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Financial Integration and Growth Outcomes in Africa: Experience of the Trade Blocs

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Ibrahim A. Adekunle
(Corresponding)
Babcock Business School, Babcock University, Ilishan-Remo, Ogun State, Nigeria
European Xtramile Centre of African Studies (EXCAS), Liège, Belgium
E-mail: adekunle_ia@yahoo.com

Abayomi T. Onanuga
Department of Economics, Olabisi Onabanjo University, Ago-Iwoye, Ogun State, Nigeria
E-mail: onanuga.toyin@oouagoiwoye.edu.ng

Ibrahim A. Odusanya
Department of Economics, Olabisi Onabanjo University, Ago-Iwoye, Ogun State, Nigeria
E-mail: ibrahim.odusanya@oouagoiwoye.edu.ng

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Ibrahim A. Adekunle, Abayomi T. Onanuga & Ibrahim A. Odusanya

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Abstract

In this study, we examine the benefits of financial integrations in four of Africa regional trade blocs: COMESA, ECCAS, CEN-SAD and ECOWAS. We regress de-jure and de-facto indices of financial integration on growth outcome using the dynamic system generalised method of moment and pooled mean group estimation procedure. Findings revealed that total foreign asset and liabilities and foreign liabilities as a percentage of GDP are inversely related to growth outcomes in COMESA. In CEN-SAD, we found that foreign liabilities as a percentage of GDP hurts growth. In ECCAS, growth-financial integration relationship showed that foreign liabilities as a percentage of GDP inhibit real per capita GDP in the long run. In ECOWAS, foreign liabilities as a percentage of GDP is inversely related to real per capita GDP in the long run. Policy implications of our findings were discussed.

Keywords: Financial Integration; Economic Growth; system GMM; Pooled Mean Group; Regional Trade Bloc; Africa

JEL Codes: F36; F43; O47

1.0 Introduction

How financial integration affects trade blocs in Africa is one of the fundamental questions that raise concern on what should be done to improve financial development and growth in Africa. Few studies on this phenomenon found that financial integration propelled financial development and also impacted on economic growth in Africa (Farid 2013; Frey & Volz, 2011). However, gains due to financial integration in quantum terms were found to be small for high risk and small capital based emerging economies (Coeurdacier, Rey & Winant, 2015). Studies on how the growth experience of the trade blocs in Africa has responded to heterogeneous measures of financial integration are very terse in the literature. There is no gainsaying that Africa financial integration can bring about an opportunity for risk-sharing and diversification, improved methods of allocating investment chances and improved growth outcomes in Africa(Sy, 2006) but the regional specific growth channels as induced by varying perceptions of financial integration by these African trade blocs remains very much different and need to be studied separately for inch-perfect policy formation and research purposes. Africa trade blocs impose a composite array of price and quantity controls on a wide-ranging variety of financial transactions(Ahmed, 2016). These heterogeneous approaches to market orientations in the regional trade blocs determine the observable level of financial integration and the overriding consequences for corresponding growth pattern (Wakeman-Linn & Wagh, 2008). Therefore, understanding the peculiarities of financial integration of regional trade blocs in Africa will not only help regional trade blocs to amass wealth but also help to stem the seemingly intractable problem of youth unemployment in Africa.

The level of research undertaken on Africa countries towards regional financial integration remains dimly discerned. Evidenced-based research on the regional financial integration-growth relationship remains grossly understudied in extant literature. Notable studies on this issue are Sy (2006); Wakeman-Linn and Wagh (2008); Frey and Volz (2013); Ahmed (2016);Ekpo and Chuku (2017) and Alagidede, Ibrahim and Sare (2020). Even these studies, were aggregate studies and overview of what can be done to improve financial integration covering sub-Sahara African (SSA) and Africa, respectively. Few other studies examined the experiences of African trade blocs and financial integration, and the overriding consequences for economic growth. For example, Muthoga, Obere, Mburru and Mukwate-Muchai (2013) conducted a related study on East Africa Community (EAC).Member nations of these trade blocs exhibit intense homogeneity

characteristics, which make findings within trade blocs mostly regional specific. It then becomes apt to appropriate data using contemporaneous estimation strategy to inform policy direction on the financial integration-growth relationship in the regional trade blocs in Africa. What are the regional financial integration strategies peculiar to each trade bloc, and why should it be at the forefront of their financial integration agenda? Which of the measures of financial integration best explained shared economic prosperity among the trade blocs? These are essential questions that need answers if we are conscious about realising the Africa 2063 Agenda.

African regional trade blocs, in the time past, has relegated to the background, critical issues on regional financial integration that has a greater prospect of delivering the much desired Africa (Alagidede *et al.*, 2020). The national governments of member nations in these trade blocs have been preoccupied with convergence criteria in a long-term monetary association among member countries neglecting regional financial intermediation, information technology enhancing payment procedures, credit security, and so on in their financial system(Ahmed, 2016). Even researchers have paid little attention to regional financial integration in Africa; instead, studies have been broad or conducted on country-specific cases. The "collective self-sufficiency objective" of setting up most regional trade blocs in Africa will be fast achieved if regional financial integration can be placed at the forefront of the policy agenda (Hoekman, Senbet, & Simbanegavi, 2017). Given this, this paper leaned empirical credence to the regional financial integration-growth nexus with a view of coming up with findings that can redefine policy and research on the subject matter.

This study focuses on four trade blocs in Africa: Common Market for Eastern Southern Africa (COMESA) comprising of 19 countries; Economic Community of Central African States (ECCAS) which is a union of 11 countries in Central Africa; Community of Sahel-Saharan States (CEN-SAD) which is a union of 24 countries in North Africa and Economic Community of West Africa States (ECOWAS) with a membership of 15 countries. The trade blocs operate along geographical divide in Africa with a common intention to liberalise trade and monetary relations. It is, therefore, expedient and crucial to find out, which of the trade blocs experiences substantial gains in growth from financial integration.

As mentioned earlier in this paper, although some studies have undertaken an aggregate study on how financial integration affects Sub Saharan Africa growth process, the welfare gains on per

capita income of these trade blocs have received little attention in the literature. This study is, therefore, focused on how financial integration using the *de jure* and *de facto* measures determine how financial integration induces growth in four Africa's trade blocs in Africa. The main research questions for this study are: how do variations in financial integration affect growth in four of Africa's trade blocs? Second, which of the trade blocs in Africa experience the highest gain in growth due to financial integration? Third, which of the financial integration sources have a relatively higher effect on economic growth in the trade blocs in Africa? We have estimated the growth model for each regional trade blocs using a balanced panel with the Generalised Method of Moment (system GMM) and the Pooled Mean Group estimation procedure. Findings from the financial integration-growth relationship in four (4) of African trade blocks were discussed with their attendant policy implications. The remaining part of this paper is structured as follows. Section two is on the literature review, and section three discusses the methodology. Sections four and five contain the research findings and the conclusion, respectively.

