

A PRELIMINARY INVESTIGATION INTO MACROECONOMIC ASPECTS  
OF REGIONAL ECONOMIC INTEGRATION: THE CONVERGENCE  
HYPOTHESIS

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# **A preliminary investigation into macroeconomic aspects of regional integration: the convergence hypothesis**

## **1. Introduction and motivation**

Southern African policy makers are searching for broader economic co-operation as a solution to generally weak economies and small markets. They also want to obtain substantial growth in their economies by deepening regional integration agreements. Jenkins and Thomas (1998a) maintain that regional integration has achieved very little in Africa despite of its political appeal. This paper intends to focus on a preliminary investigation of certain macroeconomic aspects of regional integration: the so called convergence hypothesis. It seeks to test what degree of convergence exist and what degree of convergence is necessary for effective policy co-ordination in Southern Africa. The convergence hypothesis asserts that a fairly restricted set of countries, the members of a convergence club A, are undergoing a process that brings their levels of output performance (productivity), economic development and macroeconomic behaviour increasingly closer to one another (Baumol et al.1994). Output performance (productivity) is concerned with economic growth, whereas macroeconomic behaviour is concerned with economic structure. Economic development deals with social indicators which reflects welfare performance and the spill over effects of output performance and macroeconomic behaviour. The aim of this research is to test this hypothesis in Southern Africa by using appropriate variables within the framework of the predictions of the neoclassical growth theories, which support absolute convergence and conditional convergence.

This preliminary cross country study will be based on the country risk profiles of SADC=s member countries which form part of the Development Bank of Southern Africa=s economic data set. In certain instances the actual levels of the variable involved will be used while in other instances rates of growth or even ratios= will be used to test convergence.

## **2. Approach**

The paper begins by reviewing the theoretical framework of economic growth. The paper will also provide an explanation of the convergence hypothesis as well as a clear distinction between the alternative concepts of convergence along with its significance. Concurrently, it will stipulate regional economic integration in Southern Africa together with the relationship between convergence and regional economic integration. After this discussion the limitations and restrictions to this preliminary investigation will be highlighted. The paper will be concluded with the preliminary

empirical analysis of the Southern Africa Development Community (SADC) and the Southern African Customs Union (SACU) cross country growth, social data and macroeconomic aspects. This preliminary investigation will focus on the analysis of output performance, economic development and macroeconomic behaviour in Southern Africa from 1991 to 2000. A comparative view of growth, >convergence clubs= and a summary of convergence measures will form part of the conclusion.

## **1. Theories of economic growth and convergence**

When considering the macroeconomic aspects of regional economic integration: the convergence hypothesis it is helpful to begin by reviewing the theoretical framework of economic growth. Barro and Sala-i-Martin (1995), Abromovitz (1996 ) and Barro (1997 b ) state that if we wish to understand why countries differ dramatically with regard to standard of living then we have to understand why countries experience such sharp divergence in long-term growth rates.

Classical economists such as Adam Smith, David Ricardo, Thomas Malthus and much later Allen Young and Joseph Schumpeter, provided the building blocks for the neoclassical theory of economic growth. These building blocks include approaches such as competitive behaviour, the rate of diminishing returns and its physical and human capital accumulation, the interplay between per capita income and the growth of the population, and the effects of technological progress.

This paper seeks to investigate the preliminary macroeconomic aspects of regional economic integration within the framework of the predictions of the neoclassical growth theories which predicts absolute and conditional convergence. Absolute convergence is predicted by the neoclassical growth theory for economies with equal rates of savings and population growth rates, and with access to the same technology. Conditional convergence is predicted for economies with different rates of savings and population, that is, their steady state incomes differ, but growth rates will eventually equalise<sup>1</sup>.

One of the key properties of the neoclassical growth model is its prediction of conditional convergence. Easterly and Wetzel (1989) maintain that the neoclassical theory also implies that, over time, income levels and growth rates for different countries will converge. Loayaza (1994) argues that in studies of conditional

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<sup>1</sup> References are Dornbush et al (1994) and Sala-i- Martin (1995)

convergence the positive feature of the Solow model<sup>2</sup> is crucial. The convergence property derived in the neoclassical model from the diminishing returns to capital. Economies that have less capital per worker tend to have higher rates of return and higher growth rates. The convergence is conditional because steady state levels of capital and output per worker depend in the neoclassical model on the propensity to save, the growth rate of the population, and the position of the production function (Barro 1997). In simple terms the issue of convergence implies that poorer economies might >catch up= with the richer ones<sup>3</sup>.

## **2. Convergence or divergence in cross country studies of growth**

As the previous discussion focused on the theoretical framework of economic growth and convergence, this section will deal with the interpretation of the convergence hypothesis, different concepts of convergence and their significance. Economic literature on the convergence hypothesis refers to the topic as complex, confusing and multifaceted. It appears that there are different issues involved, and no consensus on any particular issue. Literature on the topic refers to alternative concepts but does not distinguish between convergence in its different contexts. Dowrick and Nguyen (1989) argue that there is a crucial distinction between convergence and catching up. Therefore it is necessary to provide a clear understanding of the convergence hypothesis.

Acemoglu and Zilibotti (2001) state that even if all countries have access to the same set of technologies, there will be large cross country productivity differences. Baumol and Wolff (1988) and Baumol et al (1994) explain the convergence hypothesis as at least a fairly restricted set of countries, the members of a >convergence club', that are undergoing a process that brings their levels of output performance (productivity), economic development and macroeconomic behaviour increasingly closer to one another. Abramovitz (1986), De Long (1988), Barro (1991) and Gries (2000) support this statement.

The term convergence may be interpreted in many different ways. To avoid contributing to any further confusion let us take a closer look at the alternative concepts of convergence. Baumol et al

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<sup>2</sup> For a discussion of the Solow model, see Sala-i- Martin (1995), Jones, C. I.(1991) and Barro (1997)

<sup>3</sup> An in depth theoretical analysis will form part of the writers doctoral thesis

(1994) refers to seven different concepts (measures) of convergence that are mainly used.

The first measure of convergence is *homogenisation* which refers to the reduction of the dispersion among a set of countries (regions) in terms of some measure of performance. Homogenisation is often referred to as convergence of real GDP per capita. However, homogenisation can be applied to many other measures of a country=s performance<sup>4</sup>. The coefficient of variation, a sample=s standard deviation as a percentage of the sample=s mean, are used as a statistic to measure the degree convergence. Convergence occurs when the coefficient of variation declines over time for a country group. This implies that one country is >catching up= with another when closing the gap.

The second concept is *catch-up convergence*. Catch-up convergence is used to determine if a narrowing in the percentage gap between the leading country=s performance in the variable in question and that of the other countries in the pertinent set had occurred. It is important to note that homogenisation is not catch-up convergence. Homogenisation and catch-up convergence normally goes hand in hand but they are not equivalent. Most policy decisions are based on catch-up convergence rather than homogenisation.

The third concept of convergence is *gross convergence* which can be applied to either homogenisation or catch-up convergence. It refers to those countries that are experiencing some degree of convergence in the variable in question, without correcting for the influence exercised by other pertinent variables.

The fourth concept of convergence is *explained convergence*. This refers to the statistical evaluation of the role of the pertinent and measurable variables that can reasonably be expected to influence the time path and degree of convergence experienced in some countries.

The fifth concept of convergence is *residual convergence* which refers to the possibility that after a statistical removal of the effect of the variables estimated in the explained convergence calculation, the remaining, and statistically unexplained, residue in behaviour of the dependent variable will itself prove to display convergence among the countries studied.

The sixth concept of convergence is *asymptotically perfect convergence* which refers to two countries that are converging when in the long run the pertinent variables for the two countries

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<sup>4</sup> See Ingram (1992)

asymptotically approach precisely the same level.

The last concept of convergence is *bounded convergence*. Two countries are undergoing a process of bounded convergence if the time paths of the pertinent variables are heading toward destination points that are not necessarily identical but can be deemed to be reasonably close to another on some explicit and pre selected criterion.

It is also necessary to define a >convergence club= to minimise confusion. Convergence clubs are a subset of countries to which convergence applies, viz countries with similar initial human capital endowments. Members of the club which are moderately backward are able to take advantage of technological improvements in front-runners, and catch up (Baumol et al, 1994). Countries that are grouped together in a scatter diagram are assumed to form such a club<sup>5</sup>.

The convergence measures chosen for this preliminary investigation into the macroeconomic aspects of regional economic integration: the convergence hypothesis will consist of *homogenisation and catch-up convergence*. Some of the remaining measures of convergence will be referred to when discussing the limitations and restrictions of this paper and study.

The question can be asked: What is the significance of testing convergence? The analysis of the mechanism of convergence enhances the importance of the underlying factors of economic growth as well as the pattern it exhibits in the world economy. It provides a key for the evaluation of the world or regional economy and indicates the growth differences in growth between countries. Another reason for testing convergence is that it provides information for policy makers. World economies are linked in such a way that policies adopted in one country affect the economic performance of other countries. Policy decisions in one country are transmitted to another country.

### **3. Regional integration agreements and convergence**

Since regional integration agreements and co-operation influence output performance, economic development and macroeconomic behaviour, these issues need to be addressed<sup>6</sup>. International experience and economic literature explain that for policy co-

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<sup>5</sup> See Gries (2000) for a discussion on different types of >clubs=.

