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The Convergence Criteria of Monetary Integration and Economic Performance of Sub-Saharan African Countries

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Abstract:
Based on the experience of countries that have adopted the use of a single currency, there is no doubt that monetary integration remains a key strategy for Sub-Saharan African (SSA) countries to transform themselves into a strong united bloc of developed nations and a global force. Therefore, this study examines the impact of the convergence criteria of monetary integration on the economic performance of SSA countries from 1999 to 2021, using Panel Autoregressive Distributed Lag Model (PARDL). About nine SSA countries from the four regions of SSA were randomly selected, and the countries include: Nigeria, South Africa, Angola, Kenya, Lesotho, Ghana, Ethiopia, Democratic Republic of Congo, and Central African Republic. In order to achieve the main objective of this study, the annual panel data were collected from World Bank database on the variables such as Gross Domestic Product growth rate (GDPG), Inflation Rates (INFR), Real Exchange Rates (REXR), and Fiscal Deficit (FDEF). The panel unit root and Johansen Fisher cointegration tests were conducted on all the variables. While the variables exert mixed order of integration, there exists a long-run relationship among the variables. The PARDL results reveal that the inflation rate has an insignificant positive effect on the GDP growth rate in the long run and an insignificant negative effect in the short run. The result further shows that in both the long and short run, the real exchange rate has an insignificant negative impact on the economic performance of SSA countries. The fiscal deficit result shows a significant positive impact on the GDP growth rate in SSA countries both in the long run and short run. The study, therefore, recommends that government should formulate a policy that would strengthen local currencies against foreign currencies, probably by fixing the exchange rates. If this is done, the inflation rate will be tamed through various productions of goods and services at reduced costs.

Keywords: Monetary integration, panel ARDL, economic performance, sub-Saharan African countries

1. Introduction

The quest for monetary integration has been a subject of debate in recent years. Since the breakdown of Bretton Woods Agreements in the early 1970s, policymakers have had to grapple with economic instability in international monetary arrangements. Monetary integration has always been claimed as an indispensable tool for promoting trade among countries and an ingredient of regional integration. It contributes significantly to deepening regional integration, especially for regional economic communities aspiring to create common markets(United Nations Economic Commission for Africa [UNECA], 2008). The literature indicates that international trade and economic performance improve when a country enters monetary cooperation arrangements such as a monetary union. The purpose of monetary cooperation amongst countries within a regional economic community is to establish a common monetary area with a greater measure of monetary stability in order to facilitate economic integration efforts and foster sustained economic development (Kenneth & Okon, 2021).

The European Union remains one of the most successful examples of integration in the world. Experiences drawn from the union could be very informative for African aspiring to establish a monetary union. Although the road to European Union was not easy, the benefits thereafter were enormous. It took over four decades and involved a step-by-step process of block expansion. The introduction of a single currency has provided Europe with autonomy that would not otherwise exist (Leon, 2020).

The creation of a single currency for the African countries has long been a pillar of African unity, a symbol of the strength that its backers' hope will emerge from success with efforts to integrate the continent. In Africa, monetary integration exists only with the Rand and the Franc zones. The Franc zone comprises fourteen African countries and is built around two monetary unions: The West African Monetary Union and the Union of States belonging to the Banque des Etats d'Afrique Centrale (Faezeh, 1992). The Franc zone has been successful in creating a stable and convertible currency due to the backing of the French government. A single African currency is intended to contribute to regional integration

and solidarity, which together are viewed as necessary to counteract the small economic size and lack of clout of individual African countries. Monetary integration is indispensable for achieving the continent's balanced development. This would help strengthen Africa's bargaining position with Europe and other industrialized nations (International Monetary Fund African Department [IMFAD], 2015).

Although the monetary union has its costs and benefits, the theoretical and empirical evidence suggests that, if established, regional currencies among developing country grouping can bring considerable benefits similar to those expected from the introduction of the euro. They can reduce the cost of doing business within a region and eliminate exchange rate spreads and commissions in currency trading associated with intraregional trade and investment. Other benefits include: Expanded aggregate investment, improved resource allocation, increased domestic savings, enhanced financial intermediation, and greater international trade, which makes the economy of participating countries become more open in terms of the share of its exports in Gross National Product (GNP) (IMFAD, 2015).