2.0 Literature Review

The World Bank (2018) income classification affirms that the majority of African countries fall within the lower middle income and low income. This infers that most of the countries in Africa are primarily poor. Based on the Solow (1956)growth model, countries can increase output at a lower capital per worker if labour is relatively cheap. This suggests that with abundant labour supply in Africa, capital can be attracted from advanced economies at a higher return for a cheaper labour force (Romer, 1986). The argument presupposes theoretically that financial integration through capital flows should contribute to growth in Africa. Furthermore, Sy (2014) advanced some reasons for improving financial integration in Sub-Saharan Africa, and one of his propositions is that a stable regional trade bloc through a viable institution can encourage political leaders in the region to respect regional agreements in order to improve financial integration in the trade bloc or region. In addition to Sy (2014), suggestion evidence established in this paper and some others may further affirm the need for a policy direction in the trade blocs in Africa.

Evidence on this phenomenon suggests that financial integration is felt in Africa through a combination of many channels, which include foreign direct investment (Alicia & Wooldridge, 2007). It is essential to say that foreign direct investment (FDI) inflow to Africa comes with technology in the form of machines and technological know-how from abroad (Wooldridge, 2007). New skills that are foreign to Africa firms may be copied by local firms to improve domestic production. The integration of banking services, improved supervision of banking operations and issuance of long-term securities as well as improvement in the secondary market liquidity influenced economic growth in East Africa Community (EAC) (Muthoga, Obere, Mburru & Mukwate-Muchai, 2013). This study on EAC was conducted in order to clarify whether or not financial integration supported growth in the trade bloc using the Generalised Method of Moments (GMM) econometric technique. In another clime, a study by Badri and Sheshgelani (2016) investigated the effect of financial development and integration on growth in the Organization of the Islamic Conference (OIC) covering 24 countries. They found that financial development, government spending and education affected financial integration, but financial integration hurts growth.

Fakhr and Tayebi (2009) found that in the East Asia Pacific region, financial integration responds positively to gross domestic product (GDP) using panel data that included some selected East Asia Pacific countries. Other variables included in the study (exchange rate and inflation) indicated ambiguity and thus could not be interpreted with any precision. A more recent study on Asia was conducted by Rungcharoenkitkul and Unteroberdorerster (2012). The authors look at the benefits of the phenomenon for Asia. They found that the level of financial integration is low in Asia, but financial integration meaningfully affected economic rebalancing in Asia region with hope for improved financial integration in the region.

A relatively recent paper by Kizito and Hooi (2018) found that one of the channels of economic integration on growth is financial integration, among others, such as capital accumulation trade and productive growth efforts. The study has coverage of both developing and developed economies growth response to financial and economic integration. The evidence reviewed infers that economic integration, financial development and integration appears to be a tripod. One of the essences of forming a trade bloc is to drive towards a high level of economic integration with the hope of improving through cooperation, on the monetary and exchange rate stability of the

trade bloc. Facilitation of this intention can be attained through the improvement in financial integration, especially within the trade bloc and the rest of the world for the benefit of economic gain.

3.0 Methodology

Theoretical Framework and Model Specification

In gauging growth outcomes in regional trade blocs in Africa as induced by the heterogeneous influences of financial integration, this study is a prototype of Edison, Levine, Ricci and Sløk (2002). However, the significant deviation from Edison *et al.* (2002) paper is that this study introduces a theoretical framework that explains the dynamic characteristics of African trade blocs for better financial integration aimed at the broader goal of economic development. In this study, we augment the neoclassical growth model with aggregate uncertainty to include four regional trade blocs in Africa. Africa's regional trade blocs financial integration strategy for growth can be diametrically viewed from three dimensions: the aggregate risk they face in terms of capital volatility, their initial factor endowments (level of capital) and their size. These asymmetric characteristics of Africa trade blocs inform the attendant gains of financial integration in terms of benefits accruing from capital accumulation due to capital scarcity together with gains from risk-sharing and how the accruing benefits are distributed across various countries in the different regional trade blocs.

In our baseline model, we consider an incomplete market set-up where countries in a specific trade bloc are allowed to trade within and among one another. This regime of financial integration is compared to a benchmark model where countries in a specific trade bloc stay under financial autarky. These incomplete markets environment is more realistic since the focus is on the liberalisation episodes of African markets, leading to broader objectives of growth and development. Until recently, financial integration through capital flows was mostly driven by intertemporal borrowing and lending (Kraay, Servén, Loayza, & Ventura, 2005). Increased capital inflow like the foreign direct investment, portfolio investment, remittances and aids from abroad has redefined the African financial integration literature in contemporary ages(Agbloyor, Abor, Adjasi, & Yawson, 2014; Martin & Taddei, 2013).

In this study, we consider the global classification of countries into developed (rich) and developing (poor)$i = (R\ and\ P)$ with one good serving the dual function of investment and

consumption in all countries with an initial factor endowments k_{i0}. Country i production (growth outcomes) is a product of labour-capital intensity within a Cobb-Douglas production framework given as;

$$y_{i,t} = A_{i,t}(K_{i,t})^{\theta}(L_{i,t})^{1-\theta} \quad \textbf{(1)}$$

Where$A_{i,t}$ is the stochastic level of total factor productivity in country $i$at time$t$;$K_{i,t}$is capital stock in country $i$at time$t$ and $L_{i,t}$ is labour stock in country i at time t. $A_{i,0}$ is the initial level of productivity in country i which proxies in our analysis for regional trade bloc size. The law of motion of the capital stock in each regional trade bloc is then given as:

$$k_{i,t+1} = (1-\delta)k_{i,t} + k_{i,t}\emptyset\left(\frac{i_{it}}{k_{it}}\right) \quad \textbf{(2)}$$

where $0 < \delta < 1$ is the depreciation rate of capital and $i_{it}$is the gross investment in country i at date t. $\emptyset(x)$ is an adjustment function.The growth constraint of a regional trade bloc depends on the assets available for savings decisions which area function of the degree of financial integration (*de jure* and *de facto*). We consider regional financial autarky and regional financial integration in our baseline model. Under regional financial autarky, the only vehicle for savings in the regional trade blocs is regional domestic capital. A country in a specific trade bloc can therefore either consume or invest in regional domestic capital (the revenues from domestic labour and capital). For regional financial integration, we introduce an international flow of fund whose value at date t is $p_t$and which delivers optimal financial injection required to integrate a growing African population in a unified financial system.