<sup>6</sup> See Venables (1999) for a discussion on regional integration: Forces of convergence and divergence

ordination to be beneficial, some degree of convergence must exist between countries. This paper proceeds to consider regional integration and convergence.

Economic theory indicates that regional economic integration and co-operation will increase economic growth potential, but that these benefits are not evenly distributed among and within different member countries. Piazzolo (2001) states that regional integration arrangements increase the trade activities between the partner countries at large, and it is therefore useful to state that the various channels increased by exchange of goods and services affect the standard of living of these countries: export revenues provide the necessary foreign exchange to overcome the foreign exchange bottleneck, enabling the country to import necessary capital and intermediate goods as well as increasing its capability to finance its debt. Resources are allocated according to the competitive advantage of a country. This will enhance its productivity (output performance) and will induce more efficient investments which will create spill-over effects due to the externalities generated by exports and imports<sup>7</sup>.

Southern African countries strive to improve economic growth by deepening their regional economic agreements. Let us look briefly at forms of regional economic associations and their features.

The first form of regional economic integration is a *free trade area* characterised by free trade among the members. The second form of regional economic integration is a *customs union* characterised by free trade among members and a common external tariff. The third form is a *common market* characterised by free trade among members, a common external tariff and the mobility of the factors of production. The fourth form is an *economic union* characterised by free trade among members, a common external tariff, the mobility of the factors of production and economic policy *harmonisation*. The last form of economic integration is an *economic union* characterised by free trade among members, a common external tariff and the mobility of the factors of production and the *unification* of economic policy<sup>8</sup>.

Southern Africa is characterised by a number of overlapping regional integration arrangements. For the purpose of this paper emphasis will only be placed on SADC and SACU. SADC was formerly known as the Southern Africa Development Co-ordination Conference (SADCC) and formed by the

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<sup>7</sup> De Rosa (1998) provides a discussion on regional integration and welfare improvement

<sup>8</sup> For more on regional economic integration see Asante (1997) and Hitiris (1991)

Lusaka declaration in 1980. Signing a new declaration and treaty established SADC in 1992, which replaced SADCC. The aim of SADC is to enlarge the overall size of the regional markets and to integrate them into a single whole. Through regional economic integration and co-operation SADC aims to provide balanced economic growth and development, political stability and security for all its member states. The member states include Angola, Botswana, the DRC, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe. SADC is characterised by South- South regional economic integration agreements

The Southern African Customs Union (SACU) was formed in 1910 and is the oldest customs union in the world. The customs union was formed by Botswana, Namibia, Lesotho, South Africa and Swaziland. SACU members have engaged in free trade since 1910, have operated a system of fiscal transfers and are also members of a currency union except for Botswana.

SADC is characterised by South- South regional economic integration agreements, whereas SACU is characterised by North-South regional integration agreements<sup>9</sup>. Since 1999 several bilateral trading agreements exist within SADC: three between South Africa and Zimbabwe (clothing and textiles), Malawi and Mozambique. There are also free trade areas between Zimbabwe and Botswana, Malawi as well as Namibia.

Having explored the theoretical background, alternative concepts of convergence, the convergence hypothesis, regional economic integration and convergence, we can move on to the preliminary empirical analysis of SADC and SACU from 1991 to 2000. Before we can start with this analysis it is, however, important to highlight the limitations and restrictions to this analysis.

#### **4. Restrictions to this investigation**

Levine and Renelt (1991) maintain that cross country studies may be no place for the methodological perfectionist. They also suggest that almost all cross country studies results are fragile<sup>10</sup>. Kormendi and Mequire (1985) state that the main issue is how accurately some variables reflect the hypothesised phenomenon. It

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<sup>9</sup> Venables (1991, 1997 and 1999), Alesina, Spolaore and Wacziarg (2000) as well as Piazzolo (2002) provides a discussion on the effects of North-South and South- South economic relationships.

<sup>10</sup> Also see Ram (1986) and Stockman (1988) for a discussion on the methodological, conceptual and statistical problems associated with cross country studies of growth.

is against this background that the importance arises of stating the limitations and restrictions regarding the sample group, the sample period and the validity of the data involved.

The sample group of this investigation confines itself only to the Southern African Development Community (SADC) of which all SACU countries are also members. However, Angola and the Democratic Republic of the Congo will be excluded due to unavailability and / or poor quality of data.

As cross country studies of growth are complex and confusing this empirical analysis is limited to the time period from 1991 to 2000 due to the availability, accuracy and sensitivity of data involved. The sample period restricts the testing of explained, residual, asymptotically perfect and bounded convergence. Cross country regressions results will only be statistically meaningful when the sample period exceeds fifteen years<sup>11</sup>.

Due to the validity of the data involved the results of this preliminary investigation must be viewed as sensitive and fragile. The accuracy of the data involved is affected by the availability of data, as well as the past instability of the region.

It is important to state that the preliminary investigation into macroeconomic aspects of regional integration: the convergence hypothesis is confined to a test of the extent of convergence that exists in Southern Africa. The paper does not intend to explain the reasons behind the occurrence of convergence or divergence in Southern Africa.

## **7. The preliminary empirical analysis of convergence SADC and SACU between 1991 and 2000**

This section will focus on the preliminary empirical analysis of convergence of output performance (productivity levels), economic development and macroeconomic behaviour in SADC and SACU. The analysis will firstly focus on cross country growth indicators, secondly on cross country social data sets and finally on certain aggregate macroeconomic behaviour indicators.

### **7.1 Output performance measures**

As a first step in testing output performance levels average real GDP per capita and average growth in per capita GDP from 1991 to 2000 in SADC and SACU will be analysed. The aim of the assessment will be to establish the occurrence of homogenisation, catch-up

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<sup>11</sup> This will be attempted in the writers doctoral thesis.

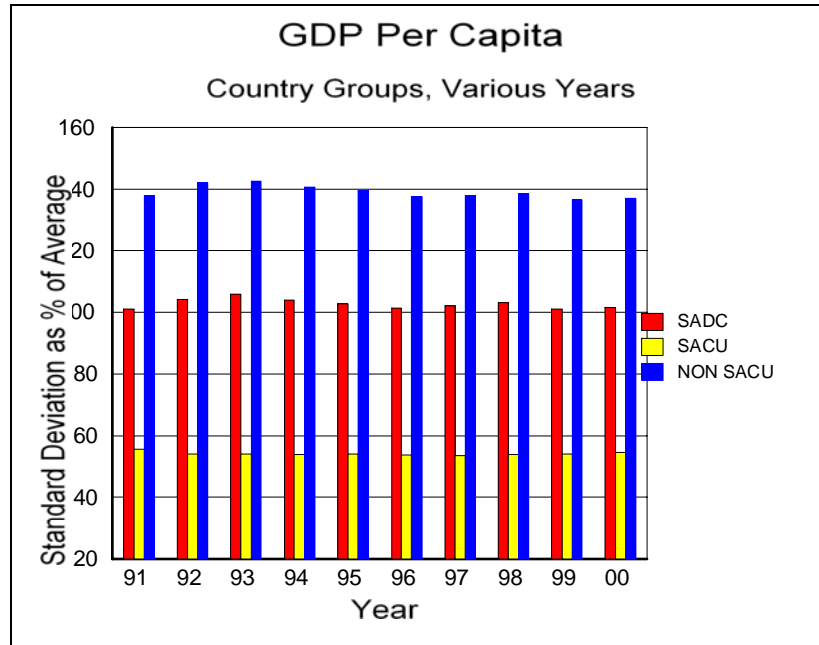
convergence and gross convergence. Ingram (1992) states that the coefficient of the variation ( a sample=s standard deviation as a percentage of the sample=s mean ) can be used as a statistic to measure convergence or divergence. He also argues that a decrease in the coefficient of variation indicates less variation in performance or an increase in homogeneity. Furthermore, the empirical analysis of SADC and SACU average real GDP per capita and average growth in per capita GDP from 1991 to 2000 will seek to assess catch-up or falling behind convergence. Baumol et al (1994) states that catch-up is to determine if a narrowing in the percentage gap between the leading country=s performance in the variable in question and that of the other countries in the pertinent set had occurred. It is important to note that most empirical studies testing the convergence hypothesis find no convergence among all countries in the world, or even between large subset of economies. However within smaller subsets of countries or regions evidence exists that convergence may occur. Furthermore, in order for convergence to occur the leaders in output performance must grow more slowly than the laggards do. If they do not grow slower it will be impossible for the laggards to catch-up.

