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Evaluation of Convergence of Per Capita Income and Its Determinants in Southern African Development Community

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ABSTRACT

This study examines whether there has been a tendency toward convergence of per capita income of member state in Southern African Development Community SADC, as well as identifying factors responsible for such convergence. Annual data for GDP per capita, Inflation rate, fiscal deficit, foreign direct investment and openness to trade from 1980 to 2016 were obtained from relevant sources. The stochastic convergence approach (unit root and cointegration technique) was applied to the data. The results revealed that, there was convergence in real per capita income towards South Africa's income in nine (9) countries (Madagascar, Mauritius, Mozambique, Namibia, Seychelles, Swaziland, Tanzania, Zambia and Zimbabwe) but divergence in five (5) countries (Angola, Botswana, DR Congo, Lesotho and Malawi). Foreign direct investment (FDI) was identified as the most common determinant of convergence in all SADC countries except Zimbabwe. Other determinants include; economic growth, fiscal deficit, inflation and Openness to trade. Based on the findings the study recommends that foreign direct investment should be encouraged particularly among those countries that experience divergence in the SADC region. Low fiscal deficit and a stable inflation rate should be pursued to guarantee macroeconomic stability in order to sustain convergence.

ملخص

تبحث هذه الدراسة في ما إذا كان هناك اتجاه نحو تقارب دخل الفرد في دولة عضو في الجماعة الإنمائية للجنوب الأفريقي (SADC)، وكذلك تحديد العوامل المسؤولة عن هذا التقارب. وقد تم الحصول على البيانات السنوية لنصيب الفرد من الناتج المحلي الإجمالي ومعدل التضخم والعجز المالي والاستثمار الأجنبي المباشر والانفتاح على التجارة في الفترة ما بين 1980 و 2016 من المصادر ذات الصلة.كما تم تطبيق نهج التقارب العشوائي (تقنية جذر الوحدة والاندماج المشترك) على

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البيانات. وكشفت النتائج أنه كان هناك تقارب في الدخل الحقيقي للفرد إلى دخل جنوب إفريقيا في تسعة (9) دول (مدغشقر وموريشيوس وموزمبيق وناميبيا وسيشيل وسوازيلاند وتنزانيا وزامبيا وزيمبابوي) وتباعد في خمسة (5) دول (أنغولا وبوتسوانا والكونغو الديمقراطية وليسوتو وملاوي). وتم تحديد الاستثمار الأجنبي المباشر (FDI) باعتباره المحدد الأكثر شيوعا للتقارب في جميع بلدان الجماعة الإنمائية للجنوب الأفريقي باستثناء زمبابوي.وتشمل المحددات الأخرى؛ النمو الاقتصادي والعجز المالي والتضخم والانفتاح على التجارة. واستنادا إلى النتائج، توصي الدراسة بضرورة تشجيع الاستثمار الأجنبي المباشر، خاصة بين البلدان التي تعاني من الاختلاف في منطقة الجماعة الإنمائية للجنوب الأفريقي. كما ينبغي السعي وراء الحفاظ على انخفاض عجز المالية العامة واستقرار معدل التضخم لضمان استقرار الاقتصاد الكلي من أجل استدامة التقارب.

ABSTRAITE

Cette étude examine s'il y a eu une tendance à la convergence du revenu par habitant des États membres de la Communauté de développement de l'Afrique australe (SADC), ainsi que l'identification des facteurs responsables de cette convergence. Les données annuelles concernant le PIB par habitant, le taux d'inflation, le déficit budgétaire, l'investissement direct étranger et l'ouverture au commerce de 1980 à 2016 ont été obtenues auprès de sources pertinentes. L'approche de convergence stochastique (racine unitaire et technique de cointégration) a été appliquée aux données. Les résultats ont révélé une convergence du revenu réel par habitant vers le revenu de l'Afrique du Sud dans neuf (9) pays (Madagascar, Maurice, Mozambique, Namibie, Seychelles, Swaziland, Tanzanie, Zambie et Zimbabwe) mais une divergence dans cinq (5) pays (Angola, Botswana, RD Congo, Lesotho et Malawi). L'investissement direct étranger (IDE) a été identifié comme le déterminant le plus commun de la convergence dans tous les pays de la SADC, à l'exception du Zimbabwe. Les autres facteurs déterminants sont la croissance économique, le déficit budgétaire, l'inflation et l'ouverture au commerce. Sur la base des conclusions de l'étude, il est recommandé d'encourager les investissements directs étrangers, en particulier dans les pays qui connaissent des divergences dans la région de la SADC. Un faible déficit budgétaire et un taux d'inflation stable devraient être recherchés pour garantir la stabilité macroéconomique afin de soutenir la convergence.

Keywords: Per Capita Income, Convergence, Determinants, SADC

JEL Classification Code: F15, F63, O57

1. Introduction

The Southern African Development Community (SADC) was established as a development coordinating conference (SADCC) in 1980 and transformed into a development community in 1992. It is an inter-governmental organization whose goal is to promote sustainable and equitable economic growth and socio-economic development through efficient productive systems, deeper co-operation and integration among fifteen Southern African member states namely: Angola, Botswana, DR Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe.
In 1992 when the SADC was established there was wide disparity in the per capita incomes of member states. South Africa had the highest GDP per capita at US$6,962, followed by Namibia with US$4,357. Other high-income countries in the region were Mauritius (US$2,303), Botswana (US$1,900), and Swaziland (US$1,441). Countries with low per capita income in the SADC region, with income levels below US$800, were Malawi (US$407), Mozambique n(US$189), Lesotho (US$533) and Madagascar (US$619). These fifteen member States are still at different stages of development, but predominantly underdeveloped (World Development Indicator 2014).

Idea of convergence of per capita income among member states of SADC is to ensures that the per capita income of poorer countries grows at a faster rate than that of the developed ones among them. It is necessary for economic growth of countries in SADC to converge for the goals of attaining a faster growth, reduce income inequality, and minimizing the poverty gap among countries in the region. Thus 27 years after establishment of SADC in 1992, it is still not clear whether there is any meaningful prospect towards the convergence of the per capita income of member states.