In summary, under regional financial autarky, equilibrium in a trade bloc $j$is a sequence of domestic consumption and initial capital stocks. Under regional financial integration, an equilibrium is a sequence of domestic consumption, initial capital stock capital stocks and international capital inflows.An extension of the neo-classical theory with uncertainty to include the predictive capacity of regional financial integration as a lead factor in determining integrating capacity of regional trade blocs in Africa toward the broader objective of economic growth and development have the dynamic form of the model in the form expressed in Equ (3).Our baseline model for empirical analysis for each of the trade blocs is expressed in equation (3) as;

$$RPGDP_{i,j,t} = A_{i,j,t} + \sum_i^j \gamma_j RPGDP_{i,t-1} + \sum_i^j \pi_j RFI_{it} + \sum_i^j \omega_j X_{it} + \varphi_i + \mu_t + \varepsilon_{i,t} \quad \textbf{(3)}$$

Where $RPGDP_{i,j,t}$is real per capita gross domestic product (GDP) in country i which is a member of trade bloc j at time t;$RPGDP_{i,t-1}$ is the one-period lag value of real per capita GDP which captures the convergence effect that resolves inherent issues of dynamic endogeneity in the panel model; $RFI_{it}$is the vector of regressors of financial integration (*de jure* and *de facto*) in country i which is a member of trade bloc j at time t; X_{it} isthe vector of the control variable that is not of primary interest, but we cannot rule out in estimating growth outcomes because of their higher precision and relevance; $\varphi_i, \mu_t$are country fixed effects and time dummiesof the panel models estimated in each of the regional trade bloc and $\varepsilon_{i,t}$ is the idiosyncratic errors. We adjusted for significant outliers of the financial integration variables by taking the semi-logarithm of Equ (3) in tandem with Levine and Zervos (1998).

$$\ln RPGDP_{i,j,t} = A_{i,j,t} + \sum_i^j \gamma_j RPGDP_{i,t-1} + \sum_i^j \pi_j lnRFI_{it} + \sum_i^j \omega_j lnX_{it} + \varphi_i + \mu_t + \varepsilon_{i,t} \quad \textbf{(4)}$$

All variables remain as earlier defined.

Data Sources and Measurements

Our study used panel data for four trade blocs in Africa based on regional classifications. The Common Market for Eastern Southern Africa (COMESA)[1] comprising of 19 countries; Economic Community of Central African States (ECCAS)[2] which is a union of 11 countries in Central Africa; Community of Sahel-Saharan States (CEN-SAD)[3] which is a union of 24 countries in North Africa and Economic Community of West Africa States (ECOWAS)[4] with a membership of 15 countries. The choice of the trade blocs and country composition is guided by the desire to limit attention to financial integration in the regional trade blocs in Africa and by the availability of reliable data on aggregates of financial integration indices (*de jure* and *de facto*) and growth outcomes in Africa. Structural component characteristics of variables across

[1]**COMESA member countries** are Burundi, Comoros, Democratic Republic of Congo, Djibouti, Egypt, Eritrea, Ethiopia, Kenya, Libya, Madagascar, Malawi, Mauritius, Rwanda, Sudan, Swaziland, Seychelles, Uganda, Zambia and Zimbabwe

[2]**ECCAS member countries** are Angola, Burundi, Cameroon, Central African Republic, Chad, Congo, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Rwanda and Sao Tome and Principe

[3]**CEN-SAD member countries** are Benin, Burkina Faso, Central African Republic, Chad, the Comoros, Côte d'Ivoire, Djibouti, Egypt, Eritrea, the Gambia, Ghana, Guinea-Bissau, Libya, Mali, Mauritania, Morocco, Niger, Nigeria, Senegal, Sierra Leone, Somalia, the Sudan, Togo and Tunisia

[4]**ECOWAS member countries** are Benin, Burkina Faso, Cabo Verde, Côte d'Ivoire, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo

these trade blocs are assumed to exhibit substantial homogeneity (Bell & Jones, 2015; Honaker, King, & Blackwell, 2011). Economic growth in the trade blocs was measured using real per capita gross domestic product(Real per capita GDP) as extensively used in the literature (see Edison *et al.*, (2002); Osada and Saito (2010); Chen and Quang (2014)for some examples). In our measure of financial integration, we key into the debate of*de-jury*,*de-facto*and *hybrid*measures of financial integrationwhich are commonly used to measure the extent of international financial openness or restrictions in cross-border financial transactions(Kose, Prasad, & Terrones, 2006).The *de facto* measures of financial integration, quantify a country's actual degree of openness through realised trade and financial flows(Schindler, 2009), while the *de jure* measures indicate the extent of government restrictions on trade and capital flows(Quinn, Schindler, & Toyoda, 2011). The *hybrid* measure of financial integration combines the two earlier measures of financial integration in some established dimension to depicts the level of financial integration in different countries(Furceri & Zdzienicka, 2012).

In this study, we gleaned more to the *de facto* measures of financial integration for some reasons; the more significant concern in the financial integration for African nations is embedded in the low level of capital that has impeded the ability of African nations to jumpstart the critical development process; weak credit security; low level of income; insufficient domestic capital and so on rather than government capital controls on international financial transactions of the *de-jure* approach(Martina, 2008). Although the *de-jure* measure of financial integration is relevant in Africa when it comes to capital flight and illicit outflow of the fund, however, the volume of inflow compared to outflow in Africa remains significantly broad. To position African regional trade blocs in a better financial integrated position, more cross-border capital finances has to be guaranteed(Kimbugwe *et al.*, 2012). Similarly, estimating the heterogeneous responses of financial integration for optimal growth outcomes in African regional trade blocs requires assessing the apparent channels of financial integration in Africa as it predicts variation in growth outcomes particularly the options of capital flows rather than capital restrictions. Another reason is that the IMF's report on exchange arrangement and exchange restrictions which is popularly used as*de-jure* measures do not fully capture the degree of enforcement and effectiveness of capital controls, as well as regulations in other fields that affect capital flows(Alagidede *et al.*, 2020).Thirdly, the *de-jure* measures are reported in binary which restricts the applicability over a long period with an attendant shortcoming in capturing the extent of

controls or the actual degree of financial openness(Oprea & Stoica, 2018). This study measured financial integration using the sum of total foreign asset and total liabilities as a percentage of GDP (stock of capital flows) as inLane and Milesi-Ferretti (2007);Alagidede *et al.* (2020); the stock of foreign assets as a percentage of GDP(stock of capital inflows) as used in the work of Furceri and Zdzienicka (2012); foreign liabilities (as a percentage of GDP) as used in the work of Kose *et al.*, 2006); the degree of country's trade openness (a *de jure* measure of financial integration was included to ensure robustness)as used in the work of Oprea and Stoica (2018)and nominal credit to the private sector as a share of GDP(domestic capital) as in Edison *et al.* (2002).The data are mainly obtained from the World Bank Database (World Bank, 2018). The variables of the study and their respective descriptions and sources are contained in Table 1.