**Table 1: Standard deviation as a percentage of the mean: GDP per capita SADC country groups, various years**

<b>GDP PER CAPITA - COUNTRY GROUPS, VARIOUS YEARS</b>					
<b>Year</b>	<b>SADC</b>		<b>SACU</b>		<b>NON SACU</b>
<b>STANDARD DEVIATION AS % OF AVERAGE ( MEAN )</b>					
<b>1991</b>	101.11		55.61		137.85
<b>1992</b>	104.15		54.15		141.97
<b>1993</b>	105.91		54.15		142.62
<b>1994</b>	103.90		53.93		140.75
<b>1995</b>	102.74		54.04		139.47
<b>1996</b>	101.36		53.68		137.59
<b>1997</b>	102.16		53.53		137.90
<b>1998</b>	103.18		53.93		138.57
<b>1999</b>	101.10		54.03		136.50
<b>2000</b>	101.59		54.53		137.08
<b>MEAN</b>					
<b>1991</b>	1868.67		2257.60		1590.86
<b>1992</b>	1902.67		2247.40		1656.43
<b>1993</b>	1926.25		2218.80		1717.29
<b>1994</b>	1925.08		2250.40		1692.71
<b>1995</b>	1934.67		2280.20		1687.86
<b>1996</b>	1983.75		2344.40		1726.14
<b>1997</b>	2037.17		2375.60		1795.43
<b>1998</b>	2056.00		2375.00		1828.14
<b>1999</b>	2044.33		2401.60		1789.14
<b>2000</b>	2064.17		2425.60		1806.00



**Figure 1: Standard deviation as a percentage of the mean - GDP per capita, SADC countries from 1991 to 2000**



This table 1 and figure 1 indicates that there is no indication of convergence or divergence of GDP per capita in SADC during the sample period. Neither convergence nor divergence occurred, thus no homogenisation exists in SADC. This table however indicates that convergence took place within SACU on a very limited scale during the sample period. The homogenisation that exists is marginal. Furthermore the table indicates no convergence or divergence in non SACU countries over the sample period. The overall effect of the sample group is that neither convergence nor divergence of GDP per capita took place during the past decade. One of the reasons why SADC and SACU growth performance differs so drastically may be explained by the fact that most non-SACU economies are characterised by closed structures, small size and South - South trade relationships, whereas SACU economies, especially South Africa, are characterised by more outward orientation, North-South trade relationships, industrialisation and an emerging market.

The following discussion will focus on the relationship between GDP per capita and growth in GDP per capita in SADC from 1991 to 2000.

Figures 2 (a), (b) and (c): The relationship between GDP per capita and the growth in GDP per capita in SADC countries during the sample period

Figure 2(a)

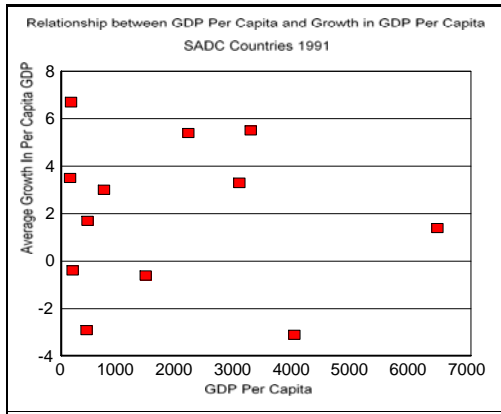


Figure 2(b)

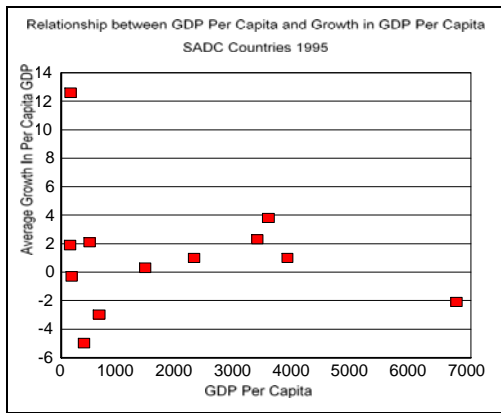


Figure 2(c)

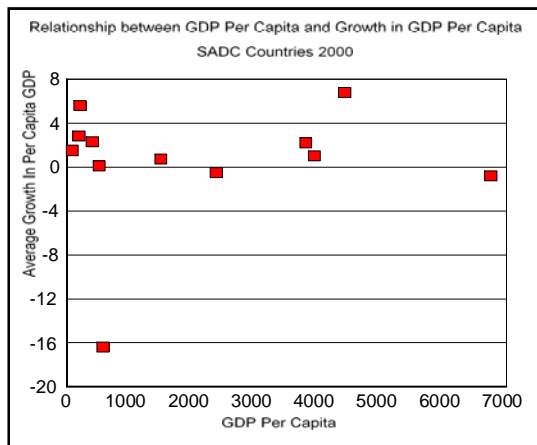


Figure 2(a) indicates that there was no definite relationship between GDP per capita and growth in GDP per capita in SADC in 1991. If one compares the situation in 1995 with that of 1991, figure 2 (b), one can see that a relationship between GDP per capita and the growth in GDP was established in SADC. This relationship indicates that countries with a low GDP per capita had experienced a positive relationship between GDP per capita and growth in GDP per capita. However, middle to high GDP per capita SADC countries had reached a plateau. Figure 2 (c) indicates that in comparison with 1995, SADC countries with higher GDP per capita experienced lower growth in GDP per capita in 2000. There is a negative relationship between average growth in GDP per capita and GDP per capita. This implies that the lagging countries are catching-up to the leading countries in SADC.

**Table 2: Catch-up convergence, cross country SADC performance 1991, 1995 and 2000**

<b>CATCH - UP CONVERGENCE CROSS SECTION COMPARATIVE ECONOMIC PERFORMANCE</b>			
<b>Country</b>	<b>1991</b>	<b>1995</b>	<b>2000</b>
	<b>GDP per capita ( US \$ )</b>	<b>GDP per capita ( US \$ )</b>	<b>GDP per capita ( US \$ )</b>
<b>Botswana</b>	3238.00	3351	3805.00
<b>Lesotho</b>	453.00	484	512.00
<b>Malawi</b>	166.00	161	85.00
<b>Mauritius</b>	3043.00	3541	4429.00
<b>Mozambique</b>	149.00	153	209.00
<b>Namibia</b>	2171.00	2268	2376.00
<b>Seychelles</b>	6428.00	6749	6748.00
<b>South Africa</b>	3986.00	3863	3944.00
<b>Swaziland</b>	1440.00	1435	1491.00
<b>Tanzania</b>	191.00	177	193.00
<b>Zambia</b>	433.00	389	402.00
<b>Zimbabwe</b>	726.00	645	576.00
<b>RSA = 100</b>			
<b>Botswana</b>	81.23	86.75	96.48
<b>Lesotho</b>	11.36	12.53	12.98
<b>Malawi</b>	4.16	4.17	2.16
<b>Mauritius</b>	76.34	91.66	112.30
<b>Mozambique</b>	3.74	3.96	5.30
<b>Namibia</b>	54.47	58.71	60.24
<b>Seychelles</b>	161.26	174.71	171.10
<b>South Africa</b>	100.00	100.00	100.00
<b>Swaziland</b>	36.13	37.15	37.80
<b>Tanzania</b>	4.79	4.58	4.89
<b>Zambia</b>	10.86	10.07	10.19

Zimbabwe	18.21	16.70	14.60
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Table 2 indicates the rates of catch-up convergence in GDP per capita for SADC countries in 1991, 1995 and 2000. South Africa was chosen as the leading country because of its emerging market economy with a strong manufacturing base as well as a first world financial sector. It is obvious that the majority of SADC countries are catching-up to the leader except for Seychelles, Mauritius, Malawi and the weakest link Zimbabwe. Although homogenisation (convergence of GDP per capita) did not occur, the catch-up convergence calculation indicates that the majority of SADC countries are catching-up with the leader.

## 7.2 Social measures

We now turn to the empirical analysis of economic development by means of social indicators. These indicators includes the age dependency ratio, adult literacy rates and percentage of the population urbanised. Only a limited number of social indicators were chosen for the preliminary analysis of economic development. This empirical analysis seeks to assess the extent to which these social indicators exhibit convergence or divergence. Ingram (1992) argues that the same logic of convergence can be applied to any other measure of a country's performance, such as social indicators. The measure that will be used compares the coefficient of variation of the social indicator involved between SADC and SACU from 1991 to 2000.

**Table 3: Standard deviation as a percentage of the mean: Age dependency ratio of SADC countries from 1991 to 2000**

AGE DEPENDENCY RATIO: COUNTRY GROUPS, VARIOUS YEARS STANDARD DEVIATION AS % OF AVERAGE ( MEAN )				
Year	SADC		SACU	NON SACU
1991	17.72		10.08	21.21
1992	17.51		9.68	21.08
1993	17.57		9.85	21.09
1994	17.42		8.13	21.01
1995	17.50		9.79	21.00
1996	18.21		9.91	22.03
1997	18.56		10.67	22.23
1998	18.42		10.77	21.79
1999	18.41		11.65	21.58
2000	18.39		12.01	21.37
MEAN				
1991	0.84		0.84	0.84
1992	0.84		0.83	0.84
1993	0.83		0.83	0.83
1994	0.83		0.80	0.83

1995	0.82	0.82	0.82
1996	0.81	0.81	0.81
1997	0.80	0.80	0.80
1998	0.80	0.80	0.79
1999	0.79	0.70	0.79
2000	0.79	0.78	0.78