Consequently, the primary criteria to fulfill to implement monetary integration include maintaining a stable inflation rate. That is, the inflation rate should be single digit at the end of each year with a 5% limit, a stable exchange rate, fiscal deficits should not exceed 3% of gross domestic product (GDP), Central banks would not finance more than 10% of the preceding year's tax collection, the total stock of gross external reserves should cover at least three months of imports. However, the secondary criteria include: the ratio of public investment to tax revenue has to be at least 20%, the real interest rate must be positive, tax revenues should be at least 20% of GDP, debt has to be sustainable, and countries must not register any new domestic payment defaults (Policy Center for the New South [PCNS], 2020). These criteria are necessary for the smooth transition to a full-fledged monetary union.

The decision to adopt a single currency was borne out of the monetary problems plaguing sub-Saharan African countries, and it is believed that these problems could be solved if there is monetary integration. The notable problems hindering monetary integration in SSA remain the differences in the economic and social structures of the participating countries. The trade patterns, cultures, natural resources, growth rate, policies, wage rate, and political and economic structures differ. These affect their motivation for integration or the applicability and effectiveness of the instruments they choose. A country whose economic and social structures are more developed than that of other members will resist any policy harmonization that might impose a regressive policy. Another problem that has been mitigated against monetary integration is the fear of the uneven distribution of the benefits which will accrue to member nations. Unstable political relation in all member countries is a serious impediment to the actualization of monetary integration in SSA countries (Agu, 1992).

Going by the convergence criteria, the 2019 convergence report also showed that none of the countries fulfilled all the criteria for convergence. In most of these countries, inflation has always been two digits for the past decade now. The rising prices have mirrored worldwide trends, where inflation has increased more rapidly and more persistently than expected and where incomes have been eroded by hikes in the cost of living. A recent increase in inflation may appear less striking relative to historical averages for sub-Saharan Africa, especially for countries with fixed exchange rates (World Bank Indicator, 2021).

The fact is that most of the countries in SSA find it difficult to satisfy and sustain their performance on the convergence scale. Almost all the regions in SSA performed abysmally poorly on the fiscal deficit criterion. Over the ten-year period, SSA countries have not been able to satisfy and sustain the inflation criterion as the inflation rates in these countries are not single-digit. This has led to the postponement of the launch of the common currency over four times from the initial date to 2020 since the ability to meet the convergence criteria forms the basis for admission into a monetary union (International Monetary Fund [IMF], 2022).

1.1. Statement of Research Problem

The problems of monetary integration stem from monetary credit and fiscal disharmony. Sub-Saharan Africa's recovery has, however, been sharply interrupted. The GDP growth rate was 4.7 percent in 2021. The growth in 2022, however, slowed by more than 1 percentage point to 3.6 percent due to a dramatic pickup in the inflation rate, which is driven by external factors, including global commodity prices and disruptions to global supply chains (IMF, 2022).

Although most currencies weakened against the US dollar in the first half of 2022, real effective exchange rates were appreciated in more than half of the sub-Saharan African countries, partly due to high inflation (IMF, 2022). Inflation has increased more rapidly and more persistently than expected. Macroeconomic imbalances are approaching levels not seen in decades. These have resulted in increased poverty, food insecurity, malnutrition, and high unemployment, to mention a few. There are fluctuations in the GDP growth rates, the inflation rates, and the exchange rates of these countries (World Bank Indicator, 2021).

Regional indebtedness is now approaching levels last seen in the early 2000s before the impact of the Heavily Indebted Poor Countries Initiative, though with a different composition. The substitution of low-cost, long-term multilateral debt with higher-cost private funds has resulted in rising debt-service costs and higher rollover risks. Most of these SSA countries are experiencing high fiscal deficits, which puts most of them in debt distress or at high risk of distress. Three out of the SSA countries (Angola, Gabon, and Nigeria) have been facing spreads of more than 1,000 basis points over the past few months (IMF, 2022). The increase in public debt is attributed to increased spending and falling revenues in the wake of COVID-19 pandemic. Approximately, one-third of the region's economies have debt levels above 70 percent of GDP. Persistent strengthening of the US dollar against the local currencies of SSA countries has further aggravated the inflation rate because 80% of our consumables are imported. This study, therefore, examines the impact of the convergence criteria of monetary integration on the economic performance of sub-Saharan African countries.

1.2. Research Questions

The following questions are proffered solutions to achieve the objectives of the study:

- What is the effect of the real exchange rate on the performance of the economy in sub-Saharan African countries?
- To what extent has the inflation rate affected the economic performance of sub-Saharan African countries?
- What effect does fiscal deficit have on the economic performance of sub-Saharan African countries?