Table 1: Variable Description

Abbreviation	Description	Variable	Source
$\boldsymbol{RPGDP}$	Economic Growth in the Regional Trade Blocs	Real Per Capital GDP	World Development Indicator (WDI), 2018
$**\ \boldsymbol{ASS_{LIA}}$	Asset-Liabilities Integration	Total Foreign Asset andLiabilities as a percentage of GDP	World Development Indicator (WDI), 2018
$*\ \boldsymbol{LIA}$	Liability Integration	Foreign Liabilities (as a percentage of GDP)	World Development Indicator (WDI), 2018
$*\ \boldsymbol{TRA_{OPEN}}$	Trade Openness	Export Minus Import as a ratio of GDP	World Development Indicator (WDI), 2018
$\boldsymbol{**CAP_{INFL}}$	Capital Inflow	FDI and Portfolio Inflow divided by GDP	World Development Indicator (WDI), 2018
$**\ \boldsymbol{NCRED}$	Private Credit by deposit money banks and other financial institutions as a ratio to GDP	Nominal Credit to Private Sector	World Development Indicator (WDI), 2018

Note: * represent *de jure* based financial integration measures, and ** represents *de-facto* based measures of financial integration.

Preliminary Statistics

The broad objective of this study is to empirically examine the impact of financial integration on economic growth in four (4) African regional trade blocs. Considering the varying characteristics of the four regional trade blocs selected in terms of their cross-sectional properties and year of formation, we modify the empirical strategy to accommodate cross-country and regional differences. In the first trade bloc of Common Market for Eastern Southern Africa (COMESA) comprising of 19 countries, (created in December 1994 to replace Preferential Trade Area (PTA)

of the 1980s in Eastern and Southern Africa), we define the parameter estimates of the financial integration-growth relationship from 2004 through 2018 (15years) using the dynamic system generalised method of moment (dynamic system GMM) estimation procedure for some reasons. The N(19)>T(15), i.e. the number of cross-sections is higher than the number of time series; the dynamic system GMM is well known for accommodating for the endogeneity of regressors and the cross-country variations are not eliminated. Finally, small-sample biases that the difference estimator fail to capture are well captured in the system GMM operator. In addition, this study relied on forward orthogonal deviations rather than first differences in order not to restrict over-identification, confines the proliferation of instruments of the model while accounting for problems of cross-sectional dependence (Love & Zicchino, 2006; Baltagi, 2008; Tchamyou, 2019). This study favoured the *two-step* robust estimate ahead of the *one-step* because it is consistent with heteroscedasticity (Baltagi, 2008).

For the second regional trade bloc which is the Economic Community of Central African States (ECCAS) comprising 11 countries in Central Africa, we estimate the coefficient of variations of the model which has a sample characteristic of 11 countries in 34 years (1985 through 2018) using the Pooled Mean Group estimation procedure. The scope of the study allows the researcher to trace the economic impacts of financial integration for growth in ECCAS in the structural adjustment Programme (SAP) era and the post SAP era. Recall that the Economic Community of Central African States was established in October 1983 on the agreement of members of UDEAC, Sao Tome and Principe and members of the Economic Community of the Great Lakes Countries, Zaire, Burundi and Rwanda for collective prosperity. It became inactive for several years due to financial constraints, which owe primarily to the austerity measure advocated in the SAP report and adopted by most African countries. It will be interesting to know how financial integration has impacted on growth outcomes in the region since the policy abolished and alternative measures proposed.

In the third regional trade bloc which is the Community of Sahel-Saharan States (CEN-SAD) comprising of 24 countries in North Africa, we estimate the dynamic system GMM for reasons similar to estimation strategy for trade bloc 1 (COMESA).We define the parameter estimates of the financial integration-growth relationship from 2004 through 2018 (15years); thus having N(24)>T(15). The empirical strategy is to estimate a series of baseline fixed effects estimators by

assuming that all explanatory variables are strictly exogenous. We then proceed to estimate system GMM and impose (test) the common factor restrictions to account for the potential endogeneity of financial integration-growth relationship.

For the fourth and last trade blocs, which is the Economic Community of West Africa States (ECOWAS) with a membership of 15 countries, we estimate the parameter estimate of the model using the Pooled Mean Group estimation procedure from 1985 through 2018. Consequent on the establishment of ECOWAS by the Lagos Treaty in 1975,economic corporations soared until several political turmoils led to its revision in 1975. Until then, no quantitative credence has been leaned to the financial integration in the region.

The overarching aim of this study is to empirically determine how variations in financial integration affect growth in four of Africa's trade blocs. Second, which of the trade blocs in Africa experience the highest gain in growth due to financial integration. Third, which of the financial integration sources have a relatively higher effect on economic growth in the trade blocs in Africa.

Empirical Strategy

In accounting for the financial integration and economic growth in four of the Africa regional trade blocs, the study employs various econometric procedures. The pre-estimation tests (descriptive statistics, correlation matrix) to establish the normality condition of the variables as well as the correlation among relevant variables in order to produce reliable estimates(Drukker, 2003). Secondly, we tested for panel unit root to ensure the variables under investigation are covariance-stationary. We relied on the panel unit-root tests developed by Levin, Lin, and Chu (2002); Im, Pesaran, and Shin (2003) and the Hadri LM test developed by Hadri (2000). Although, conventional unit-roots (Dickey-Fuller, Augmented Dickey-Fuller (ADF), Phillips-Peron, and KPSS tests) could have been applicable if not for their low power in small samples like those found in the GMM assumptions. Since the panel unit roots are more powerful when combining time-series and cross-sectional information for stationarity testing, we rely on panel unit roots estimation procedure. (Hsiao, 2007). Consequent with what is found in leading panel stationarity research, the tests are based on estimating the following model:

$$\Delta Y_{it} = \alpha_i + \eta_i y_{it-1} + \delta_{it} + \sum_{k=1}^{k_i} \theta_i^{(k)} \Delta y_{it-k} + \varepsilon_{it}$$

$$\varepsilon_{it} \sim iidN(0, \theta_\varepsilon^2) i = 1,2, \ldots \ldots . N, t = 1,2 \ldots \ldots T \quad \textbf{(5)}$$