**Figure 3: Standard deviation as a percentage of the mean: Age dependency ratio of SADC countries from 1991 to 2000**

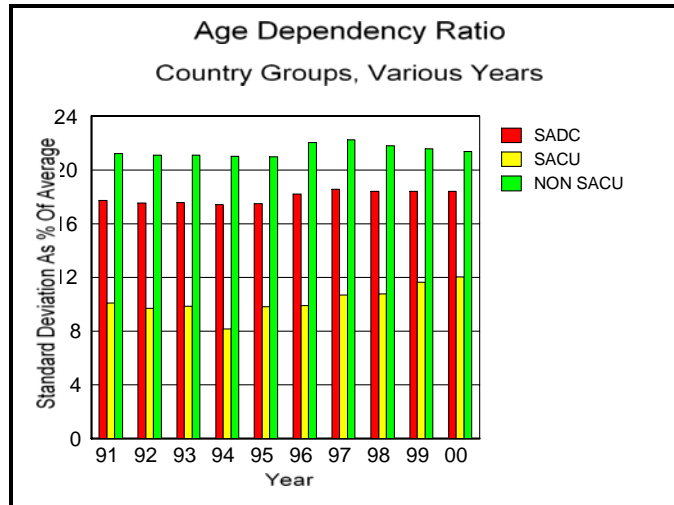
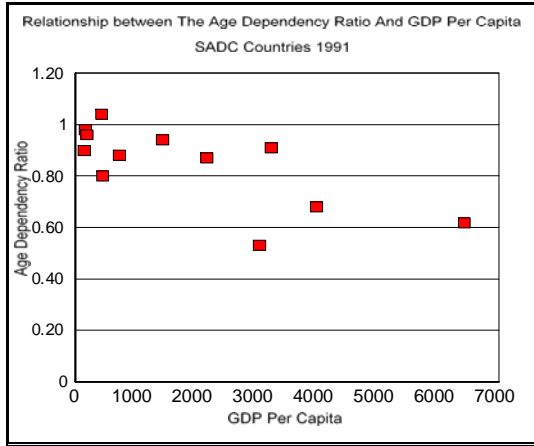


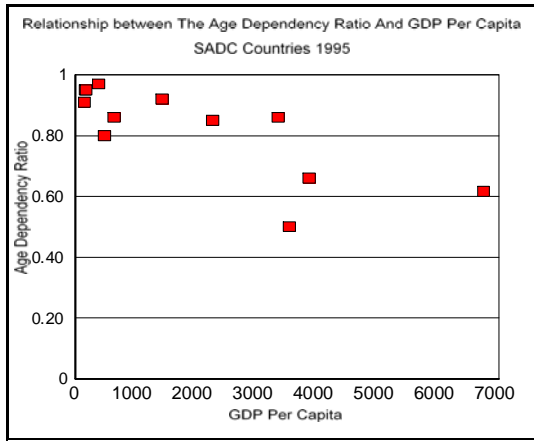
Table 3 and figure 3 indicate the standard deviation as a percentage of the mean for the age dependency ratio. The age dependency ratio has a similar pattern as life expectancy at birth. The age dependency ratio is the ratio of dependents to the working age population. From this table it is obvious that there is no evidence of convergence or divergence during the sample period. However, the table indicates that the sample group experienced a small degree of divergence. The overall effect of the sample group is that no homogenisation exists in SADC regarding the age dependency ratio.

**Figure 4 (a), (b) and (c): The relationship between the age dependency ratio and GDP per capita for SADC countries in 1991, 1995 and 2000**

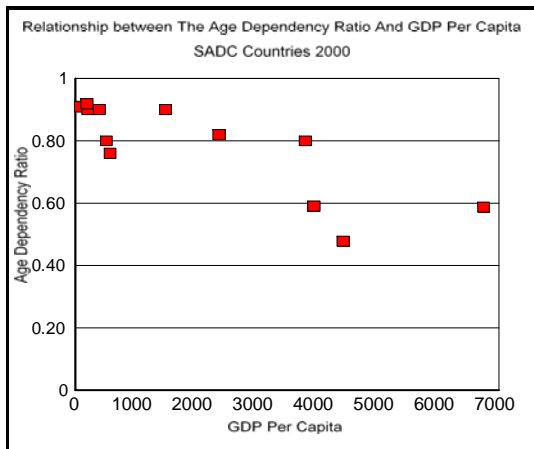
**Figure 4(a)**



**Figure 4(b)**



**Figure 4(c)**



Figures 4(a), (b) and (c) indicate that the relationship between GDP

per capita and the age dependency ratio is negative. This implies that the higher the GDP per capita in SADC countries the lower the age dependency ratio. It is also obvious that there was no significant change throughout the sample period if one compares the situation in 2000 with that of 1995 and 1991.

The second social indicator to be investigated is the adult literacy rate. The adult literacy rate is the proportion of the population that are over the age of 15 and who can read and write.

**Table 4: Standard deviation as a percentage to the mean: Adult literacy rate, SADC countries from 1991 to 2000**

<b>ADULT LITERACY RATE: COUNTRY GROUPS, VARIOUS YEARS STANDARD DEVIATION AS % OF AVERAGE ( MEAN )</b>						
<b>Year</b>		<b>SADC</b>		<b>SACU</b>		<b>NON SACU</b>
1991		18.12		5.77		14.85
1992		17.63		5.50		15.16
1993		17.36		5.26		15.09
1994		17.06		4.98		15.01
1995		17.05		4.72		15.13
1996		16.78		4.49		15.00
1997		16.42		4.19		14.89
1998		16.13		3.91		14.77
1999		15.71		3.68		14.50
2000		15.43		3.47		14.31
<b>MEAN</b>						
1991		69.87		75.62		65.76
1992		71.32		76.16		67.86
1993		72.08		76.92		68.61
1994		72.83		77.68		69.37
1995		73.42		78.36		69.89
1996		73.96		78.92		70.41
1997		74.79		79.66		71.31
1998		75.51		80.38		72.03
1999		76.03		80.22		72.61
2000		76.61		81.48		73.13

**Figure 5: Standard deviation as a percentage to the mean: Adult literacy rate, SADC countries from 1991 to 2000**

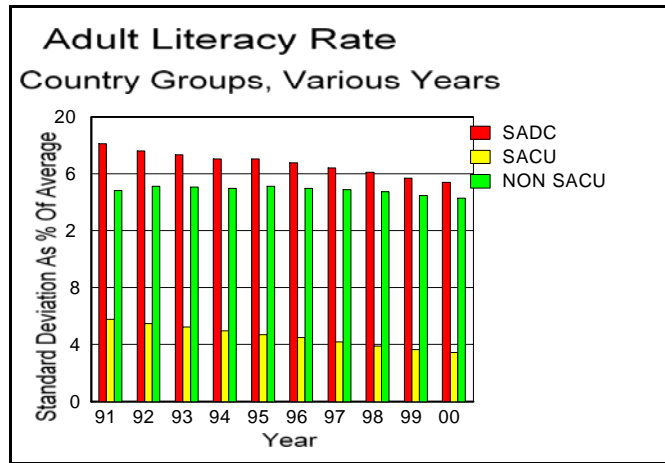
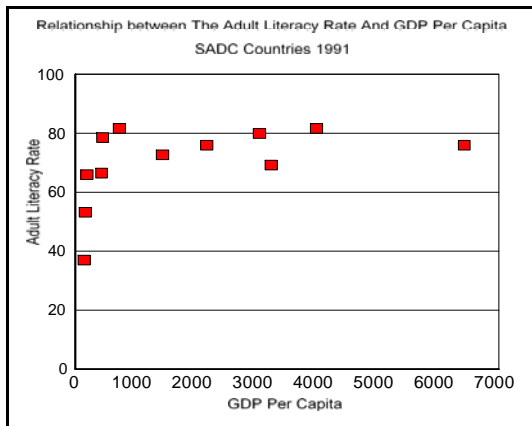


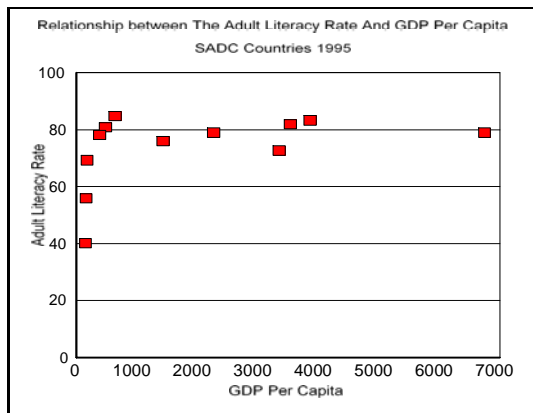
Table 4 and figure 5 it is obvious that SADC countries experienced a decline in the standard deviation as a percentage of the mean. This implies that SADC countries are converging regarding the adult literacy rate and that homogenisation exists.

**Figure 6(a), (b) and (c): The relationship between GDP per capita and the adult literacy rate of SADC countries 1991, 1995 and 2000**

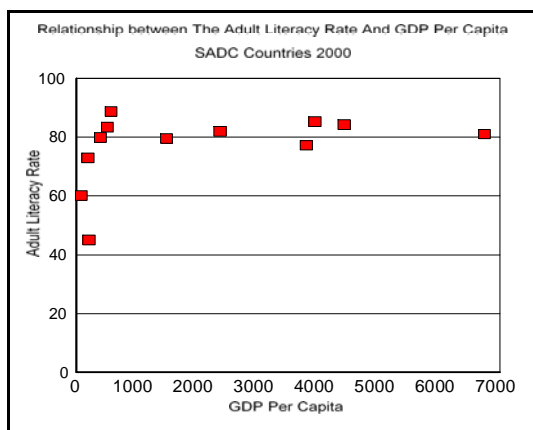
**Figure 6(a)**



**Figure 6(b)**



**Figure 6(c)**



Comparing the situation in figure b in 1991, 1995 and 2000 one can see that the pattern throughout SADC countries remain the same. It thus follows that the lower the GDP per capita in some SADC countries the higher the adult literacy rate. However, SADC countries with a higher GDP per capita have reached a plateau.