1.3. Objectives of the Study

The main aim of this study is to examine the convergence criteria of monetary integration on the economic performance of sub-Saharan African countries. The specific objectives are:

- Examine the effect of the real exchange rate on the economic performance of sub-Saharan African countries.
- Ascertain the extent to which the inflation rate affects the economic performance of the sub-Saharan African countries.
- Investigate the effect of fiscal deficit on the economic performance of sub-Saharan African countries.

1.4. Research Hypotheses

The following research hypotheses were tested in null form:

- H_{01}: Real Exchange Rate has no significant impact on economic performance in sub-Saharan African countries.
- H_{02}: Inflation Rate has no significant impact on the economic performance in sub-Saharan African countries.
- H_{03}: Fiscal Deficit does not have a significant impact on the economic performance in sub-Saharan African countries.

2. Literature Review

2.1. Conceptual Issues

2.1.1. Concept of Monetary Integration

African Development Bank Group [AFDB] (2016) defines monetary integration as a process whereby two or more countries embark on measures of rapprochement of monetary conditions. The index of monetary conditions is calculated by the weighted average of an indicator measuring interest rate variation and an indicator measuring the exchange rate variation. According to Saka *et al. (*2015), monetary integration is an arrangement whereby a group of countries agrees to use a common currency and adhere to a single monetary and exchange rate policy. These policies are managed in such a way that the common economic objective of integration can be achieved.

According to Agu (1992), monetary integration is a process whereby a group of countries, usually in adjacent geographical areas, forms a monetary union that has the following characteristics:

- Establishing one central monetary authority which takes over the formulation of the union's monetary and fiscal policies,
- Issuing a single currency to which all the national currencies of member countries are convertible and the flow of the union currency is unrestricted among member countries, and
- Pooling of the foreign exchange reserves of the member countries

Monetary integration is the monetary unification of participating member countries in an economic union and involves the adoption of a common currency, co-ordinated exchange rate policies, and harmonization of fiscal and monetary policies. It is a process that can only be envisaged during the final stages of economic integration (Omoruyi, 1986). The definition of Agu (1992) forms the working definition of this study because he specifically explained the geographical areas of countries that can form a monetary union, which is also key in ensuring the smooth operation of monetary integration.

2.1.2. Concept of Economic Growth

Nwogwugwu *et al.* (2022) define economic growth as the process whereby the country's real national and per capita income increases over a long period of time. The increase in per capita income is the better measure of economic growth since it reflects the increase in the improvement of the living standards of the masses. Another measure of economic growth is the increase in real national income. This increase should be in terms of an increase in the output of goods and services and not due to a mere increase in the market prices of existing goods. Ogboru *et* al. (2018) defined economic growth as a long-term expansion of the productive potential of the economy. The trend of growth could be expanded by raising capital investment spending as a share of national income as well as the size of capital inputs and labour supply, labour force, and technological advancement. Economic growth is the increase of per capita GDP or other measures of aggregate income. Jhingan (2011) defines economic growth as a quantitative sustained increase in a country's per capita income which is a result of expansion in the labour force of a country, level of consumption, capital formation, and volume of trade. Thus, economic growth can be seen as the value of all the production made in the economy over a period of one year. This, therefore, forms the working definition of this study.

2.2. Theoretical Literature

2.2.1. Classical Theory of Optimum Currency Area

The theory was propounded by Mundell in 1961 and is not particularly optimistic about the prospects of African countries entering into a monetary union. The theory suggests that for a region to opt for a monetary union, member countries should have similar structures. The importance of this criterion is to ensure that they face similar vulnerability to asymmetric shocks. For instance, if one country is a major oil exporter and another is a net importer of oil, like the case of Nigeria and Burkina Faso, shifts in the price of oil would have a very different impact on the two economies and might make regional integration between the member countries untenable. The theory further argued that there should be a high degree of labour mobility across state borders. Mundell assumes that there should be a large degree of wage flexibility amongst the member countries, such that asymmetric shocks could be assimilated. Mundell's analysis suggests that if the impact of shocks on particular areas is similar, i.e., symmetric, fixed exchange rates or a monetary union is appropriate. On the other way, if the impact of shocks is asymmetric, high labour mobility and/or wage flexibility are the main prerequisites. However, this theory has been criticized on the ground that African economies are typically undiversified, and depending on the kind of commodities they export, their economic structures are often quite different.