Where y_{it} denotes the y variable observed for the ith of *N* entities in the *t*th of *T* periods, and Δis the difference operator. The LLC test involves the null hypothesis $H_0 : \rho_i = 0 \; \forall i$against the alternative $H_A : \rho_i = \rho < 0 \; \forall i$. The IPS test involves the same null hypothesis as the LLC test, but its alternative hypothesis allows for non-stationarity for some individuals. The idea of IPS is to compute the average of the individual ADF test statistics.However, for robustness and heteroskedasticity consistency, this study also applies Hadri (2000) reconfirmation test for stationarity due to its richness in panel data stationarity confirmation. Hadri panel unit root test is similar to the KPSS unit root test and has a null hypothesis of no unit root in any of the series in the panel. Like the Kwiatkowski, Phillips, Schmidt, and Shin (1992) (KPSS) test, the Hadri test is based on the residuals from the individual OLS regressions of a constant, or on a constant and a trend. The Hadri panel unit root test requires only the specification of the form of the OLS regressions: whether to include only individual-specific constant terms, or whether to include both constant and trend terms. *Stata* reports two Z-statistic value, one based on Langranger Multiplier (LM_1)with the associated homoskedasticity assumption, and the other using (LM_2)that is heteroskedasticity consistent. In particular, the Hadri test appears to over-reject the null of stationarity and may yield results that directly contradict those obtained using alternative test statistics (see Hlouskova and Wagner (2006) for discussion and details).

After the panel unit root tests, we proceed to estimate the models in each of the regional trade blocs using different estimation procedures. In trade blocs 1 (COMESA) and 3 (CEN-SAD), we employed the dynamic system generalised method of moment (system GMM) as in Roodman (2009). This is because the number of the cross-section is higher than the number of time series (i.e. N >T), the essential criterion for the employment of dynamic system GMM is met. Also, the estimation approach controls for endogeneity in all regressors and cross-country differences are not eliminated in the estimation strategy. It should be noted that small-sample oriented biases that are characteristic of the difference estimator are accounted for in the system GMM strategy(Roodman, 2009).

In trade blocs 2 (ECCAS) and 4 (ECOWAS), we employed the Pooled Mean Group (PMG) estimation procedure. The pool mean group (PMG) reports consistent mean-reverting estimates(Pesaran & Smith, 1995). The PMG is by far the most potent estimator for long-run parameter estimates with heterogeneous variances between groups (Bangake &Eggoh, 2012). The pooled mean group estimator resolves the shortcomings of the fixed and random estimation procedures that emphasises identical parameterisations among cross-sections which generates spurious long-term estimates usually in an extensive panel data set (Pesaran, Shin, & Smith, 1999). Pesaran, Shin and Smith (1999) argued that short-term coefficients could vary between groups without disrupting the symmetrical conditions of long-term coefficients. Well above the capacities of the dynamic least square and the fully modified least squares, the pool mean group estimator symmetrically balance short-run and long-run dynamics. Without compelling evidence, symmetric short-run and error variances seem implausible. By implication, the dynamic specifications differ across cross-sections since short-run slope coefficient equality is not imposed. Therefore, the long-run relationship between financial integration and economic growth in the regional trade blocs is expected to be identical from country to country, but the short-run coefficients are expected to differ. We test the inference of homogeneous long-run coefficients using the Hausman test. We extend empirical proof for financial integration and economic growth in the regional trade blocs by experimenting $I(1)$variables, cointegrated μ_{it}which is I(0) for all *i* and autonomously dispersed across time *t*.

4.0 Results and Discussion

In all the regional trade blocs, the mean values of the variables in their respective panel within the maximum and minimum values indicating a high tendency of normal distribution. All the variables are positively skewed except trade openness in the CEN-SAD trade bloc, which was negatively skewed. The kurtosis statistics also show that for all the regional trade blocs, distributions were flat relative to normal (platykurtic assumptions when values are less than 3). Capital inflow in the ECOWAS trade bloc showed distribution peaked relative to normal (leptokurtic assumptions when values greater than 3). In summary, all the regional trade blocs have dataset that were normally distributed as shown by the insignificance of the corresponding probability at 5% level.

Table 2: ***Summary Statistics***

Description	COMESA	ECCAS	CEN-SAD	ECOWAS
$RPGDP$				
MEAN	5.672	1.4938	3.6727	3.7322
MAX	9.988	4.3334	6.8676	6.5434
MIN	1.2717	1.1235	-1.6522	2.5622
SKEWNESS	2.4322	5.973	2.8992	3.7433
KURTOSIS	1.6434	2.6484	2.3322	2.4333
JARQUE-BERRA	23.438	35.233	27.7237	37.632
PROB.	0.2812	0.4552	0.3311	0.6455
ASS_{LIA}				
MEAN	2.6636	2.6637	2.6262	2.2455
MAX	4.4332	5.5536	7.4392	5.6672
MIN	1.9442	2.1243	1.8256	2.1138
SKEWNESS	1.2222	4.6738	5.6773	7.9326
KURTOSIS	1.3321	2.6632	1.4522	2.5623
JARQUE-BERRA	43.122	56.552	23.341	37.456
PROB.	0.6322	0.2321	0.4552	0.8632
LIA/GDP				
MEAN	3.7738	2.4422	3.4287	5.672
MAX	6.8822	7.4526	5.8722	9.988
MIN	2.9939	1.3334	1.5322	4.5231
SKEWNESS	2.1122	2.6636	6.7883	4.2162
KURTOSIS	2.3882	1.6671	1.4522	2.7842
JARQUE-BERRA	32.133	34.432	45.232	21.6622
PROB.	0.5623	0.4526	0.5526	0.5452
TRA_{OPEN}				
MEAN	2.6363	2.4332	3.4422	1.5673
MAXMIN	6.1232	3.5627	5.6673	4.7872
SKEWNESS	1.7737	1.5262	2.6363	1.2332
KURTOSIS	7.4422	4.6566	-3.4332	2.4342
JARQUE-BERRA	2.4333	2.3223	1.2221	2.3321
PROB.	51.223	31.7732	24.3221	32.1221
	0.7721	0.5627	0.9876	0.1122
CAP_{INFL}				
MEAN	4.2233	2.3323	4.5337	1.5663
MAX	8.3222	4.7473	7.3222	4.2442
MIN	3.1211	1.7663	2.6632	1.1114
SKEWNESS	2.7453	4.5562	4.6622	6.6377
KURTOSIS	2.5463	2.5562	2.5652	4.4391
JARQUE-BERRA	23.3332	24.5522	33.6727	24.455
PROB.	0.5353	0.6622	0.7723	0.7123
$NCRED$				
MEAN	4.2232	2.6737	5.672	5.672
MAX	5.1221	5.6377	9.988	9.988
MIN	3.2443	1.3332	-1.717	-1.717
SKEWNESS	1.3432	6.7373	4.3454	2.8831
KURTOSIS	2.3773	2.7772	1.5819	2.3322
JARQUE-BERRA	34.233	32.772	66.873	32.6637
PROB.	0.3323	0.3111	0.3322	0.3323

Source: Authors, 2020
Note: The summary statistics were computed before taking the natural logs

Test of Multicollinearity

We tested for multicollinearity among the variables of interest (per capita real GDP; asset-liabilities integration; liability integration, trade openness, capital inflow and private credit by

deposit money banks and other financial institutions as a ratio of GDP) using the Variance Inflation Factor (VIF). The VIFs estimate the depth of covariance among the explanatory variables of a model with a clear emphasis on the magnitude of inflation in a regressor owing to collinearity with other regressors. We report the tolerance factor and the corresponding VIF in Table 3.