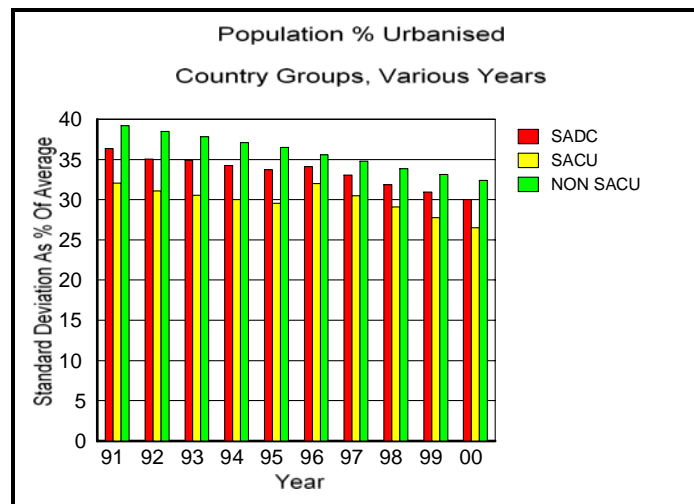
The third social indicator to be investigated is the percentage of the population urbanised, namely the percentage of the population living in urban areas. Urbanisation is often seen as the handmaiden of development, where this refers to the percentage of the population living in urban areas.

**Table 5 Standard deviation as a percentage of the mean: Percentage of the population urbanised, SADC countries 1991 to 2000**

POPULATION % URBANISED COUNTRY GROUPS, VARIOUS YEARS STANDARD DEVIATION AS % OF AVERAGE ( MEAN )				
Year	SADC		SACU	NON SACU
1991	36.38		32.07	39.24
1992	35.05		31.05	38.45

1993	34.89	30.55	37.79
1994	34.24	29.99	37.07
1995	33.69	29.54	36.46
1996	34.14	31.97	35.55
1997	33.01	30.43	34.73
1998	31.89	29.06	33.81
1999	30.97	27.75	33.14
2000	30.05	26.53	32.39
<b>MEAN</b>			
1991	33.21	33.50	33.00
1992	33.92	34.40	33.57
1993	34.55	35.04	34.20
1994	55.18	35.74	34.79
1995	35.84	36.40	35.44
1996	36.90	38.14	36.01
1997	37.37	38.42	36.61
1998	37.87	38.69	37.29
1999	38.35	38.96	37.91
2000	38.85	39.22	38.59

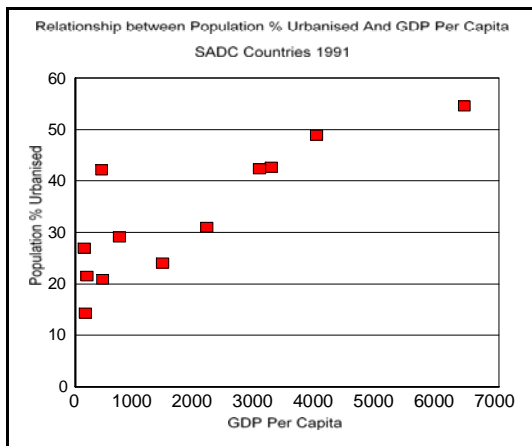
Figure 7: Standard deviation as a percentage of the mean: Percentage of the population urbanised, SADC countries 1991 to 2000



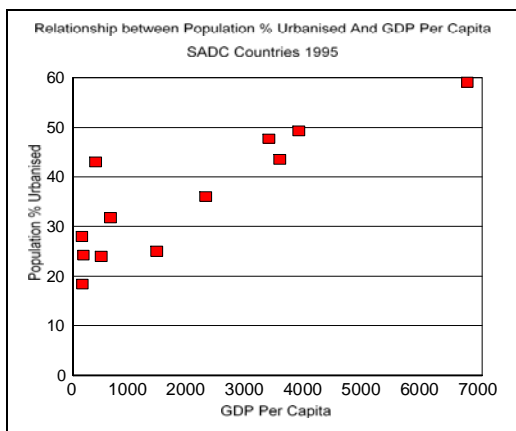
From this table 5 and figure 7 it is obvious that there is a strong decline in the standard deviation as percentage of the mean for all SADC countries as well as the subset of SACU countries. Thus convergence of the percentage of population urbanised had occurred and homogenisation exists in the sample group.

**Figure 8(a), (b) and (c): Percentage of the population urbanised in the SADC countries 1991, 1995 and 2000**

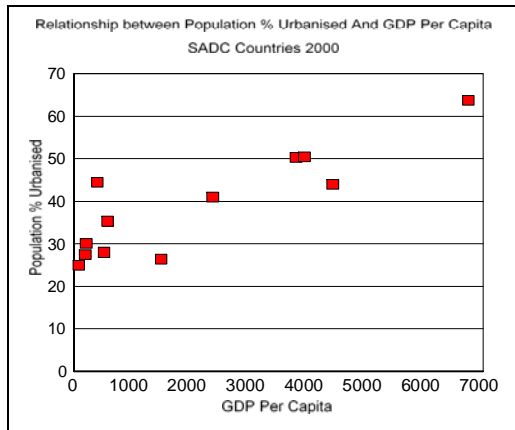
**Figure 8(a)**



**Figure 8(b)**



**Figure 8(c)**



From these figures 8 it are obvious that there is a positive relationship between GDP per capita and the percentage of population urbanised. This relationship indicate that the higher the GDP per Capita of SADC countries the higher the percentage of the population unurbanised. Comparing the situation in 1991, 1995 and 2000, one can see the pattern throughout SADC countries remains the same.

### 7.3 Macroeconomic behaviour

The empirical analysis now turns to the extent of convergence or divergence in respect of macroeconomic behaviour in SADC for the sample period. This empirical analysis seeks to assess the extent to which macroeconomic indicators, such as the consumer price index ( % change over period), exchange rate movements and exports as a percentage of the GDP, exhibit convergence or divergence. The measure that will be used compares the coefficient of variation of the macroeconomic indicator involved among SADC countries from 1991 to 2000. The first macroeconomic indicator to be investigated is the consumer price index (CPI), (period average % change).

**Figure 9: Standard deviation as a percentage of the mean: Consumer price index (period average % change) of SADC countries from 1991 to 2000.**

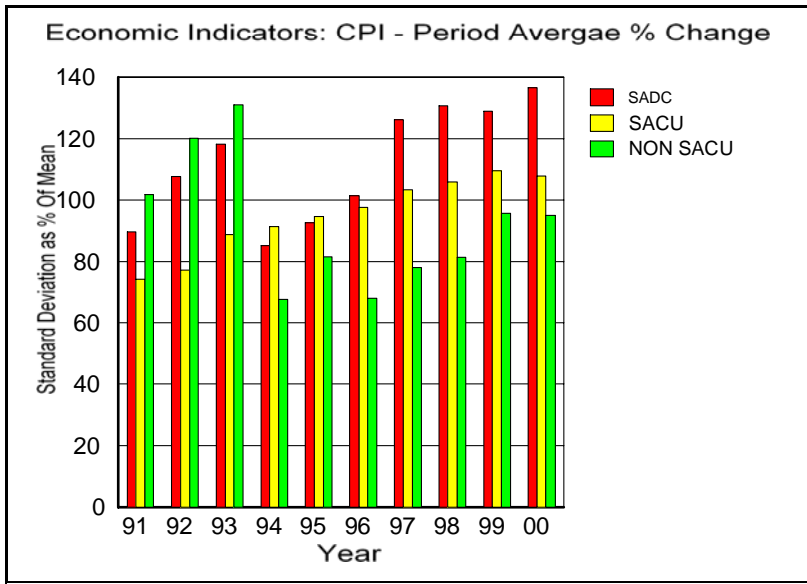
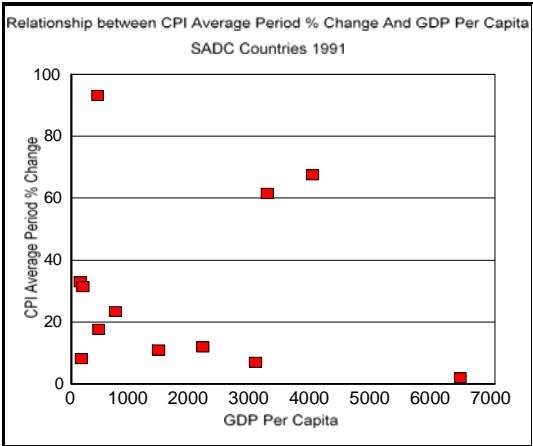


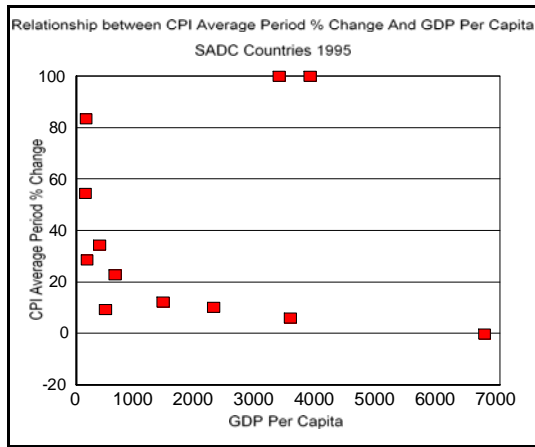
Figure 9 indicates the standard deviation as a percentage of the mean for consumer price index ( % change over period ). From this figure it follows that SADC and SACU countries experienced an increase in the standard deviation as a percentage of the mean. This implies that there is a significant degree of divergence. The overall effect of the sample group is that no homogenisation exists in SADC regarding consumer price index.