2.2.2. The New Theory of Optimum Currency Areas (OCAs)

The new theory of optimum currency areas was developed by Bolton and Huang (2018b). The theory extended the framework to two countries, and it is based on monetary sovereignty. They consider two countries with separate currencies and monetary policies but with exchange under-reaction. The new theory shows that the two countries are engaged in a strategic monetization game, which may generate excessive inflation in equilibrium. Bolton and Huang (2018b) emphasized that a monetary union between the two countries can not only eliminate this excess inflation cost but also remove a nation's monetary sovereignty. They argue that there is an important tradeoff involved in joining a monetary union: the monetary discipline of the single currency and the elimination of strategic monetary expansions come at the opportunity cost of the option value embedded in a nation's monetary sovereignty. The theory further shows that a monetary union is best combined with a fiscal union, allowing fiscal transfers to help a member country deal with its debt-servicing burden in a crisis. In addition, debt monetization remains desirable in a monetary union in the state of the world where both member countries simultaneously face an economic crisis. By eliminating the option to monetize debt in times of exigency, a monetary union may give rise to costly debt defaults. Thus, joining a monetary union involves trading excess monetization costs for debt default costs (Bolton and Huang (2018b).

Bolton and Huang (2018b) point out the importance of political cohesion and centralization of fiscal competencies in sustaining a monetary union. The history of US monetary unification, in particular, and that of the Bretton Woods system, reveals how fragile a monetary union is without a strong federal political structure.

This study is anchored on the new theory of optimum currency areas developed by Bolton & Huang (2018b) because it takes into account the fact that OCAs come with tradeoffs. Truly, there are lower transaction costs, but in return, countries give up a certain amount of sovereignty. The theory further emphasized that while the monetary union would help control inflation, the loss of each country's individual currency eliminates the ability to issue money to service debt obligations in times of financial upheaval. Linking this to SSA countries where inflation hits hard and debt servicing takes a large percentage of their revenue, joining the monetary union is the way out, as argued by (Bolton and Huang (2018b).

2.3. Empirical Literature

Empirical investigations of the views of monetary integration and economic growth in SSA remain inconclusive. This study, therefore, reviews the empirical works that were done by scholars across the globe.

Djirimu *et al* (2022) carried out the analysis of single currency on the ten countries of the Association of Southeast Asian Nations and three other countries in the Asia pacific regions (ASEAN+3) between 1993 and 2017. The study used pooled OLS regression and revealed that ASEAN+3 regions are not ready to implement a single currency because of an increasing trend of asymmetric shock, lack of business cycle synchronization, and differences in the production structure, trade relations, and economy sizes. Kankpeyeng *et al.* (2021) examined the impact of inflation on gross domestic product growth in Ghana from 1986 to 2018. The Vector Autoregressive Model (VAR) was employed, and the result showed that a high rate of inflation is detrimental to the growth rate of GDP in Ghana.

Adebowale (2021) studied the asymmetric relationship between budget deficit and economic growth in Nigeria from 1981 to 2018 using a non-linear ARDL model. The result showed that budget deficit has a negative impact on economic growth in Nigeria both in the long run and short run. Leon (2020) also investigated to ascertain if monetary integration can help improve the productivity of the economies in the Eurozone from 1996 to 2016. The method of analysis employed was panel data analysis. It was found that the productivity growth of the countries that joined in 2004 and adopted the euro was higher than those that maintained their own currency. Adekunle (2020) analyzed the costs and benefits of monetary integration in West Africa (2020) using a descriptive method of analysis. The study showed that the gains and opportunities that await integrating economies outweigh the perceived costs.

A study carried out by Gnabe and Huang (2020) on the impact of monetary policy on the economic growth of West African Economic and Monetary Union (WAEMU) countries between 1988 and 2018 used a panel cointegration structure for the eight WAEMU countries. It was revealed that interest rate, money supply, and gross fixed capital formation have a positive and significant impact on economic growth in WAEMU. Kangami and Akinkugbe (2019) carried out a study on the effect of a common currency on the economic growth of Central African Economic and Monetary Community (CEMAC)

Customs Union. The study covered the period from 1970 to 2013, using both parametric and non-parametric approaches. The study, however, found that monetary policy change instituted in the CEMAC region in 1994 has not played any significant role in promoting economic growth in the CEMAC region.