Table 3: Collinearity Statistics

Description	COMESA	ECCAS	CEN-SAD	ECOWAS
ASS_{LIA}	0.562 {3.5522}	0.323 {2.9752}	0.232 {2.7832}	0.811 {2.3321}
LIA	0.983 {2.6682}	0.528 {1.4391}	0.862 {3.4663}	0.432 {1.8832}
TRA_{OPEN}	0.455 {1.7829}	0.672 {2.6493}	0.773 {2.6294}	0.956 {2.1742}
CAP_{INFL}	0.234 {4.2493}	0.349 {3.5522}	0.897 {1.8221}	0.621 {1.7722}
$NCRED$	0.312 {3.6349}	0.832 {2.6732}	0.482 {2.6721}	0.771 {2.8261}

Source: Authors, 2020

Note: Tolerance values are reported in the text box while the VIF is in the parentheses. The dependent variable is Real GDP per capita growth. Decision rule: Tolerance values ≥ 0.2, and VIF values ≤ 5.

Results presented in Table 3 report the collinearity relationship aming the variables of interest. Findings revealed no existence of multicollinearity amidst the explanatory variables across the regional trade blocs since the Tolerance values are not less than 0.2, and VIF values are far less than 5. This, therefore, implies that; the explanatory variables of the model in each of the panel of the trade blocs are independent of each other and hence can be considered as a truly independent measure of financial integration assumed to predict variation in growth outcomes in each of the Africa trade blocs.

Test of Slope Homogeneity and Cross-Sectional Dependence

We account for cross-sectional dependence to avoid spurious estimates and misinformation in consonance with Grossman and Krueger (1995); Dong, Sun, Hochman and Li(2018). Following Breitung (2005), we estimated slope homogeneity to avoid misleading estimates. We rely on the adjusted delta tilde test developed by Pesaran-Yamagata (2008) and the Pesaran cross-sectional dependence test (Pesaran, 2004).

Table 4: Pesaran-Yamagata's Homogeneity Test

Test	Statistics	P-Value
$\overline{\Delta}$	22.55*	0.0061
adj$\overline{\Delta}$	21.22*	0.0082

Source: Author, 2020

Note: $*\ P < 0.01, **\ P < 0.05$ respectively

Based on the delta tilde and adjusted delta tilde estimates reported in Table 4, we rejected the null hypothesis of the slope homogenous coefficients at 1% level of significance. Thus, implying the presence of heterogeneity among the variables in the panel data set. We proceed to estimate heterogeneous panel model that accounts for unobserved heterogeneity.

Table 5: Pesaran Cross-Sectional Dependence Test

	NRD	***RULE_LAW***	***REG_QALITY***	***GOV_EFF***
CD-Test Value	12.65*	21.47*	31.34*	11.45*
Prob.	0.00	0.00	0.00	0.00

Source: Author, 2020

Note: $*\ P < 0.01, **\ P < 0.05$ respectively

The Pesaran CD test, we rejected the null hypothesis of cross-sectional dependence since the probability values if the CD test was statistically significant at 1% level of significance. We conclude that there exists cross-sectional dependence among the variables in the panel data set. Consequent on the above, we estimated the first- and second-generation panel unit-roots with caution. We estimated the Im, Pesaran and Chin test (first generation), Levin, Lin and Chin test and the Hadri LM test (second-generation test) in this study. Given the observation of heterogeneity and cross-sectional dependence, panel data methods adopted in this study considers problems of heterogeneity and cross-sectional dependence in order to provide reliable and accurate results.

Panel Unit Root

The outcomes of Levin, Lin, and Chu (2002); Im, Pesaran, and Shin (2003) and the Hadri (2000)panel unit root tests are shown in Table 6 and 9 respectively. Table 6 shows the panel unit root result for COMESA and CEN-SAD trade blocs, while Table 9 shows the result for ECCAS and ECOWAS trade blocs. All tests confirmed that all the variables in all trade blocs (COMESA,

ECCAS,CEN-SAD and ECOWAS) are non-stationary at levels but are stationary at first difference. Because of the cross-sectional and time-series characteristics of trade blocs 1 and 3 (COMESA and CEN-SAD), we estimated the dynamic system generalised method of moment. We follow Arellano and Bover (1995) as well as Blundell and Bond (1998) and present empirical evidence using system GMM, which performs well with highly persistent data under mild assumptions.

Table 6: Result of the Panel Unit Root Tests

TRADE BLOCS	**COMESA**			**CEN-SAD**		
Variables	**LLC**	**IPS**	**HADRI**	**LLC**	**IPS**	**HADRI**
	Intercept {Trend & Intercept}	**Intercept {Trend & Intercept}**	**Intercept {Trend & Intercept}**	**Intercept {Trend & Intercept}**	**Intercept {Trend & Intercept}**	**Intercept {Trend & Intercept}**
LEVELS						
$RPGDP$	0.4323 {0.5727}	0.6823 {0.8839}	0.6673 {0.8822}	0.7722* {0.2828}**	0.5266* {0.7838}	0.7783* {0.8929}
ASS_{LIA}	-1.6232 {0.8822}	-1.6883 {0.8892}	-1.6723 {0.4323}	-1.7828* {0.8266}	-1.9939* {0.9393}	-1.7883* {0.6728}
LIA	-1.9923 {0.7919}*	-1.5627 {0.7893}	-1.7389 {0.7892}**	-1.7828* {0.8992}	-1.8288* {0.6883}	-1.7734* {0.7883}
TRA_{OPEN}	0.8828 {0.6232}*	0.6282 {0.9893}**	0.6372 {3.7722}**	0.6627* {0.6727}	0.8838* {0.6838}	0.7838* {0.7883}
CAP_{INFL}	-1.8837* {0.7828}	-1.6839 {0.0023}**	-1.6728 {0.5627}**	-1.7288* {0.7782}	-1.7838* {0.8893}	-1.7888* {0.9939}
$NCRED$	-1.9838 {0.8837}*	-1.3332 {0.7782}	-1.6828 {0.8992}	-1.9299* {0.7332}	-1.9399* {0.8839}	-1.9939* {0.3993}
FIRST DIFFERENCE						
$RPGDP$	0.7833* {0.8839}	-1.8939* {0.9293}	-1.7388* {0.6837}	0.8933* {0.7899}	0.0040* {0.7738}	0.8838* {0.9939}
ASS_{LIA}	-1.8939* {0.9293}	-1.7737 {0.67378}**	-1.7883* {0.7383}	-1.8299* {0.8829}	-1.8833* {0.7737}	-1.9929* {0.3993}
LIA	-1.0203* {0.0020}	-1.8966* {0.8473}	-1.8383* {0.5452}	-1.7789* {0.8992}	-1.6288* {0.8838}	-1.0904* {0.8838}
TRA_{OPEN}	0.09394* {0.8939}	-1.8939* {0.7838}	-1.6922* {0.1132}	0.7883* {0.5633}	0.7882* {0.3662}	0.8392* {0.6637}
CAP_{INFL}	-1.7293* {0.0994}	-1.8388* {0.9393}	-1.2219* {0.8778}	-1.8833* {0.8828}	-1.7728* {0.8288}	-1.8828* {0.8893}
$NCRED$	-1.6723* {0.6737}	-1.9393 {0.4563}**	-1.3832* {0.5773}	-1.9937* {0.5662}	-1.8892* {0.6632}	-1.7734* {0.6377}