**Figure 10(a), (b) and (c): The relationship between CPI (period average % change) and GDP per capita of SADC countries from 1991 to 2000.**

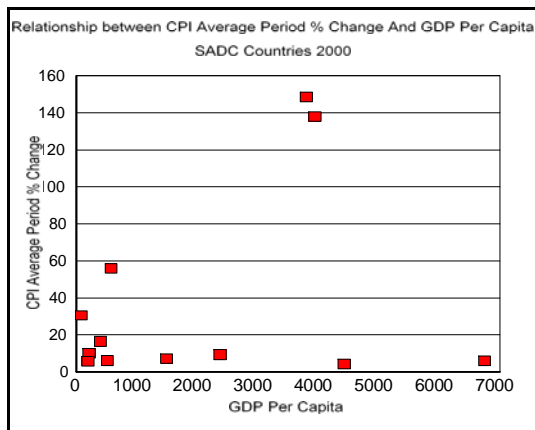
**Figure 10(a)**



**Figure 10(b)**



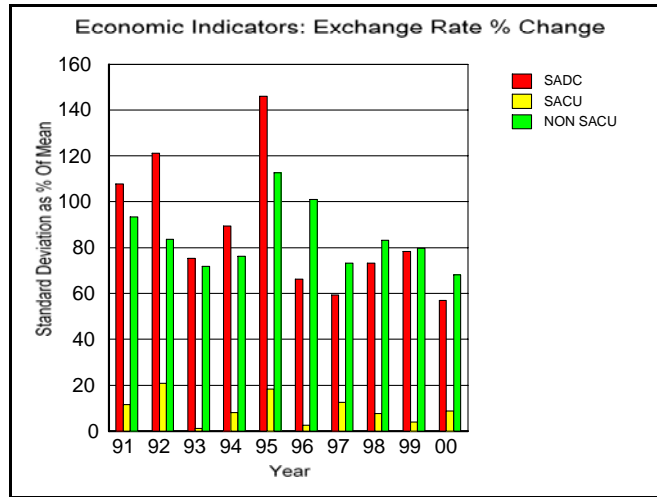
**Figure 10(c)**



Figures 10(a), (b) and (c) indicate that the relationship between CPI and GDP per capita for SADC countries from 1991 to 2000 is negative. The higher the GDP per capita of SADC countries the lower the CPI. It is also obvious that there was no significant change throughout the sample period if one compares the situation in 2000 with that of 1995 and 1991. This is the general pattern for SADC, in spite of two expectations.

The second macroeconomic indicator to be investigated is the percentage change in the exchange rate change for SADC countries for the sample period.

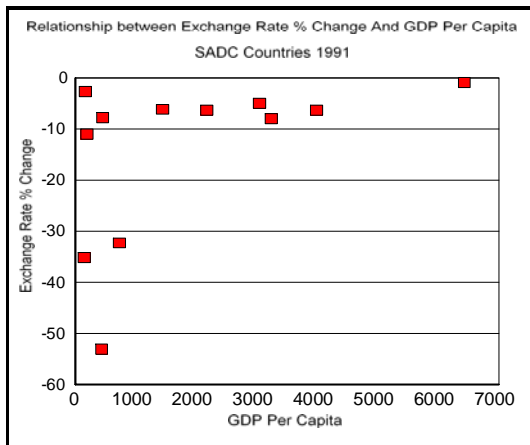
**Figure 11: Standard deviation as a percentage of the mean: Exchange rate percentage change for SADC countries from 1991 to 2000.**



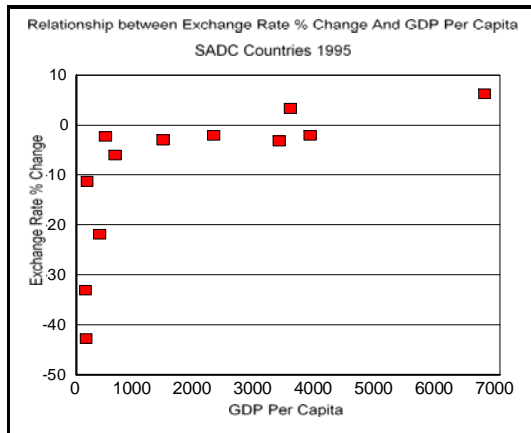
From figure 11 one can see that SADC countries experienced a decrease in the standard deviations as a percentage of mean for the variable in question. Convergence had thus occurred in SADC. SACU countries on the other hand indicate an increase in the standard deviation as a percentage of the mean, which means that divergence had occurred in SACU. The overall effect of the sample group is that homogenisation exists in SADC regarding the percentage change in exchange rates.

**Figures 12(a), (b) and (c): The relationship between exchange rate percentage change and GDP per capita for SADC countries from 1991 to 2000.**

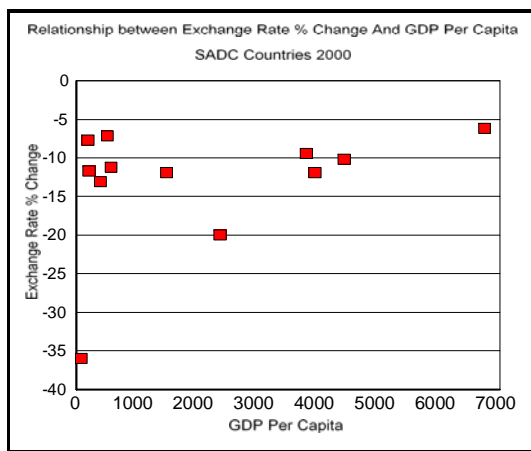
**Figure 12(a)**



**Figure 12(b)**



**Figure 12(c)**



Figures 12(a), (b) and (c) indicate there is a positive relationship between GDP per capita in SADC countries and the percentage change in exchange rates. Comparing the situation in 1995 with that of 1999, one can see that the higher the GDP per capita the higher the percentage change in exchange rates. The situation in 2000 compared with that in 1995, indicates that there is a significant change in the relationship between GDP per capita and the percentage change in exchange rates.

The final macroeconomic indicator to be investigated is openness to trade, where we use exports as a percentage of GDP as an indicator.

**Figure 13: Standard deviation as a percentage of the mean: Exports as a percentage of GDP for SADC countries from 1991 to 2000.**

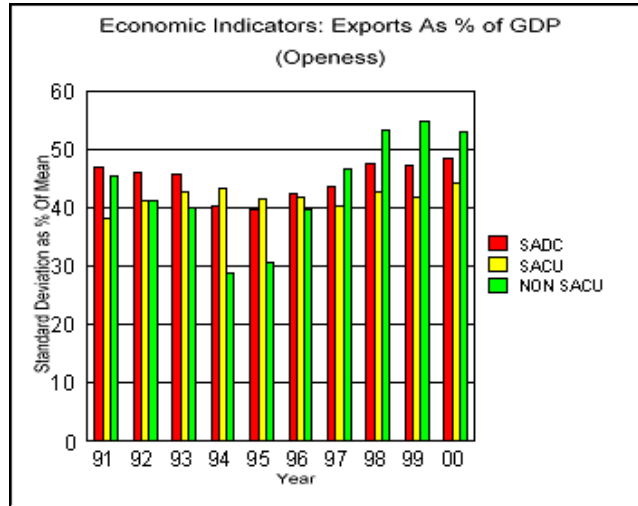
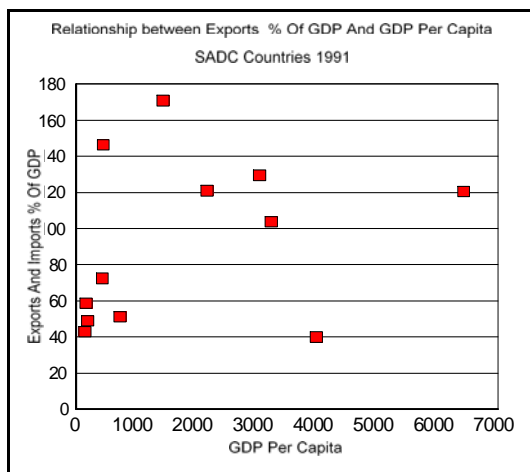


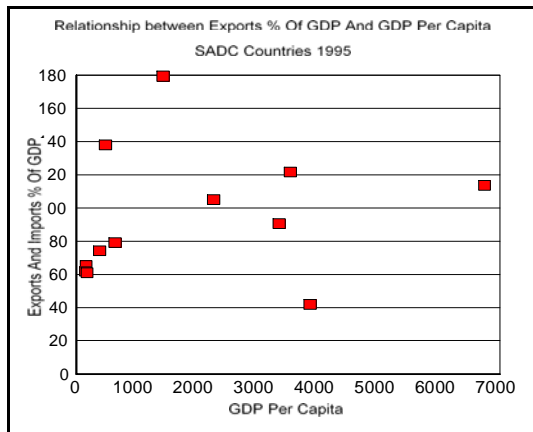
Figure 13 indicates that there is an increase in the standard deviation as a percentage of the mean, in respect of exports as a percentage of GDP. From this table it is obvious that there is no evidence of convergence or divergence during the sample period. The overall effect is that no homogenisation exists in SADC regarding exports as a percentage of GDP.