Given these seemingly wide disparities in their per capita income, it will be of interest to determine if there is any discernible tendency towards the convergence of their per capita income and hence reduction of income disparity among member states in line with one of the objectives of SADC. It is also necessary to determine the factors responsible for the convergence or lack of it. Hence, this paper examines whether there has

been a systematic tendency for convergence of per capita income within members' state in SADC, with South Africa being the largest economy in the SADC as a benchmark. The paper also identified factors responsible for the convergence of per capita income among SADC states.

2. Literature Review

2.1 Conceptual Literature (Concept of Convergence of per capita income)

The idea of convergence of per capita income is anchored on the Solow-Swan model of economic growth. It hypothesizes that, poorer economies' per capita incomes will tend to grow at faster rates than those of richer economies and then to catch-up with them in the long-run. Convergence can also be referred to as the Catch-up effect. In a situation of convergence, developing countries have the potential to grow at a faster rate than developed countries because diminishing returns (in particular to capital) are not as strong as in capital rich (developed) countries. Also, poorer countries can as well replicate the production methods, technologies and institutions of developed countries. Convergence is conditional, depending on the ability of the economies to become more competitive. The main source of this competitiveness is found in their technical progress, innovation ability, capital accumulation and human capital formation (Wolassa, 2011).

2.2 Theoretical Framework

There are two dominant theoretical perspectives used in the studies of convergence namely: neoclassical and endogenous growth theories. These theories attempt to quantify the extent to which the growth process leads to convergence or divergence in regional performance over time. The theories are discussed below.

2.2.1 Neoclassical Growth Theory

The theory is built on the assumptions of diminishing returns to capital and factor mobility. It predicts that economic integration among national and regional economies would inevitably result in per capita income convergence. This will further lead to more capital accumulation and

faster economic growth in poor countries (regions) than in rich ones resulting in economic convergence towards a common level of per capita income in the long run. This phenomenon is commonly known as the convergence hypothesis in the economic literature. Traditional neoclassical growth models, which assume exogenous and universal technological progress and diminishing returns to capital accumulation, predict convergence of countries to the same steady-state rate of growth and level of income and capital per person, with initially poor countries catching up but not overtaking the leaders.

2.2.2 Endogenous Growth Theory

This is an economic theory which argues that economic growth is generated from within a system as a direct result of internal processes. It explains further that investment in human capital, innovation and knowledge, rather than external factors are significant contributors to economic growth. As cited by Wolassa (2011), the theory was advanced by Romer (1986) and Solow (1988). They condemned the neoclassical growth theory insisting that there are no inherent factors that makes for convergence. It maintains that there is no explicit tendency of poor countries to catch–up with the advanced countries. According to the endogenous growth theory, there is divergence rather than convergence.

Supporters of endogenous growth theory argue that the productivity and economies of today's industrialized countries compared to the same countries in pre-industrialized eras are evidence that growth was created and sustained from within the country and not through trade. It insists that policies, internal processes and investment capital, rather than external factors, are chiefly responsible for economic growth.

The new economic geography developed Krugman and Venables (1995) supports endogenous growth theory maintaining that economic integration may not lead to income convergence. Whereas neoclassical growth theory is based on the assumptions of increasing returns in physical or human capital and positive externalities, the new economic geography maintains that countries or regions with higher levels of physical or human capital may continue to grow more rapidly as growth generates positive spillover effects that produce further growth. Conversely, poorer countries (regions) may not be able to accumulate

the required physical and human capital to generate the positive spillovers that facilitate self-sustained economic growth.

In a similar vein, the new trade theory argues that although economic integration creates new opportunities for economies of scale and specialization resulting from increased trade and factor mobility, it does not necessarily follow that all integrating countries (regions) benefit from it equally. It insists that earlier stages of integration tend to bring larger gains for already more industrialized regions, as firms exploit economies of scale by concentrating production close to markets where they have more customers and suppliers. This process tends to increase income differences between rich and poor countries (regions). The endogenous growth theory is in contrast to the exogenous growth theory, in that the productivity growth is the outcome of incentive structures that may differ across countries, entertain the possibility of persistent divergence in growth performance and thus of the overtaking of one country by another or of ever-widening gaps between leaders and followers. The root of this difference is their treatment of technical change and returns to capital accumulation.

It is clear that none of these two theories, on its own is capable of explaining the process of integration in SADC. Thus, an eclectic approach is used in this study that combines the strengths in each.

2.3 Empirical Literature Review

The empirical literature review is divided in to two namely: empirical literature review on per capita income convergence and empirical literature review on determinants of per capita income convergence

2.3.1 Literature on Per Capita Income Convergence

The notion that economic integration among countries or regions within a country leads to economic convergence has been widely debated in the growth and development literature over the last four decades. Starting with empirical literature that supports economic convergence, Haider et al. (2010) examined whether there is an income convergence over time in South Asian economies as well as comparing the convergence results of South Asian economies with its parallel East Asian region within the Asian block using beta and sigma convergence methodologies as well as Theil's inequality-based approach. Their result indicated no evidence to

the existence of absolute income convergence but revealed the presence of conditional income convergence for both East and South Asian economies, implying that, the income gap between these two groups of economies had narrowed down based on some common characteristics over time.

Basil (2002) examined economic integration and convergence of per capita income in West Africa, using both cross sectional and time series approach to investigate the convergence and test for beta and sigma convergence. He examined the tendency for income levels to converge within a group of homogenous ECOWAS countries similar in key macroeconomic variables like, similarities in preferences, technologies, government policies and some strategic factors of production. His results showed that there has indeed been convergence in real per capita GDP across ECOWAS economies. While convergence occurred, the speed at which the initially poor economies are catching up with the rich economies was slow. This explains the fact that the cross-country income inequality is disappearing overtime.

Carmignani (2006) used the cointegration technique to inflation and monetary aggregates to determine the degree of nominal convergence in Common Market for Eastern and Southern Africa (COMESA) from 1980 to 2002. The results reveal that there was partial convergence among the COMESA countries driven by the existence of independent policies.

Studies that do not favoured economic growth convergence or provided evidence that there is little observable tendency for poorer economies to catch up with richer ones includes, McCoskey (2002) investigates the convergence properties of six indicators of well-being for 37 Sub-Saharan African countries using both the panel unit root test and the panel cointegration test. The results showed no evidence of time series convergence across the whole sample for the real GDP-based variables. The finding was extended to cover more homogeneous groups of economies sharing some institutional arrangements such as the Southern African Development Community (SADC) and the Southern African Customs Union (SACU).