Source: Authors, 2020

T-Stat values of intercept estimates are reported in the text box while T-Stat values of trend & intercept estimates are in the parentheses; $*\ P < 0.01$, $**\ P < 0.05$ respectively.

Table 7: ***Empirical Result from the Dynamic System GMM- Robust Two-Step Estimates***

Variables	COMESA	CEN-SAD
Constant ρ	0.1234 {0.0000*}	0.8663 {0.0017*}
$RPGDP_{t-1}$	0.5623 {0.0423**}	0.1295 {0.0024*}
ASS_{LIA}	-0.2396 {0.0034*}	0.6238 {0.0384*}
LIA	-0.7245 {0.0274**}	-0.8734 {0.0026*}
TRA_{OPEN}	0.5179 {0.0383**}	0.4523 {0.0095*}
CAP_{INFL}	0.8543 {0.0412**}	0.8856 {0.0052*}
$NCRED$	0.7621 {0.0194**}	0.6572 {0.0078*}

Source: Authors, 2020

Note: Parameter estimates are reported in the text box while the probability values are in the parentheses. The dependent variable is Real GDP per capita growth. $*\ P < 0.01$, $**\ P < 0.05$ respectively

Table 7 shows that in the COMESA trade bloc, the coefficient of the lagged value of real per capita GDP is positive and statistically significant at 5% level of significance. This implies that a percentage increase in the lagged value of real per capita GDP will induce 0.5623 percentage increase in real per capita GDP in the Common Market for Eastern Southern Africa (COMESA) trade bloc. Also, the coefficient of total foreign asset and liabilities as a percentage of GDP and foreign liabilities as a percentage of GDP is negative and statistically significant at 1%and 5% level respectively. Thus, implying that a percentage increase in total foreign asset and liabilities and as a percentage of GDP and foreign liabilities as a percentage of GDP will lead to 0.2396 and 0.7245 percentage decrease in real per capita GDP in the Common Market for Eastern Southern Africa (COMESA) trade bloc respectively. The coefficient of trade openness, capital inflow and nominal credit to private sector all as a ratio of GDP are positive and statistically significant at 5% level of significance respectively. This implies that a percentage increase in trade openness, capital inflow and nominal credit to private sector all as a ratio of GDP will induce 0.5179, 0.8543 and 0.7621 percentage increase in real per capita GDP in the Common Market for Eastern Southern Africa (COMESA) trade bloc respectively.

Also, in Table7 is the result of the financial integration-growth nexus in the Community of Sahel-Saharan States (CEN-SAD). The findings revealed that the coefficient of the lagged value of real per capita GDP is positive and statistically significant at 1% level of significance. This implies that a percentage increase in the lagged value of real per capita GDP will induce 0.1295 percentage increase in real per capita GDP in the Community of Sahel-Saharan States (CEN-

SAD) trade bloc. Also, the coefficient of foreign liabilities as a percentage of GDP is negative and statistically significant at 1% level of significance. Thus, implying that a percentage increase in foreign liabilities as a percentage of GDP will lead to 0.8734 percentage decrease in real per capita GDP in the Community of Sahel-Saharan States (CEN-SAD) trade bloc. However, the coefficient of total foreign asset and liabilities, trade openness, capital inflow and nominal credit to private sector all as a ratio of GDP are positive and statistically significant at 1% level of significance respectively. This implies that a percentage increase in total foreign asset and liabilities, trade openness, capital inflow and nominal credit to private sector all as a ratio of GDP will bring about 0.6283, 0.4523, 0.8856 and 0.6572 percentage increase in real per capita GDP in the Community of Sahel-Saharan States (CEN-SAD) trade bloc respectively.

Post Estimation Check of the System GMM Estimates

Table 8: ***Test of Validity of Instruments***

	COMESA	**CEN-SAD**
F-test of Joint Significance	$F = 845.39$	$F = 752.48$
Arellano Bond for AR(1) in First Differences	$z = -2.42 \ \ pr > z = 0.0354$**	$z = -2.38 \ \ pr > z = 0.0001$*
Arellano Bond for AR(2) in First Difference	$z = -0.96 \ \ pr > z = 0.7392$	$z = -0.29 \ \ pr > z = 0.5853$
Hansen *J*-Test for Overidentifying Restrictions	$Chi2\ (5) = 1.76$ $Prob > chi(2) = 0.532$	$Chi2\ (5) = 1.82$ $Prob > chi(2) = 0.649$

Source: Authors, 2020
Note: $* \ P < 0.01, ** \ P < 0.05$ respectively

Table 8 reports the tests of the validity of the instruments in the system GMM estimation procedure. Panel data estimates are known to suffer from problems of unobserved heterogeneity, dynamic endogeneity and simultaneity bias (Baltagi, Bun, & Sarafidis, 2015). System GMM are well known for heteroscedasticity and does not assume normality conditions like the least square estimates since it assumes linearity and that the error terms not autocorrelated. In resolving these ambiguities, we examined the validity of the instruments introduced in the estimation of the COMESA and CEN-SAD growth-financial integration model. Arellano and Bover (1995); Blundell and Bond (1998), argued that the system GMM estimator requires the presence of first-order serial correlation and not the second-order serial correlation in the residual term. First-order and second-order differences results favour rejection of the null hypothesis in the first-order serial correlation examination and acceptance of the null hypothesis for the second-order serial correlation test. The result above (for both COMESA and CENSAD trade blocs) confirms

that we obtained appropriate diagnostics. $z = -2.42;\ p < 0.05$ for COMESA and $z = -2.38; p < 0.05$ for COMESSA and CENSAD at 5% level of significance in the first order serial correlation analysis and then no second order serial correlation based on calculated $z$that is not statistically significant at 5% $(z = -0.96;\ p > 0.05)$ for COMESA and $(z = -0.29;\ p > 0.05)$ for CEN-SAD.