Silva (2018) investigated the impact of the single currency on economic growth in Organization for Economic Cooperation and Development (OECD) countries between 1985 and 2015. The study employed a fixed effect model and it was found that the euro has an insignificant impact on economic growth in the OECD countries. Muzekenyi *et al.* (2018) assessed the role of real exchange rates on economic growth in South Africa. The study covered the first quarter of 1994 to the fourth quarter of 2015, using VECM method of data analysis. However, it was found that both in the long run and short run, the real exchange rate has a negative impact on economic growth in South Africa. Aero and Ogundipe (2018) employed the Threshold Autoregressive Model (TAR) to investigate the effects of fiscal deficits on economic growth in Nigeria between 1981 and 2014. The result revealed that fiscal deficit has a negative effect on economic growth in Nigeria.

Arcade (2017) studied the threshold effects of inflation on economic growth in Africa from 1970 to 2013 using dynamic panel threshold regression. The result shows that low inflation is enhancing growth in Africa. Saka *et al.* (2015) empirically analyzed the behaviours of the convergence criteria in a proposed monetary union of Economic Community of West African States (ECOWAS) from 2000 to 2008. The study utilized the panel least square technique, and it was found that all the variables (exchange rate, fiscal deficit, interest rate, tax revenue) have indirect effects on the income growth rate. Kazimoto (2014) empirically examined the role of a single currency on the economic development of East African countries, using questionnaires with 91 respondents. It was revealed that exchange rate fluctuations and inflation rates have a direct impact on the development of the region.

Noer *et al.* (2013) carried out a feasibility study of a single currency on ten countries of the Association of Southeast Asian Nations and six other countries in the Asia pacific region (ASEAN+6) between 1999 and 2009. The study used weighted average and principal component analysis methods, and it was found that a single currency will give more benefits to member countries. Durmus (2012) utilized pooled Ordinary Least Square (OLS) method to empirically investigate the effect of monetary union on the macroeconomic performance of 24 Organizations for Economic Cooperation and Development (OECD) countries between 1988 and 2009. The study found that the euro monetary union has a positive effect on foreign trade in the 24 OECD countries.

Kin (2012) examined the impact of real exchange rates on economic growth in South Africa between 1994 and 2010. The study employed a vector error correction model and it was revealed that devaluation of currency significantly hampers economic growth in the long run. Mukwaya (2009) studied the trade effects of a single currency in East Africa from 1988 to 2003. The study employed simulation analysis and it was found that a single currency will result in a regional net welfare gain in East Africa.

2.4. Empirical Gap

Having sourced empirical literature on the subject matter, it was discovered that there is a paucity of empirical works on the convergence criteria of monetary integration across the globe. Thus, the few that were available were reviewed. However, none of these empirical works covered the sub-Saharan African (SSA) countries. The majority were done for Eurozone, while some were carried out in some regions of Africa and Asia. The most recent empirical work also covered the period till 2018. Having observed this empirical gap, this study, therefore, filled the gap in the literature by focusing on the SSA countries and also widened the scope of the study to 2021.

3. Methodology

3.1. Model Specification

The choice of variables in this study is informed by the theoretical framework on which the study is premised. The theory presented the control of inflation and the ability to service debt as the major benefits of monetary integration. This study, therefore, introduced the exchange rate into the model to examine the impact of convergence criteria of monetary integration on the economic performance of SSA countries. The explanatory variables of this study, thus, include:

- Inflation rate,
- Fiscal deficit (% of GDP),
- Real exchange rate

On the other hand, the dependent variable is the growth rate of GDP for the selected countries (Nigeria, South Africa, Kenya, Angola, Central African Republic, Democratic Republic of Congo, Ethiopia, Lesotho, and Ghana). These countries are selected randomly amongst the sub-Saharan African countries. The model is specified in line with the model of Saka *et al* (2015). While Saka *et al.*'s model is specified as shown in equation 1, the model of this study is specified in equation 2.

GDPG   = f (CBNFIN, FD, INF, PUBINV, REXCR, RINTR, TAXREV, WAGE BIL, EXTREX)   1

Where:

- CBNFIN = Central Bank Financing
- FD = Fiscal Deficit
- INF = Inflation Rate
- PUBINV = Public Investment
- REXCR = Real Exchange Rate
- RINTR = Real Interest Rate

- TAX REV = Tax Revenue
- WAGE BIL = Wage Bill
- EXTREX = External Reserve
  The functional form of this study's model is specified as:
  GDPG = f (REXR, INFR, FDEF)   2
  Where:
- GDPG = Gross Domestic Product's Growth Rate
- REXR = Real Exchange Rate
- INFR = Inflation Rate
- FDEF = Fiscal Deficit as a percentage of GDP
  The variables such as tax revenue, interest rate, wage bill, external reserve, and public investment were removed because they are secondary convergence criteria, while Central Banks financing was removed since it is not necessary for countries to satisfy all the criteria. This study, therefore, includes only the primary convergence criteria of monetary integration, which countries should satisfy before joining the monetary union.