**Figure 14(a), (b) and (c): The relationship between exports as percentage of GDP and GDP per capita of SADC countries in 1991, 1995 and 2000.**

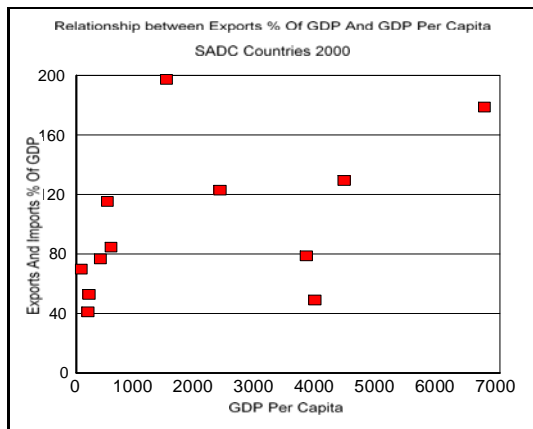
**Figure 14(a)**



**Figure 14(b)**



**Figure 14(c)**



Figures 14(a), (b) and (c) indicate that there is no definite relationship between GDP per capita and exports as percentage of GDP for SADC in 1991, 1995 and 2000, if one compares the situation in 2000 with that in 1995 and 1991.

Having investigated output performance, some economic developmental and some macroeconomic behavioural measures, we can now move on to a comparative view of growth and convergence clubs in SADC.

#### **7.4 A comparative view of growth and 'convergence clubs' in SADC**

This discussion will focus on a comparative view of the percentage

deviation from per capita income in 1991 and average growth in per capita GDP from 1991 to 2000 as well as the disparity in the relationship between GDP per capita in SADC countries from 1991 to 2000 and thus the possible identification of >convergence clubs=.

**Figure 15: The relationship between GDP per capita in 1991 and subsequent growth in SADC countries**

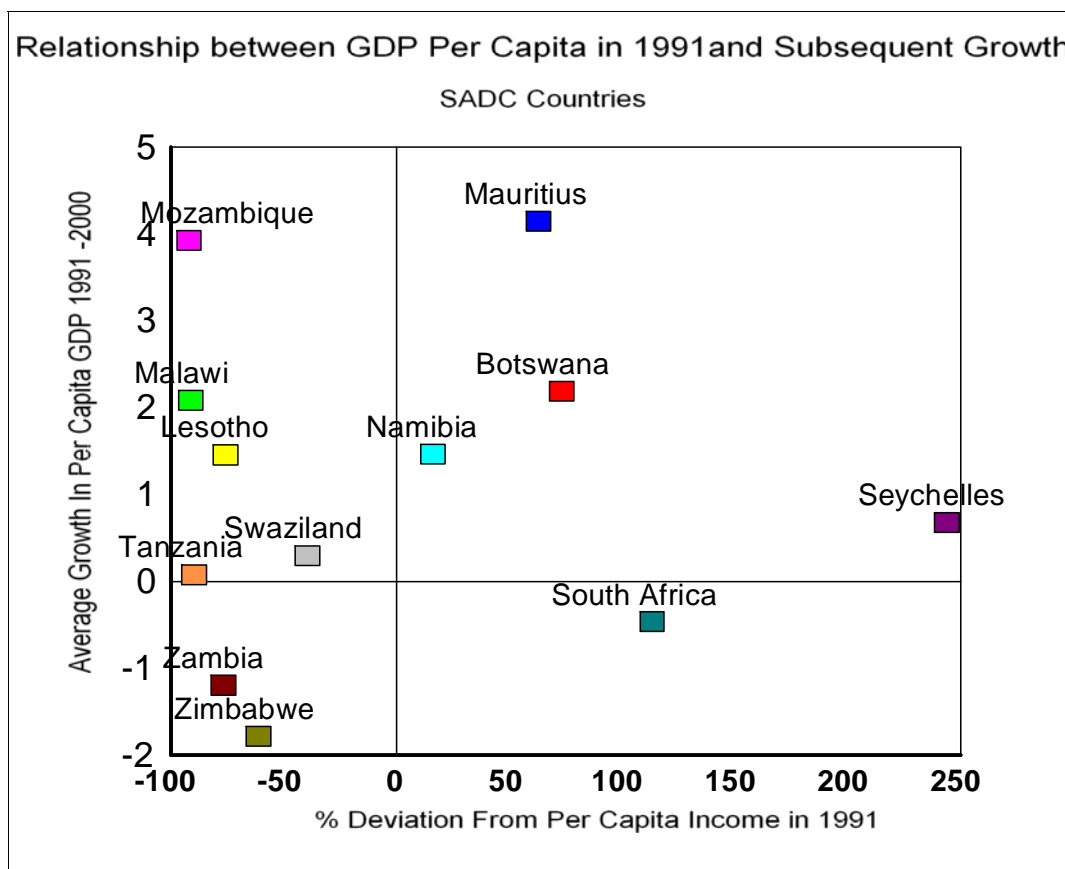


Figure 15 indicates the relationship between the standard deviation as a percentage of the SADC=s average real GDP per capita in 1991 and the subsequent growth in average GDP per capita from 1991 to 2000.

Block 1 ( right bottom block ) indicates countries that are below the zero growth line. These are countries who were above the SADC average in 1991 and had subsequently experienced negative growth in GDP per capita from 1991 to 2000. South Africa is the only country that falls into this category. This could be viewed in the light of Baumol et al (1994) which states that the leaders in output performance must grow more slowly than the laggards for the laggards to catch up.

Block 2 ( left bottom block ) indicates countries that are below the zero growth line who were also below the SADC=s average GDP per capita in 1991 and had subsequently experienced negative growth in GDP per capita from 1991 to 2000. Zambia and Zimbabwe fall into this category. These two countries are significantly falling behind.

Block 3 ( top right ) indicates countries who are above the zero growth line, who were also above SADC=s average real GDP per capita in 1991 and had subsequently experienced positive growth in GDP per capita from 1991 to 2000. Seychelles, Mauritius, Botswana and Namibia fall into this category.

Block 4 ( top left ) indicates countries who are above the zero growth line, were also below SADC=s average real GDP per capita in 1991 and had subsequently experienced positive growth in GDP per capita from 1991 to 2000. Swaziland, Lesotho, Malawi and Mozambique fall into this category. These countries are catching up to SADC=s average real GDP per capita.

Tanzania is the only SADC country which is on the zero growth line. Tanzania was below the average SADC real GDP per capita in 1991 and had subsequently experienced very little or no growth in average GDP per capita over the sample period.

From this figure one can conclude that most SADC lagging countries are catching up except for Zambia and the weakest link Zimbabwe who are significantly falling behind.

Figure 16 below show the distribution of average growth rates in GDP per capita for the sample group. SADC is divided into SACU countries and non SACU countries. Countries that are grouped together in the scatter diagram are assumed to form a >convergence club=.

**Figures 16(a), (b) and (c): The relationship between GDP per capita and growth in GDP per capita of SADC countries from 1991 to 2000**

**Figure 16(a):**

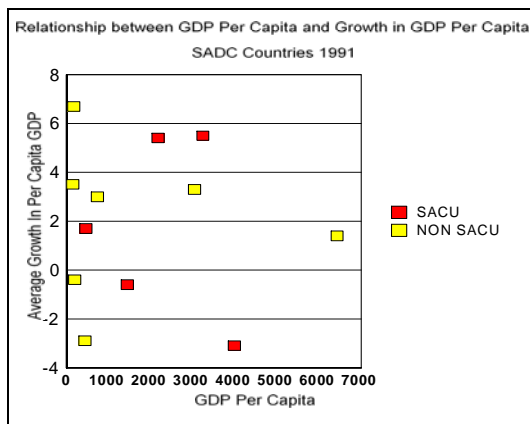


Figure 16(a) indicates the distribution of the average growth rate in GDP per capita of SACU and non SACU countries in 1991. From this

figure it is evident that there was no >convergence club= between SACU countries or non SACU countries. Thus no >convergence club= existed in SADC.

