burkina Faso	-3.887***	-3.897***	-	-
Côte d'Ivoire	-3.526***	-3.558**	-1.408	-
Guinea Bissau	-1.395	-4.572***	-4.090***	-
Mali	-2.913***	-3.268**	-1.858*	-
Niger	-3.012***	-3.236**	-3.316***	-
Senegal	-2.853***	-2.998*	-4.020***	-
Togo	-1.870*	-1.974	-2.275**	-

^aAutomatic selection of lag length based on Schwarz Information Criterion.

^bTest critical values were calculated for 20 observations and may not be accurate for this particular series.

(-) means insufficient data.

***Significant at 1%; **significant at 5%; *significant at 10% . See MacKinnon (1996) for asymptotic critical values.

Table A4-5b. Cointegration analysis on the inflation series of UEMOA countries

Included observations: 63 after adjustments
Trend assumption: Linear deterministic trend
Series: GUINEA_B TOGO
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.192736	17.43531	15.49471	0.0252
At most 1 *	0.060724	3.946693	3.841466	0.0470

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table A4-5c. Cointegration analysis on fiscal balance series of UEMOA countries

Included observations: 17 after adjustments
Trend assumption: Linear deterministic trend
Series: CIV MALI

Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.473307	12.74771	15.49471	0.1244
At most 1	0.103026	1.848381	3.841466	0.1740

Trace test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Endnotes:

¹ The SADC countries are Angola, Botswana, DR Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe.

² The member countries in COMESA are Angola, Burundi, Comoros, DR Congo, Djibouti, Egypt, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Namibia, Rwanda, Seychelles, Sudan, Swaziland, Uganda, Zambia and Zimbabwe.

³ The ECOWAS countries are Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, Gambia, Ghana, Bissau Guinea, Guinea, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo.

⁴ The CEMAC countries are namely: Cameroon, Central African Republic, Chad, Republic of Congo, Equatorial Guinea and Gabon.

⁵ The UEMOA countries are Benin, Burkina Faso, Cotê d'Ivoire, Guinea Bissau, Mali, Niger, Senegal and Togo.

⁶ This particular set includes Botswana, Lesotho, Madagascar, Malawi, Mauritius, Namibia, South Africa, Swaziland, Tanzania and Zambia. Other SADC countries such as Angola, Mozambique and Zimbabwe do not have sufficient data to be included in the analysis from 1987Q1 to 2004Q2. D. R. Congo was eliminated from the analysis due to its erratic and highly volatile inflation values. Also, in some quarters its inflation values are extremely high. For example in 1994Q3, inflation is 73,529%.

⁷ It can also be shown that the difference between country, *i* and its regional mean, has a tendency to approach zero value.

⁸ The countries included in the analysis are Burundi, Egypt, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Namibia, Rwanda, Seychelles, Swaziland, Uganda and Zambia. Other COMESA countries such as Angola, Djibouti, Sudan and Zimbabwe do not have sufficient data. Eritrea and Comoros do not have inflation data from the source while DRC was eliminated due to volatile and extremely high inflation levels.

⁹ The countries included are Burkina Faso, Cape Verde, Cote d'Ivoire, Gambia, Ghana, Guinea Bissau, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo. Benin, Guinea and Liberia do not have sufficient data on quarterly inflation.

¹⁰ The countries included are Cameroon, Central African Republic, Chad and Gabon. Republic of Congo and Equatorial Guinea do not have sufficient data.

¹¹ The countries included are Burkina Faso, Cote d'Ivoire, Guinea Bissau, Mali, Niger, Senegal and Togo. Only Benin is not included due to insufficient data.

¹² Here fiscal balance represents the government deficit/surplus including grants. It represents the net financing requirement of the consolidated government expressed as % of current GDP in national currency (World Bank Africa Database CD-ROM 2004/5).