Similarly, Alagidede, P. & Tweneboah, G. (2015) estimated the extent of convergence and synchronization of business cycles within the west African Monetary Zone (WAMZ) using univariate and multivariate

unobserved components models over the period 1970 to 2011. The results showed a substantial divergence in the economic characteristics of member countries.

Artelaris et al. (2011) used quadratic weighted least squares regression analysis to examine convergence patterns in the world economy. Their result indicates that countries with a low to medium-high level of development show convergence while, countries with a medium-high to a very high level of development show divergence. Accordingly, they concluded that convergence and divergence co-exist but at different rates and with different strengths. That the forces of divergence appear to dominate after a certain threshold and further increases the world development gap.

Wolassa (2011) investigated convergence in real per capita GDP, macroeconomic policy and stability indicators within the SADC. Using the ADF unit root test, for the period of 1992-2009, the empirical test showed no evidence of absolute beta and sigma convergence in real per capita GDP among the SADC economies, he pointed out that the absence of convergence does not necessarily implies lack of economic growth. The empirical results also show that Botswana and South Africa's real per capita GDP converged to a common stochastic trend while the rest were characterized by a boundless drift.

Charles, Darne and Hoarau (2012) examines the absolute and conditional convergence of real GDP per capita in the Common Market for Eastern and Southern Africa (COMESA) during the period 1950-2003. Income departures across COMESA countries were evaluated from several panel data unit root tests. They found no evidence supporting the existence of convergence process for the income in the COMESA. They concluded that most economies of COMESA are locked into a sustained poverty trap process.

Gilles, Valerie and Theo (2010), argues that there has been no absolute convergence between the GDP per capita of developing countries since 1950 except only a few cases of income convergence of which only a few of them have grown faster than the others, namely the so-called emerging economies (Brazil, China, India, Mexico, South-East Asian countries, oil-exporting countries in the Middle East, Central and Eastern European countries). Using econometric methods (non-stationary long-memory models, wavelet models and time-varying

factor representation models), their result showed that, growth is an unusual phenomenon that yields different forms of transitional economic performance: growth tragedy (some countries with an initial low level of per capita income diverge from the richest ones), growth resistance (countries experiencing a low speed of growth convergence), and rapid convergence.

Solomon and Festus (2013) in their investigation of per capita income convergence hypothesis in Sub-Saharan Africa, using panel dataset for 37 countries from 1980 to 2010 and Panel Generalized Least Squares technique. Their study established per capita income divergence among the countries in Sub-Saharan Africa, with the level of divergence increasing with the inclusion of FDI, trade openness and government spending into the basic model. Their findings further suggested that regardless of the presence of FDI (Foreign Direct Investment), trade openness and per capita income, disparity gap among countries in SSA tends to diverge.

Our inference from literature reviewed above is that, as long as the issue of economic growth and development remains dynamic and determine by both internal and external factors, the idea of economic convergence and divergence will ever remain debatable. Hence, constant research in this area is important in order to provide specific results or appraisal of specific zones towards economic convergence or divergence in the face of ever changing economic phenomena. In line with this inference, though there have been a number of studies on economic integration and convergence in southern Africa, like Wolassa (2011) who studied Growth and Macroeconomic Convergence in SADC (1992- 2009) using ADF Unit root test, and obtained results that shows no tendency for convergence in real per capita GDP among the SADC countries. It is important to point out here that, Wolassa (2011) study is about ten (10) years now and many developments have taken place in the SADC region. The small sample size (17 years) then may have minimized the possibility of convergence among the SADC countries. Accordingly, this present study, used relatively a larger sample size (1992- 2016) to ascertain the tendency of convergence in SADC. Additionally, the study addresses the issues pertaining to the determinants of the observed convergence.

2.3.2 Literature on Determinants of Per Capita Income Convergence

Zhang (2001) explored the role of trade and FDI in a cross-country convergence analysis, indicating that export and FDI tend to accelerate the convergence process in the Asian newly industrialized economies and Japan.

Azam, M. (2016) examines the impacts of governance and foreign Direct investment (FDI) on economic growth in 20 countries from organization of Islamic Cooperation (OIC) using Probabilistic econometrics models based on growth theory and panel data set over the period 1986 to 2012. One of the results obtained was that, FDI impacted significantly on economic growth of the OIC.

Wahiba (2015) evaluated the conditional convergence hypothesis among African countries that belonged to the West African Economic and Monetary Union (WAEMU, using control variables such as: the share of investment in gross domestic product, enrolment and the opening ratio. The study revealed that these variables contribute to the revival of economic growth and convergence in the region.

Jawaid and Raza (2012) investigated the impact of FDI on income convergence in addition to the relationship between FDI and economic growth by using seven years average annual data of 129 countries across the world from the period of 2003 to 2009. These countries were grouped into low, middle and high income by the World Bank. Results indicated a significant positive relationship between foreign direct investment and economic growth in all countries. Results of conditional convergence based on foreign direct investment suggested that, the low and middle income countries are converging with each other more rapidly. This shows that chances of converging with high income countries remain steady in the presence of foreign direct investment.

Studies by Ebi and Okon (2019) and Effiom and Ebi (2016) had also pointed at FDI as an important determinant of performance and patterns of economic growth of four biggest economies in Africa: South Africa, Algeria, Nigeria, and Egypt (SANE) as well as determinant of growth in some states in Nigeria respectively.

3. Research Methodology

The study is rooted in neoclassical equilibrium theory and endogenous growth divergence theory. Whereas the neoclassical growth theory postulates that provided that there are no major barriers to operations of market processes, strong tendency exists for countries to converge to common steady state in the long run, the post neoclassical endogenous growth theory insists that there are inherent factors that makes for convergence of countries over time. Endogenous growth theory maintains that market forces are spatially disequilibrating and economies of scale (increasing returns) lead to cumulative concentration of capital, labour and output in certain regions at the expense of others; uneven development is self-reinforcing rather than self-correcting (Martin & Sunley 1996).

3.1 Model Specification

3.1.1 Johansen Cointegration Test.

The Johansen cointegration method is a system approach to cointegration and it is used when the variables are each integrated of order one. It allows for multiple cointegration relationship on the basis of which it is possible to determine if there is complete convergence or partial convergence or no convergence at all (divergence).