The stochastic form of this model is written as:

$GDPG_t = \beta_0 + \beta_1 REXR_{t-1} + \beta_2 INFR_{t-1} + \beta_3 FDEF_{t-1} + \pounds_t$

Where:

- β_0 = Intercept
- $\beta_1, \beta_2, \beta_3$ = Slope of the coefficients of the independent variables
- $\pounds$ = Stochastic error term, which captures other explanatory variables that could not be explicitly specified in the model

3.2. Nature and Sources of Data

The annual panel data were collected from World Bank Development Indicator on variables such as GDP growth rate (GDPG), real exchange rate (REXR), inflation rate (INFR), and fiscal deficit as a percentage of GDP (FDEF). The period covered the period from 1999 to 2021, which was due to the availability of data.

3.3. Estimation Techniques

This study used the technique of Panel Autoregressive Distributed Lag (PARDL) to analyze the impact of the convergence criteria of monetary integration on the economic performance of SSA countries. This method was employed to check the long-run and short-run dynamics of the model, and it can be applied even if the variables are integrated of different orders, that is, I(0) and I(1). It also produces more efficient estimates, even in small samples. To achieve this, the panel unit root test was carried out to ensure our estimations are consistent and unbiased. Johansen-Fisher cointegration test was also employed to check if a long-run relationship exists amongst the variables. Based on the specification of Shin *et al*. (2011), the long-run elasticities-based panel ARDL-UECMmodel for this study is specified as thus:

$\Delta GDPG_t = \beta_0 + \beta_1 GDPG_{t-1} + \beta_2 INFR_{t-1} + \beta_3 REXR_{t-1} + \beta_4 FDEF_{t-1} + \sum_{i=1}^{q} \beta_5 \Delta lnGDPG_{t-1} + \sum_{i=1}^{q} \beta_6 \Delta lnINFR_{t-2} + \sum_{i=1}^{q} \beta_7 \Delta lnREXR_{t-1} + \sum_{i=1}^{q} \beta_8 \Delta lnFDEF_{t-1} + \emptyset ECM_{t-1} + \mu_t$

4. Presentation and Interpretation of Results

4.1. Panel Unit Root Test

This section presents the individual panel unit root test carried out on all the variables.

Variables	Order of Integration	LLC	IPS	ADF	PP
GDPG	I(0)	-21.3	-10.1	295.6	85.3
INFR	I(0)	-17	-10.5	197.5	108.2
REXR	I(1)	-1.76	-2.8	48.7	61.4
FDEF	I(1)	-7.5	-8.9	105.3	261.2

Table 1: Summary of Panel Unit Root
Source: Eviews 10 Output

From the result, the tests reveal that the variables have a mixed order of integration based on the fact that all the p-values are less than 0.05. The result is presented in table 1, and it shows that gross domestic product growth rate (GDPG) and inflation rate (INFR) are integrated of order zero, that is, stationary at levels while real exchange rate and fiscal deficit are stationary at the first difference, that is, integrated of order one.

Panel cointegration test is necessary to establish the presence of cointegration among the variables of the study. In this study, the Johansen-Fisher cointegration test was employed, and the result is presented in table 2.

Johansen-Fisher Panel Cointegration Test				
Hypothesized	Fisher Stat.*		Fisher Stat.*	
No. of CE(s)	(from trace test)	Prob.	(from max-eigen test)	Prob.
None	192.5**	0.0000	143.3**	0.0000
At most 1	89.96**	0.0000	62.61**	0.0000
At most 2	46.06**	0.0003	36.60**	0.0059
At most 3	36.43**	0.0062	36.43**	0.0062

Table 2: Panel Cointegration Test
*** Indicates That the Estimated Parameters Reject the Null Hypothesis of No Cointegration*
Source: Eviews 10 Output

The Johansen-Fisher cointegration test indicates that there exists cointegration among the variables. This can be verified from the p- values of all the hypothesized numbers of cointegrating equations, which are less than the level of significance at 5 percent. Thus, the null hypothesis of no cointegration is rejected.