**Figure 16(b)**

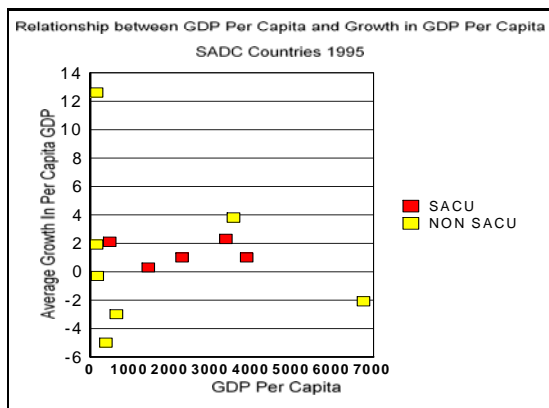


Figure 16(b) indicates the distribution of the average growth rate in GDP per capita of SACU and non-SACU countries in 1995. This figure indicates that a = convergence club= had emerged between SACU countries and some non-SACU countries. One can see that this convergence club is not very strong.

**Figure 16(c)**

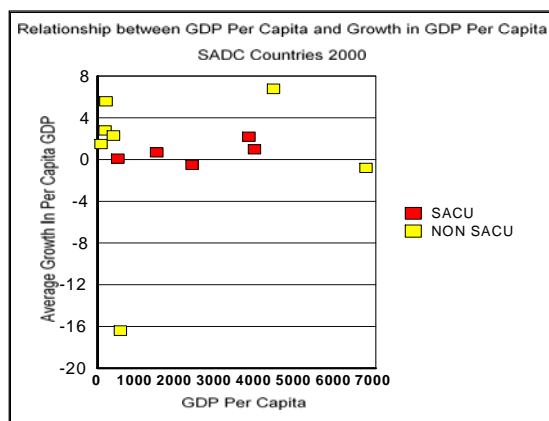


Figure 16(c) indicates the distribution of the average growth rate in GDP per capita of SACU and non-SACU countries in 2000. This figure indicates that another change has occurred between the sample countries. All SACU countries and most non-SACU countries formed a >convergence club=, except for the strong performers, which are Seychelles and Mauritius, and the weakest link, Zimbabwe.

One can conclude this discussion on a comparative view that there is a clear indication that

over the sample period SACU countries formed a >convergence club=. Furthermore, there was no consistency in the region over the sample period. However, all non-SACU countries are slowly catching up except for the weakest link, Zimbabwe.

## Conclusion

In the past decade, differences in GDP per capita levels across SADC countries have changed. The following table summarises the convergence measures used in this empirical analysis of output performance, economic development and macroeconomic behaviour. The effect this may have on policy formulation will also be highlighted.

**Table 6: Summary of convergence measures**

<b>Summary of Convergence Measures</b>			
<b>Indicator</b>	<b>Coeff. of Variation Falls for Group?</b>		
	<b>SADC</b>	<b>SACU</b>	<b>NON SACU</b>
<b>Output Performance</b>			
GDP Level	=	+	-
GDP Growth	=	+	-
<b>Economic Development Indicators</b>			
Age Dependency Ratio	=	=	=
Adult Literacy Rate	+	+	+
Population % Urbanised	+	+	+
Labour Force Participation Rate	+	+	=
Per Capita Telephones (Per 1000 People)	-	-	-
Radio's Per 1000 People	+	=	=
Roads Paved (%)	+	-	+
Social Indicator Convergence Count	5	3	3
<b>Macro-Economic Indicators</b>			
Consumer Price Index Period Average % Change	-	=	+
Exchange Rates (% Change)	+	-	+
Public Finance; Overall Balance (Excluding Grants) as % of GDP	+	+	+
Exports as % of GDP (Openness)	-	-	-
Total Debt as % of GDP	+	=	+
Gross National Savings as % of GDP	+	+	+
Gross National Investment as % of GDP	-	-	-

Macro-Economic Indicator Convergence Count	4	2	5
<i>*Comments -</i> +: <i>Convergence</i> -: <i>Divergence</i> =: <i>No Change</i>			

Having summarised the output performance, economic development and macroeconomic behavioural measures, one can conclude that in respect of output performance the convergence and divergence count cancel out one another.

Regarding economic development measures, five indicators from the seven indicators tested indicate a certain extent of convergence in SADC.

In respect of macroeconomic behaviour, from the seven indicators tested, only four indicators indicate a certain degree of convergence, whereas in SACU five indicators show a certain degree of convergence.

Many of these indicators (measures) are directly or indirectly the result of economic policy or of the degree of personal freedoms (democracy) that are permitted.

In conclusion, with the small extent of convergence that exists in SADC this paper suggests that policy makers in Southern Africa should consider expanding SACU and/or the formation of a free trade area between SADC member countries. Any other attempt at regional economic integration may be premature. However, further research is required to assess the extent of macroeconomic aspects and regional integration: the convergence hypothesis in SADC.

## **Bibliography**

Abramovitz, M. 1986. A Catching up, forging ahead, and falling behind. @ Journal of Economic History. 46: 385 - 406.

Abramovitz, M. 1996. The mosaic of economic growth. Stanford. Stanford University Press.

Acemoglu, D. and F. Zilibotti. 2001. Productivity differences: North versus South. Quarterly Journal of Economics. May. 563 - 605

Alesina, A, E. Spolaore and R. Wacziarg. 2000. Economic integration and political disintegration. The American Economic Review. 90. December. 1276 -1296.

Asante, S.K.B. 1997. Regionalism and Africa=s development. London. Macmillan Press Ltd.

Barro, R.J. 1991. Economic growth in a cross section of countries. Quarterly Journal of Economics. CVI. May. 401 - 443.

Barro, R.J. and Xavier Sala-i-Martin. 1995. Economic Growth. New York. McGraw-Hill.

Barro, R.J. 1997a. Determinants of Economic growth. Cambridge, Massachusetts. MIT Press.

Barro, R.J. 1997b. Macroeconomics. Cambridge, Massachusetts. MIT Press.

Baumol, W. J. and E. N. Wolff. 1988. Productivity growth, convergence, and welfare: reply. The American Economic Review. 78. December. 1155 -1159.

Baumol, W.J. et al. 1994. Convergence of productivity. New York. Oxford University Press Inc.

De Long, J. B. 1988. Productivity growth, convergence, and welfare: Comments. The American Economic Review. 78. March. 1138 - 1154.

De Rosa, D.A. 1998. Regional integration arrangements: Static economic theory, quantitative findings and policy guideline. Policy Working Paper 2007. World Bank. Washington, DC.

Development Bank of Southern Africa. 2001. SADC country risk profiles.

Dowrick, S. and D. Nguyen. 1989. OECD comparative economic growth 1950 -85: Catch-up and convergence. The American Economic Review.

79. March. 1010 - 1030.

Easterly, W.R. and D.L. Wetzel. 1989. Policy determinants of growth: Survey of theory and evidence. Policy, Planning, and Research. Working Papers. World Bank. Washington, DC.

Funke, M. and H. Strulik. 2002. Growth, convergence in two-region model: The hypothetical case of Korean unification. IMF Working Paper. WP/02/26. International Monetary Fund.

Gries, T. 2000. Catching-up, falling behind and the role of FDI: A model of endogenous growth and development. South African Journal of Economics. V70(5). 588

Hitiris, T. 1991. European Community economics. Hertfordshire. Harvester Wheatsheaf.

Ingram, G. 1992. Social indicators and productivity convergence in developing countries. Conference on historical perspectives on international convergence of Productivity. World Bank. Washington, DC.

Jenkins, C. and L. Thomas. 1998a. Divergent growth experience in Southern African Development Community. Centre for study of African economics, University of Oxford and Centre for research into Economics and Finance in Southern Africa, London School of Economics.

Jenkins, C. and L. Thomas. 1998b. Is Southern Africa ready for regional monetary integration? In L Peterson (ed), Post Apartheid Southern Africa: Economic challenges and policies symposium, Routledge, London and New York. 1998. 141 - 163.

Kormendi, R. and P. Meguire. 1985. Macroeconomic determinants of growth: Cross country evidence. Journal of Monetary Economics. 16. 141 - 163.

Levine, R and D. Renelt. 1991. Cross country studies of growth and Policy: Methodological, conceptual and statistical problems. Policy Research and External Affairs, Working Papers. Macroeconomic adjustments and growth. World Bank. Washington, DC.

Loayaza, N. 1994. A test of the international convergence hypothesis using panel data. Policy Research Working Paper 1333. World Bank Washington, DC.

Piazolo, M. 2001. Regional integration in Southern Africa: Motor for Economic Development. South African Journal of Economics. V70(8). 1198.

Ram, R 1986. Government size and economic growth. A new framework

and some evidence from cross-section and time series data. American Economic Review. 76. March. 194 - 204.

Romer, P. 1989. What determines the rate of technological change? Working Paper 279. World Bank. Washington, DC.

Stockman, A. 1988. Sectoral and national aggregate disturbances in industrial output in seven European countries. *Journal of Monetary Economics*. 21. 312 - 320.

Todaro, M.P. 2000. *Economic development in the third world*. 6ed. New York. Longman.

Venables, A.J. 1991. *European integration: trade and industry*. Cambridge. Cambridge University Press.

Venables, A. J. 1997. *Trading arrangements and industrial development*. Policy Research Working Paper. 1787. World Bank. Washington, DC.

Venables, A.J. 1999. *Regional integration agreements: A force of convergence or divergence*. Policy Research Working Papers. World Bank. Washington, DC.