The Johansen multivariate tests of cointegration is specified as:

$$\Delta Y_t = \Pi_o + \Pi Y_{t-1} + \Pi_1 \Delta Y_{t-1} + \Pi_2 \Delta Y_{t-2} + \ldots + \Pi_p \Delta Y_{t-p} + v_{5t} \qquad (1)$$

Where Y_t = vector of a macroeconomic variable (for example per capita GDP), Π =matrix of coefficients.

According to Johansen (1988) if Y_t is a vector of all the variables, then the term containing the long-run parameters can be written as ΠY_{t-1}, where $\Pi = \alpha\beta$, α is the speed of adjustment vector, β is the vector of long run parameters. In equation 3.1 the main interest is the rank of Π, which is related to the number of cointegrating vectors. If the rank Π = n (the number of countries in the sample), then Y_t is a stationary process. If the rank Π is such that $0<r<n$, there are r cointegrating vectors for the individual series in Y_t and thus the group of countries is driven by (n-r) common shocks. If the rank Π =0, there are n stochastic trends and the

long run output levels are not related across countries, i.e there is no convergence.

The Johansen approach to cointegration was applied to determine the degree of nominal convergence (inflation and deficit/GDP ratio) in SADC. vidence of nominal convergence and macroeconomic convergence is indicative that the region is achieving the desired macroeconomic outcomes. The variables tested for nominal convergence in SADC include fiscal deficit/GDP ratio, nominal effective exchange rate, interest rate and consumer price index.

3.1.2 Stochastic Convergence

Stochastic convergence is based on the concept of unit roots and cointegration. If the output differences series is a mean zero stationary process, then there is stochastic convergence. Similarly, in order for countries i and j to converge, their outputs must be cointegrated with cointegrating vector [1, -1].

Let LY_{it} = log of per capita GDP of country i in time t and let LY_{0t} = log of per capita income of benchmark country for which all the other countries are converging to. Then $LY_{oit} = LY_{it} - LY_{0t}$ is the log difference of per capita GDP of country i and benchmark country 0.

The augmented Dickey Fuller (ADF) unit test for convergence is specified as:

$$\Delta LY_{0it} = \psi_0 + \psi_1 T + \psi_2 LY_{0it-1} + \sum \phi_i \Delta LY_{0it-i} + w_t \qquad (2)$$

Where Δ denote change, LY_{0it} = log difference of per capita GDP of a member country in SADC and per capita GDP of South Africa, T= time trend, Y_{oit-1} = one period (year lag) of per capita GDP, wt is the stochastic random term. The addition of the autoregressive components in the equation is the basis of the Augmented Dickey-Fuller unit test which ensures that the error term $\mathbf{w_t}$ is white noise.

Null hypothesis: $\psi_2 >= 1$ and not significant (there is no convergence, i.e divergence is the case)

Alternative hypothesis: $\psi_2 < 1$ and statistical significant (there is convergence, i.e countries exhibit catching-up).

3.2 Determinants of convergence

Where there is convergence we proceed to determine the role of technology transfer (FDI), fiscal deficit (FDY), inflation (INF), trade (OPEN) and growth in real GDP (G) in the convergence process. Our model is of the form:

$$CONV_t = f(FDI, FDY, INF, G, OPEN) \quad (3)$$

$$CONV_t = \Theta_0 + \Theta_1 FDI_t + \Theta_2 FDY_t + \Theta_3 INF_t + \Theta_4 G_t + \Theta_5 OPEN_t + v_{7t} \quad (4)$$

$$\Theta_1, \Theta_4, \Theta_5 < 0, \quad \Theta_2, \Theta_3 > 0$$

Where $CONV_t$ = deviation of per capita income of country i from South African per capita GDP, FDI=foreign direct investment, FDY=fiscal deficit as ratio of GDP, G= real GDP growth rate, INF=inflation rate, and OPEN = trade measured by (export + import)/GDP. Fiscal and monetary policies are brought into the equation because for the economies in a given economic integration area to deal with economic shocks effectively in a coordinated manner, their macroeconomic policies need to be harmonized.

As noted in Ndiaye and Korsu (2013), there has to be fiscal convergence otherwise sustaining economic integration would be difficult. In addition, there have to be convergence in inflation rate since low and stable inflation is the ultimate goal of monetary policy in an economic integration area.

3.3 Sources of Data

Annual data on inflation rate was obtained from World Bank World Development Indicators. Real GDP, Inflation, fiscal deficit, foreign direct investment, openness to trade and consumer price index were taken on an annual basis. Real GDP was obtained as GDP at constant 2010 prices. Budget deficit is measured as annual budget deficit as a percentage of GDP. Data were obtained from International Financial Statistics Year Book (various issues).

4. Results and Discussion Of Findings

The empirical results are presented in Tables 1 to 16 beginning with results on nominal convergence.

4.1 Result of Real Convergence in Per capita GDP

Table 1 below presents the results of unit root test based on augmented Dickey-Fuller (ADF). The test was carried out with trend and without trends and evaluated at 1 to 10% level of statistical significance. Stationary test was carried out to determine whether the variables are stationary or non-stationary to avoid having spurious regression results.

Table 1: ADF Unit Root Test of Convergence of SADC Countries

S/n	COUNTRY	LEVEL	1ST DIFFERENCE	ORDER OF INTEGRATION	DECISION
1	ANGOLA	-1.9455	-3.2433***	I(1)	Diverging
2	BOTSWANA	-1.8694	-8.7228*	I(1)	Diverging
3	CONGO DR	1.0041	-3.0819**	I(1)	Diverging
4	LESOTHO	-1.6272	-4.0774*	I(1)	Diverging
5	MADAGASCAR	-3.5784**	-	I(0)	Converging
6	MALAWI (with trend)	-2.7431	-3.8588*	I(1)	Diverging
7	MAURITIUS	-3.5057**	-	I(0)	Converging
8	MOZAMBIQUE	-3.3289***	-	I(0)	Converging
9	NAMIBIA	-4.9193*	-	1(0)	Converging
10	SEYCHELLES	-5.2707*	-	1(0)	Converging
11	SWAZILAND	-3.6602**	-	I(0)	Converging
12	TANZANIA	-3.7353**	-	I(0)	Converging
13	ZAMBIA	-3.7049**	-	I(0)	Converging
14	ZIMBABWE	-6.7016*	-	1(0)	Converging

Critical Values With Trend Trend

*1% → -4.2529

**5% → -3.5485

***10 → -3.2071

Critical Values Without

*1% → -3.6394

**5% → -2.9511

***10% → -2.6143

Also, the test was carried out to determine the possibility of a convergence of per capita income among the member states of SADC to the benchmark country (South-Africa) and the empirical results as presented in table 1 below show the t-values of countries, the corresponding decision of convergence or divergence.