After establishing a long-run relationship amongst the variables, the long-run elasticities-based panel ARDL-UECM model was conducted, and the result is presented in table 3.

Dependent Variable: D(GDPG)				
Method: ARDL				
Date: 03/04/23 Time: 22:46				
Sample: 2000 2021				
Included observations: 198				
Maximum dependent lags: 1 (Automatic selection)				
Model selection method: Akaike info criterion (AIC)				
Dynamic regressors (1 lag, automatic): INFR REXR FDEF				
Fixed regressors: C				
Number of models evaluated: 1				
Selected Model: ARDL(1, 1, 1, 1)				
Note: final equation sample is larger than the selection sample				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.***
Long Run Equation				
INFR	0.002164	0.014208	0.152286	0.8792
REXR	-0.003388	0.007697	-0.440103	0.6605
FDEF	0.525699	0.077263	6.803999	0.0000
Short Run Equation				
COINTEQ01	-0.761712	0.114270	-6.665864	0.0000
D(INFR)	-1.044223	0.952157	-1.096691	0.2744
D(REXR)	-0.600205	0.543948	-1.103423	0.2715
D(FDEF)	0.634693	0.263622	2.407582	0.0172
C	6.827185	2.495072	2.736268	0.0069
Mean dependent var	0.230808	S.D. dependent var		35.13971
S.E. of regression	17.83196	Akaike info criterion		5.618885
Sum squared resid	50558.62	Schwarz criterion		6.391689
Log-likelihood	-533.5546	Hannan-Quinn criteria.		5.931400
*Note: p-values and any subsequent tests do not account for model				

Table 3: Panel Autoregressive Distributed Lag (ARDL)-UECM Model
Source: Eviews 10 Output

The result in table 3 presents both the long-run and short-run estimates of ARDL. The long-run estimate shows that inflation rate (INFR) has a positive relationship with the growth rate of GDP (GDPG). The coefficient of the inflation rate is 0.0022 and it implies that 1 percent increase in inflation rate will increase GDPG of SSA countries by 0.0022 percent in the long run. An increase in the inflation rate will always erode the purchasing power of individuals and investors, thereby forcing people to dis-save and causing a reduction in the level of investments that could foster economic growth. This finding is against a priori expectation and corroborates the finding of Kazimoto (2014), who found a positive relationship between the inflation rate and the economic growth in East African countries.

The coefficient of the real exchange rate, which stands at -0.0034, indicates that 1 percent increase in the real exchange rate will decrease the GDP growth rate of SSA countries by 0.003 in the long run. This conforms with a priori expectation because the further devaluation of local currencies will force investors to cut down production since most of the raw materials used for production are imported. This will result in a reduction in the contributions of firms to output growth. The study's outcome supports the findings of Saka *et al.* (2015) and is contrary to the findings of Kazimoto (2014). The coefficient of fiscal deficit also reveals a positive relationship, with a value of 0.5257. The implication is that 1 percent increase in the fiscal deficit will increase the GDP growth rate of SSA countries by 0.53 percent in the long-run. Looking at

this from the angle of fiscal discipline, if the money borrowed to finance the deficit is utilized judiciously and efficiently, it is expected that the GDP growth rate will increase. However, if the funds are mismanaged, the resultant effect will be a reduction in the growth rate of GDP since the money would be paid back. This finding failed to support the findings of Saka *et al.* (2015), who revealed that fiscal deficit has negative implications on economic growth among ECOWAS countries. Going by the p-values of all the variables, the result shows that only fiscal deficit is statistically significant at 5 percent level with a p-value of 0.0000 which is lower than 5 percent. While inflation and exchange rates are statistically insignificant since their p-values of 0.88 and 0.66, respectively, are greater than 5 percent.

Furthermore, the short-run estimate shows that the coefficient of the inflation rate stands at -1.0442. This relationship is negative, and it is expected because a high inflation rate will cause a reduction in investments as there would be little or nothing to invest as the purchasing power is being eroded. The coefficient suggests that 1 percent increase in the inflation rate in the short run will reduce the GDP growth rate of SSA countries by 1.04 percent. The finding conforms to a priori expectation but is contrary to the findings of Kazimoto (2014) who found in his study that inflation has a positive impact on economic growth in East Africa.