From table1 above, a country in SADC is deem to converge to the bench-mark country per capita income (South Africa per capita income) when the GDP per capita data of the country is stationary. That is having 1(0) order of integration. For the data or series to be stationary, then its calculated t-statistics value must be negative and greater than the critical value at least 10% level of significance. Accordingly, the calculated t-values of Angola (-1.9455), Botswana (-1.8694), Lesotho (-1.6272) and Malawi (-2.7431) though negative are less than critical value at 10% (-3.2071) with trend as shown in table 1. The t-value of DR Congo shows a positive value of 1.0041 and is less than the critical value at 10% level of significance. This means that these countries per capita GDPs have unit root and are not stationary in relation to South Africa GDP per capita data. Hence their per capita GDP diverged from that of South Africa.

Fascinatingly, the result also shows that the t-values for Madagascar, Mauritius, Mozambique, Namibia, Seychelles, Swaziland, Tanzania, Zambia and Zimbabwe were negative and greater than the critical values at one percent level. This implies that these counties per capita GDPs do not have unit root and are stationary in relation to South Africa GDP per capita data. Hence their per capita GDP converged to that of South Africa.

In summary, it is deduced that there are five (5) countries diverging from South-Africa (the benchmark country). This means that their per capita income gap to South Africa is going wider and it will be very difficult for these countries to catch up with the benchmark country. These five (5) countries are; Angola, Botswana, DR Congo, Lesotho and Malawi.

The result also shows that apart from the 5 countries showing divergence, the other nine (9) countries shows convergence towards South-Africa. This depicts that the gap between these nine (9) countries and South-Africa is reducing. Thus there is a better chance of these countries to catch up with South Africa or even overtake South Africa in

their per capita income in the nearest future. The converging countries are; Madagascar, Mauritius, Mozambique, Namibia, Seychelles, Swaziland, Tanzania, Zambia and Zimbabwe.

4.2 Results of Determinants of Convergence of Per Capita GDP in SADC

The idea of convergence is the hypothesis that poorer economies (countries) will tend to grow at a faster rate than richer economies. As a result, all economies in the SADC region should eventually converge in terms of per capita income in order to attain a faster growth, reduce income inequality and minimize the poverty gap between the countries in the region and the benchmark country (South Africa).

There must be some factors or conditions necessary for convergence to take place. These determinants (factors) help draw the income of each of the countries in the region to the benchmark country. Thus, from the econometric results of the parameter estimates for each of the countries in the SADC region, the following were observed as the key determinants of convergence in the countries in the SADC region; foreign direct investment (FDI), economic growth (G), openness to trade (OPEN), inflation (I) and fiscal deficit (FDY). Also, to determine the variables necessary for convergence in each of the countries in the region, the variables used in each of these countries must be statistically significant at less than 10 percent level. These will enable us to know the most important determinants (variables) that brings convergence in the country.

Table2: Angola Parameter Estimates for drivers of Convergence

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.360439	0.017896	-20.14043	0.0000
FDY	0.000265	0.001135	0.233478	0.8170
FDI	-19772698	9789266.	-2.019835	0.0527
INF	-2.93E-05	1.06E-05	-2.756111	0.0100
G	-0.000422	0.001654	-0.255310	0.8003
G(-1)	0.003182	0.001641	1.939072	0.0623
Adjusted R-squared- 0.364883, F-statistic- 4.906686, Durbin-Watson stat- 1.852597				

From the results presented in the table 2, foreign direct investment (FDI), Inflation (INF) and economic growth (G), are the key drivers of convergence in Angola. The variables were statistically significant at less than 10 percent level. Whereas foreign direct investment (FDI) has a negative sign implying that increased inflow of foreign direct investment (FDI) will help to reduce the income gap between South-Africa and Angola. The positive sign for economic growth (G) and negative sign for inflation (INF) are inconsistent with economic theory. A fast economic growth should promote convergence or catch-up with South-Africa, not divergence.

Table 3: Botswana Parameter Estimates for drivers of Convergence

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-0.076408	0.027016	-2.828302	0.0083
FDY	-0.006408	0.002068	-3.098367	0.0042
FDI	-54813997	8447848.	-6.488516	0.0000
INF(-1)	0.002604	0.002199	1.184383	0.2456
G	-0.005079	0.002927	-1.735314	0.0929
Adjusted R-squared- 0.779458, F-statistic- 31.04144, Durbin-Watson stat- 1.976505				

The results in table 3 above for Botswana are interesting in that, most of the variables bear signs that are consistent with economic theory. These variables are statistically significant at less than 10 percent level. Fiscal deficit (FDY), foreign direct investment (FDI) and economic growth (G) have the potential to reduce the income gap between Botswana and South-Africa. They are all significant and bear negative signs. For instance, rapid economic growth (G) in Botswana will promote catch-up with South-Africa. Its population growth is less than the growth rate of real GDP.

Table 4: DR Congo Parameter Estimates for drivers of Convergence

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.637349	0.090290	-18.13433	0.0000
OP	-913250.3	189543.4	-4.818158	0.0000
INF(-1)	2.90E-05	2.41E-05	1.202215	0.2390
FDI	-2.79E+08	1.33E+08	-2.099881	0.0446
FDY	-0.011602	0.005467	-2.122231	0.0425
G	-0.000688	0.006308	-0.109021	0.9139
Adjusted R-squared- 0.679734, F-statistic- 15.43237, Durbin-Watson stat- 1.733043				

It can be deduced from the results in table 4 for Dr. Congo that fiscal deficit (FDY), foreign direct investment (FDI) and openness (OPEN) are the key drivers of convergence in DR Congo. These variables were statistically significant at less than 5 percent level and the all beer negative signs. The negative signs of foreign direct investment (FDI) means that an increase in the inflow of foreign direct investment into Dr. Congo will help reduce the income gap between DR Congo and South-Africa. The fiscal deficit (FDY) also shows negative, which depicts that a decrease in DR Congo's fiscal deficit (FDY) will draw the income of DR Congo closer to the benchmark country (South-Africa).

Table 5: Lesotho Parameter Estimates for drivers of Convergence

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.81572	0.19785	-4.12296	0.0003
INF	-0.00399	0.00196	2.03901	0.0507
FDI(-1)	-164165.	629097.	2.66771	0.0321
FDY	-0.00490	0.00214	2.29247	0.0293
OP	-155692	153543	-1.01400	0.3190
G(-1)	0.010595	0.006448	1.64321	0.1111
Adjusted R-squared- 0.676032, F-statistic- 6.592678, Durbin-Watson stat- 1.820415				

The results in table 5 for Lesotho shows that fiscal deficit (FDY), foreign direct investment (FDI) and inflation (INF) are the key drivers of convergence in Lesotho, they have the capacity to draw Lesotho closer to South-Africa. These variables are statistically significant at less than 10 percent level and they are all statistically significant and with negative signs. For example, a reduction in the inflation (INF) rate and fiscal deficit (FDY) in Lesotho will draw the income of Lesotho closer to catch up with the income of South-Africa.

Table 6: Madagascar Parameter Estimates for drivers of Convergence

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-1.047452	0.020808	-50.33778	0.0000
OP	-435738.1	64845.63	-6.719622	0.0000
FDI	45671936	23022786	1.983771	0.0572
FDI(-1)	-61638752	21290069	-2.895188	0.0073
FDY(-1)	-0.002489	0.001793	-1.38827	0.1760
G(-1)	-0.00219	0.00128	-1.71057	0.0982
INF	-0.001691	0.000642	-2.634803	0.0136
Adjusted R-squared- 0.755556, F-statistic- 18.51517, Durbin-Watson stat- 1.838626				

From the econometric results indicated in table 6 above, foreign direct investment (FDI), economic growth (G), openness (OPEN) and inflation (INF) are the key drivers of convergence. The result is interesting and different from Angola, Botswana, DR Congo and Lesotho in that, the econometric result of Madagascar shows a convergence towards South-Africa. The key drivers of convergence in Madagascar (FDI, G, OPEN and INF) are the variables responsible for the income of Madagascar to converge with that of South-Africa and they are statistically significant at less than 10 percent level. The negative sing of foreign direct investment (FDI) implies that an increase in the flow of foreign direct investment into Madagascar will help the country's income to catch up with that of South-Africa at a faster rate and possible overtake it.

Table 7: Malawi Parameter Estimates for drivers of Convergence

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.298899	0.033225	-39.09450	0.0000
OP	-111003.9	58293.54	1.904224	0.0668
FDY(-1)	-0.002679	0.001216	2.365978	0.0301
FDI(-1)	-9935602.	1020384	9.915390	0.0000
G	-0.002348	0.001046	2.244176	0.0326
INF	-0.000453	0.000252	1.798329	0.0825
Adjusted R-squared- 0.748813, F-statistic- 7.252343, Durbin-Watson stat- 1.849043				

The results in table 7 are interesting in that all the variables of Malawi are key drivers of convergence in Malawi. They variables are fiscal deficit (FIS), foreign direct investment (FDI), economic growth (G), inflation (INF) and openness (OPEN). These variables are statistically significant at less than 10 percent level and beer negative signs. These variables are consistent with the economic theory and have the potential to reduce the per capita income gap between Malawi and South-Africa. For instance, an increase in the flow of foreign direct investment (FDI) into Malawi and a rapid economic growth (G) will push the income of Malawi closer to South-Africa. Also, the negative signs in Inflation (INF) and Fiscal deficit (FDY) shows that a reduction in inflation rate and a decrease in the fiscal deficit will draw the income of Malawi closer to the benchmark country.

Table 8: Mauritius Parameter Estimates for drivers of Convergence

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.221793	0.204846	1.082731	0.2876
OP	-472033.4	194961.9	-2.421157	0.0217
INF	0.015965	0.005419	2.946121	0.0062
G	-0.001864	0.000831	-2.240260	0.0282
FDI	-24773200	10361169	-2.235348	0.0266
FDY	0.021241	0.013579	1.564256	0.1282
Adjusted R-squared- 0.644597, F-statistic- 6.634742, Durbin-Watson stat- 1.703425				

In the case of Mauritius, the result in Table8 shows that foreign direct investment (FDI), economic growth (G), openness (OPEN) and inflation

(INF) are the key drivers of convergence in Mauritius. These variables are statistically significant at less than 5 percent level. For example, rapid economic growth in Mauritius will cause the income of Mauritius to catch- up with South-Africa's income and if possible overtake it overtime.

Table 9: Mozambique Parameter Estimates for drivers of Convergence

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.676939	0.046724	-35.89033	0.0000
OP	-328686.0	93410.57	-3.518724	0.0014
INF	-0.001257	0.000404	-3.108070	0.0041
FDI	-82855919	26906962	-3.079349	0.0044
G	-0.003781	0.001965	-1.924587	0.0638
FDY	-0.002184	0.004365	-0.500403	0.6204
Adjusted R-squared- 0.800684, F-statistic- 29.12011, Durbin-Watson stat- 1.818997				

The result of Mozambique in table 9 indicates that the variables responsible for convergence are the same with that of Mauritius. These variables - foreign direct investment (FDI), economic growth (G), inflation (INF) and openness (OPEN) are statistically significant at less than 10 percent level and beer negative signs and are the key variables of convergence in Mozambique. The result shows that an increase in the flow of foreign direct investment (FDI) into Mozambique and a decrease in the rate of inflation in Mozambique will help reduce the income gap between Mozambique and South-Africa.

Table 10: Namibia Parameter Estimates for drivers of Convergence

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.345821	0.043871	-7.882653	0.0000
OP	-118201.5	47145.30	-2.507174	0.0178
G	-0.005737	0.001761	-3.257158	0.0028
FDI	-934683.4	4129835.	-2.496064	0.0181
INF	-0.002306	0.000951	-2.424492	0.0216
FDY	-0.003558	0.001585	-2.244531	0.0323
Adjusted R-squared- 0.841069, F-statistic- 10.878388, Durbin-Watson stat- 1.748818				

The results of Namibia in table 10 are similar to those of Malawian case in that all its variables are key drivers of convergence. The results are however different from those of Mozambique and Mauritius given the differences in their economic performance. The key variables include fiscal deficit (FDY), foreign direct investment (FDI), economic growth (G) and openness (OPEN). These variables are all negative and significant at less than 5 percent level. They are also consistent with economic theory. They are the main drivers of income convergence between Namibia and South-Africa.