The coefficient of the real exchange rate in the short run is -0.6002. It means that if the real exchange rate is increased by 1 percent, the GDP growth rate will be reduced by 0.60 percent. The finding conforms to a priori expectation and corroborates the findings of Saka *et al.* (2015). The coefficient of fiscal deficit also shows a positive value of 0.6347. This implies that 1 percent increase in fiscal deficit will increase the GDP growth rate of SSA countries by 0.63 percent in the short-run. Fiscal deficit is revealed as a growth enhancer in this study. However, it does not support the findings of Saka *et al.* (2015). Judging from the p- values, the result also shows that only fiscal deficit is statistically significant at the 5 percent level, while inflation and exchange rate are statistically insignificant.

The constant value of 6.8272 shows that if all the variables are held constant, the value of the GDP growth rate will be 6.8272. This finding conforms to a priori expectation because the constant or intercept value can be positive or negative. The Error Correcting Term (ECT), the cointegrating equation representing the speed of adjustment from the short-run disequilibrium position to the long-run equilibrium position, is -0.7617 with a p-value of 0.0000. The ECT has the expected sign and is statistically significant at 5 percent level. This implies that 76 percent of disequilibrium in the previous years will be corrected or adjusted for in the current year. The speed of adjustment value is quite high, and it suggests that any disequilibrium will be quickly adjusted for the economy to come back to the path of equilibrium.

5. Conclusion and Policy Recommendations

5.1. Conclusion

This study examines the impact of convergence criteria of monetary integration on the economic performance of sub-Saharan African countries between 1999 and 2021 using the panel ARDL approach. The panel unit root test conducted shows a mixed order of integration, that is, I(0) and I(1). The Johansen-Fisher cointegration test also reveals a long-run relationship among the variables. After establishing the long-run relationship, the study proceeded to use the panel ARDL model, and the result suggests that in the long run, the inflation rate is positive while it is negative in the short run. The study further shows that both in the long run and short run, the real exchange rate has a negative and insignificant effect on the economic performance of SSA countries. Fiscal deficit also has a positive and significant effect both in the long run and short run. The error correcting term shows 76 percent speed of adjustment, and it is rightly signed.

There is no doubt that monetary integration remains a key strategy for SSA to transform itself from a continent of mainly least developed and developing countries to a strong united bloc of developed nations and a global force. It is imperative to widen the region's economic space to generate economies of scale for production and trade and maximize welfare functions. In conclusion, the convergence criteria of monetary integration vis-à-vis the economic performance of SSA countries suggests that monetary integration is achievable but not without costs.

5.2. Policy Recommendations

Based on the findings of this study, the study, therefore, recommends the following:

- Governments should ensure that the exchange rate is fixed to avoid the continuous devaluation of their local currencies. This would help increase investments, thereby contributing to the growth of the economy of SSA countries.
- If the exchange rate is fixed and there is an appreciation of local currencies against foreign currencies, the inflation rate will be tamed through various productions of goods and services at reduced costs. Therefore, the government should formulate a policy that will help control the exchange rate. As a way of controlling inflation as well, monetary policy tightening should be encouraged. This will help reduce the excess money in circulation.
- Although, the fiscal deficit is positive and significant both in the long run and short run. This shows that borrowed funds have been judiciously utilized in these countries. However, governments of SSA countries should, as a matter of urgency, diversify their economies by tapping into their untapped abundant natural resources. These would help increase revenue generation, and there would be a surplus against the fiscal deficits these countries run.

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Appendix

Balanced observations for each test (GDPG)				
Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-21.3061	0.0000	9	189
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-10.0985	0.0000	9	189
ADF - Fisher Chi-square	295.575	0.0000	9	189
PP - Fisher Chi-square	85.2942	0.0000	9	198
Balanced observations for each test (INFR)				
Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-17.0371	0.0000	9	189
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-10.4636	0.0000	9	189
ADF - Fisher Chi-square	197.518	0.0000	9	189
PP - Fisher Chi-square	108.187	0.0000	9	198
Balanced observations for each test (REXR)				
Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-1.76260	0.0390	9	180
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-2.83884	0.0023	9	180
ADF - Fisher Chi-square	48.7301	0.0001	9	180
PP - Fisher Chi-square	61.4422	0.0000	9	189
Balanced observations for each test (FDEF)				
Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-7.48091	0.0000	9	180
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-8.95399	0.0000	9	180
ADF - Fisher Chi-square	105.282	0.0000	9	180
PP - Fisher Chi-square	261.203	0.0000	9	189

Table 4: Balanced Observations for Each Test (GDPG)