Table 11: Seychelles Parameter Estimates for drivers of Convergence

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.044670	0.041902	-1.066056	0.2952
OP	-111165.1	37019.95	-3.002843	0.0055
FDI	-5735842.	833688.6	-6.880078	0.0000
INF	0.689984	0.587089	1.175263	0.2494
FDY	-0.003122	0.001452	-2.150879	0.0400
G(-1)	0.002165	0.001948	1.111316	0.2756
Adjusted R-squared 0.692300, F-statistic 16.29942, Durbin-Watson stat 1.753928				

From the results of Seychelles presented in table 11, we found that FDY, FDI & OPEN are the Key drivers of convergence in Seychelles. These variables were statistically significant at less than 5 percent level. The negative signs of the variables indicate that an increase in the flow of foreign direct investment (FDI), an increase in the level of openness and a decrease in the fiscal deficit (FDY) in Seychelles will reduce the income gap between Seychelles and South-Africa.

Table 12: Swaziland Parameter Estimates for drivers of Convergence

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.206219	0.074306	-2.775262	0.0094
INF	0.000390	0.001807	0.215649	0.8307
FDI	-4870319.	2426845.	-2.052622	0.0309
OP	-170430.8	66619.25	-2.558282	0.0158
G	-0.002129	0.001298	-1.860525	0.0793
FDY	0.000770	0.004551	0.169205	0.8668
Adjusted R-squared- 0.652294, F-statistic- 5.807376, Durbin-Watson stat- 1.837362				

The results of Swaziland presented in table 12, show that FDI, OPEN and G are they key drivers of convergence. These variables are responsible for the convergence of Swaziland's income to that of the benchmark country (South-Africa). They are all negative and significant at less than 10 percent level. An increase in the level of openness promotes trade between Swaziland and South Africa and with other countries while rapid economic growth in Swaziland may lead to the convergence of the income of Swaziland and South-Africa.

Table 13: Tanzania Parameter Estimates for drivers of Convergence

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.221288	0.046341	-26.35412	0.0000
OP	-172621.4	87044.01	-1.983150	0.0566
G	-0.007229	0.003553	2.301895	0.0459
INF	-0.003792	0.001471	2.577981	0.0151
FDI	-33985727	15361123	-2.202999	0.0551
FDY	0.003774	0.005477	0.689115	0.4960
Adjusted R-squared- 0.645569, F-statistic- 6.860363, Durbin-Watson stat- 1.741062				

Table 13 highlight Tanzania's result. It is deduced from the results that foreign direct investment (FDI), economic growth (G), inflation (INF) and openness (OPEN) are the major drivers of convergence in Tanzania. They are statistically significant at less than 10 percent level and with negative signs. An increase in the openness encourages trade between Tanzania and other countries. This increases the income of Tanzania and reduces the income gap with the benchmark country. Also, a rapid economic growth (G) in Tanzania will promote catch-up with South-Africa given that its population growth is less than its growth rate of real GDP.

Table 14: Zambia Parameter Estimates for drivers of Convergence

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.521516	0.086343	-6.040067	0.0000
OP	-555562.1	147393.0	-3.769256	0.0007
G	-0.013652	0.003861	-3.535959	0.0013
INF	-0.000721	0.000389	-1.852838	0.0738
FDI	-1.08E+08	21405115	-5.054282	0.0000
FDY	-0.002876	0.002272	-1.265975	0.2153
Adjusted R-squared- 0.686285, F-statistic- 16.31322, Durbin-Watson stat- 2.149647				

The result for Zambia in table 14 above is the same with that of Tanzania in that it shows that the same drivers of convergence as that of Tanzania. These variables (FDI, G, INF and OPEN) are negative and statistically significant at less than 10 percent level. An increase in the flow of FDI into Zambia will help minimize the income gap between Zambia and South-Africa.

Table 15: Zimbabwe Parameter Estimates for drivers of Convergence

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-0.740085	0.028353	-26.10222	0.0000
OP(-1)	11163.27	42478.44	0.262799	0.7946
G	-0.002254	0.000887	2.539579	0.0167
INF	-0.000469	0.000141	-3.814002	0.0007
FDI(-1)	-22333512	39421732	-0.566528	0.5754
FDY(-1)	0.005890	0.001688	3.488702	0.0016
Adjusted R-squared- 0.594778, F-statistic- 5.842350, Durbin-Watson stat- 1.786726				

The result of Zimbabwe is different from other member countries in that Foreign Direct Investment in Zimbabwe (FDI) is not a key indicator of convergence. The key drivers of convergence in Zimbabwe include: growth in Zimbabwe (G), Inflation in Zimbabwe (INF) and Fiscal Deficit in Zimbabwe (FDY). These variables are statistically significant at better than 5 percent level and help to promote the income convergence of Zimbabwe to South-Africa's income.

Table 16: Summary of Key Determinants of Convergence in SADC Countries

C/N	Country	Fiscal Deficit	Foreign Direct Investment	Growth in GDP	Openness	Inflation
1	Angola		•	•		•
2	Botswana	•	•	•		
3	DR Congo	•	•		•	
4	Lesotho	•	•		•	
5	Madagascar		•	•	•	•
6	Malawi		•	•	•	•
7	Mauritius		•	•	•	•
8	Mozambique		•	•	•	•
9	Namibia	•	•	•	•	•
10	Seychelles	•	•		•	
11	Swaziland		•	•	•	
12	Tanzania		•	•	•	•
13	Zambia		•	•	•	•
14	Zimbabwe	•		•		•

Note: • Denotes significant / determinant.

In conclusion, from Table 16 presented above, it is obvious that foreign direct investment (FDI) plays a major role in the convergence of per capita income in SADC. This is because it is a key determinant of convergence in all but one country (Zimbabwe) in the region. This is followed by economic growth (G) which is also a key determinant of convergence in eleven (11) out of fourteen (14) countries in the region. These principal determinants help to reduce the income gap between the member countries and South-Africa. They are indeed the promoters of convergence (catch-up) of member countries to South-Africa.

5. Conclusion

In this study, we made contribution to the existing literature by evaluating convergence of per capita income in the southern African development community (SADC). We explained the criteria necessary for convergence of per capita income in the SADC region. The neoclassical growth theory constituted the theoretical anchor of the study. It predicts that economic integration among national and regional economies would inevitably result in per capita income convergence. This will further lead to more capital accumulation and faster economic growth in poor countries (regions) than in rich ones, resulting in

economic convergence towards a common level of per capita income in the long run.

We adopted the unit root tests and cointegration methodology to determine the existence of convergence. The results of the study are revealing. We showed that although there was wide disparity of income of SADC member state in the 1992, there has been a tendency towards convergence in real per capita income of 9 out of 15 countries in the SADC region. This finding, although aligned with Artelaris et al. (2011), Gilles et al. (2010) and others that, convergence and divergence co-exist but lend credence to more convergence in per capita income in SADC. The finding disagrees with the finding of McCoskey (2002) and Wolassa (2011). Specifically, Wolassa (2011) had investigated convergence in real per capita GDP, macroeconomic policy and stability indicators within the SADC using the ADF unit root test, for the period of 1992-2009. The results showed no evidence of absolute beta and sigma convergence in real per capita GDP among the SADC economies except in Botswana and South Africa's real per capita GDP while the rest of the countries were characterized by a boundless drift. It is important to note that, Wolassa (2011) study is about eleven (11) years now and many developments have taken place in the SADC region. Again, the small sample size (17 years) employed then may have minimized the possibility of more convergence among the SADC countries. Hence, the finding of this present study proficiently updates Wolassa (2011) study with more (9 out of 14 countries or about 64%) evidence of per capita income convergence in SADC.

The study also identified drivers of convergence of per capita income in the SADC region. These include: foreign direct investment as the main driver and followed by economic Growth, inflation, openness to trade and fiscal deficit/GDP. This finding aligned strongly with the findings of Zhang (2001), Jawaid and Raza (2012) Wahiba (2015), Azam ((2016) and Ebi and Okon (2019) that increase in FDI and trade openness, tend to accelerate the economic growth and convergence process. Hence, we conclude that, growth convergence is eminent in SADC. Increase in FDI, low fiscal deficit and a stable inflation rate should be pursued to guarantee macroeconomic stability in order to sustain convergence.

References

Alagidede, P. & Tweneboah, G. (2015), "Convergence of Growth Rates in West African Monetary Zone", *Journal of Economic Cooperation and development, 36(4),* 29-54.

Amelie, C. Olivier, D, and Jean-François, H. (2012), "Convergence of real per capita GDP within COMESA countries: A panel unit root evidence", *Annals of Regional Science, Springer Verlag (Germany)* 49 (1), 53-71.

Artelaris, P., Arvanitidis, P., & Petrakos, G. (2011), "Convergence Patterns in the World Economy: Exploring the Nonlinearity Hypothesis", *Journal of Economic Studies, 38(3),236-252.*

Azam, M. (2016), "Does Governance and Foreign Capital Inflows Affect Economic Development in OIC Countries", *Journal of Economic Cooperation and development 37(4),* 21-50.

Basil, J. (2002). Economic integration and convergence of per capita income in West Africa. *African Development Bank*. Malden, MA. Blackwell Publishers.

Carmignani, F. (2006), The road to regional integration in Africa: macroeconomic consequence and performance in COMESA. *Journal of African Economies*, 15(2), 212-250.

Charles, M. Darne, O. and Hoarau, J.F. (2012), "Convergence of real per capita GDP within COMESA countries: A panel unit root evidence", *The Annals of Regional Science* 49(1):1-19

Ebi, B.O & Okon, A. N. (2019), Economic Performance and Patterns of Economic Growth in Africa: A Case Study of SANE, in Omotor, D.G, Ajakaiye, O. and Orubu, C.O (eds) *The Dynamics of Economic Development in Africa*: *Essays in Honour of Professor Akpan H. Ekpo*. West African Institute for Financial and Economic Management (WAIFEM), 337-360.

Effiom, L. & Ebi, B.O (2016), "Foreign direct investment in Cross River State, Nigeria: An evaluation of investment policy framework", *Nigerian Journal of Economic and Social Studies* 58(3), 389-411.

Gilles, D., Valerie, M., &Theo, N. (2010), "The Slow Convergence of per capita income between the Developing Countries: Growth resistance and sometimes growth tragedy," *Credit Research Paper, Centre for Research in Economic Development and International Trade*. University of Nottingham.

Haider, A., Hameed, S., & Wajid, A. (2010). "Income convergence hypothesis: A regional Comparison of selected East and South Asian Economies", *Munich Personal RePEc Archive*, No. 23739.

Jawaid, S. T. & Raza, S. A. (2012), "Foreign direct investment, growth and convergence hypothesis: a cross-country analysis", *Munich Personal RePEc Archive.*

Johansen, S. (1988), "Statistical analysis of cointegrating vectors", *Journal of Economic Dynamics and Control*, 12, 231-540.

Krugman, P. & Venables, J. (1995), "Globalization and the inequality of nations", *Quarterly Journal of Economics,*110, 857–880.

Martin, R. & Sunley, P. (1996), "Slow convergence? Post-neoclassical endogenous growth theory and regional development", *ESRC Centre for Business Research,* University of Cambridge, Working Paper No. 44.

McCoskey S.K. (2002), "Convergence in Sub-Saharan Africa: A nonstationary
panel data approach", *Applied Economics*, 34, 819-829.

Ndiaye, M. B. O. &Korsu, R. D. (2013), "The quest for monetary union in ECOWAS: An Econometric test for convergence of countries", *West African Monetary Agency-WAMA*, Freetown, Sierra Leone.

Solomon A. & Festus, T. (2013). "An empirical investigation of per capita income convergence hypothesis in Sub-Saharan Africa. *Department of Economics", University of Ghana, Legon – Accra. Paper Submitted for Review for CSAE 2014 Conference on Africa*.

Wolassa L. K. (2011) "Growth and macroeconomic convergence in SADC", *Development Bank Group, Working Paper no 140*.

World Bank (2014), *World Development Indicators* 2014, Washington DC (www.worldbank.org)

World Bank. (2017). *Key Development Indicators*, 2015. http://www.worldbank.org/

Zhang, Z. (2001), "Trade liberalization, economic growth and convergence: Evidence from East Asian Economies", *Journal of Economic Integration*, 16(2), 147-64.