We established that our model was correctly specified with valid instruments. The Hansen J-statistics test results as in Hansen (1982) confirms the model has valid instruments since we fail to reject the null of overidentifying restriction at a 5% level of significance$(p > 0.05; i.e\ p = 0.532)$ for COMESA and $p = 0.649$ for CEN-SAD. Blundell and Bond (1998)corroborate our choice of test for overidentifying restrictions over the Sargan test. The Hansen J-Statistics is the most commonly used diagnostics test in GMM estimation for assessment of the appropriateness of the model. The F-statistics value 845.39 in the COMESA model and 752.48 in the CEN-SAD model are jointly significant at 5% level of significance.

Table 9: Result of the Panel Unit Root Tests

TRADE BLOCS	**ECCAS**			**ECOWAS**		
Variables	LLC	IPS	HADRI	LLC	IPS	HADRI
	Intercept {Trend & Intercept}	Intercept {Trend & Intercept}	Intercept {Trend & Intercept}	Intercept {Trend & Intercept}	Intercept {Trend & Intercept}	Intercept {Trend & Intercept}
LEVELS						
$RPGDP$	0.6833* {0.7993}	0.6372* {0.2822}	0.6737* {0.8939}	0.6783* {0.6737}	0.6272* {0.6828}	0.6626* {0.3773}
ASS_{LIA}	-1.4788* {0.7893}	-1.3883* {0.2233}	-1.7838* {0.3332}	-1.8832* {0.7673}	-1.7882* {0.9292}	-1.6622* {0.2243}
LIA	-1.7393* {0.7932}	-1.3343* {0.3993}	-1.8883* {0.7828}	-1.7838* {0.9923}	-1.3332* {0.8829}	-1.3672* {0.4882}
TRA_{OPEN}	0.7763* {08823}	0.6783* {0.8822}	0.8832* {0.8839}	0.22378* {0.7783}	0.88912* {0.9921}	0.4782* {0.4433}
CAP_{INFL}	-13227* {0.7377}	-1.8929* {0.8777}	-1.8999* {0.3332}	-1.6828* {0.4323}	-1.7738* {0.8833}	-1.3343* {0.1243}
$NCRED$	-1.4425* {0.6636}	-1.3221* {0.1321}	-1.7372* {0.8993}	-1.9929* {0.0023}	-1.1993* {0. 7373}	-1.3222* {0.4223}
FIRST DIFFERENCE						
$RPGDP$	0.7388* {0.7838}	0.2221* {0.2222}	0.6637* {0.8823}	0.6728* {0.8992}	0.7727* {0.2323}	0.4311* {0.2113}
ASS_{LIA}	-1.3773* {0.6732}	-1.3333* {0.4432}	-1.5272* {0.8920}	-1.8929* {0.3334}	-1.3233* {0.3323}	-1.4113* {0.3213}
LIA	-1.7893* {0.7833}	-1.3221* {0.3822}	-1.6723* {0.5672}	-1.2333* {0.8293}	-1.3993* {0.4332}	-0.1112* {1.2123}
TRA_{OPEN}	0.7782* {0.7322}	0.4883* {0.7377}	0.6782* {0.7292}	0.7682* {0.9922}	0.1323* {0.4225}	3.4983* {0.4943}
CAP_{INFL}	-1.7737* {0.8829}	-1.2291* {0.2322}	-1.9002* {0.22242}	-1.7829* {0.9920}	-1.3733* {0.5831}	-9.7723* {0.1223}
$NCRED$	-1.7829* {0.2662}	-1.6737* {0.7782}	-1.1134* {0.7829}	-1.2222* {0.6283}	-1.7392* {0.6713}	-1.8822* {8.4523}

Source: Authors, 2020

Note:T-Stat values of intercept estimates are reported in the text box while T-Stat values of trend & intercept estimates are in the parentheses;$*\ P\ <\ 0.01, **\ P < 0.05$ respectively

For trade blocs 2 and 4 (ECCAS and ECOWAS), we estimated the panel cointegration leading to the pooled mean group procedure. Table 10 affirms that there is a co-integration relationship among the variables using Pedroni and Kao residual co-integration test.The Pedroni cointegration results show that in five (5) out of seven (7) statistics are significant for the growth model of ECCAS and ECOWAS. Similarly, the Kao cointegration tests confirmed the existence of the long-run relationship. Hence, we proceed to estimate the pool mean group estimator for consistent long-run averages as in (Kao, 1999; Pedroni, 1999). Table 11 shows the result of the pooled mean group (PMG) and mean group (MG) estimates. Akaike Information Criteria (AIC) informs our optimal lag length choice of one (1).

Table 10: ***Panel Cointegration Test***

	Method	ECCAS	ECOWAS
Between Dimension			
	Panel v-Statistics	-1.716	-1.832
	Panel rho-Statistics	0.432**	1.923**
	Panel PP-Statistics	-1.532*	1.552*
	Panel ADF-Statistics	-1.572**	1.562**
Within Dimension			
	Group rho-Statistics	1.753	2.782
	Group PP-Statistics	-1.452**	-1.552*
	Group ADF-Statistics	-1.782*	-1.662**
Kao Residual Cointegration Test		-1.439*	-3.221**

Source: Authors, 2020
Note: $*\ P\ <\ 0.01, **\ P < 0.05$ respectively

Pooled Mean Group Estimation Results

To gauge growth outcomes as induced by financial integration in Economic Community of Central African States (ECCAS) and Economic Community of West Africa States (ECOWAS), this study estimation procedure is in consonance with Pesaran *et al.* (2006). Pesaran *et al.* (2006)conducted an empirical examination of non-stationary estimates in a heterogeneous group using the Mean Group (MG) and the Pooled Mean Group (PMG) estimators. We relied on the pool mean group estimator for estimating the ECCAS and ECOWAS financial integration induced growth model based on the significance of the probability value of the Hausman statistics. The pool mean group estimator combines pooled and average coefficients and

constrains the long-run elasticity to be equal across all panels, which yield efficient and consistent estimates only when homogeneity restriction is valid(Iwata, Okada, & Samreth, 2011). Due to heterogeneous influence of weaknesses emanating from financial integration strategies adopted by African regional trade blocs, it is essential to employ the pooling estimates since it allows for heterogenous short-run dynamics in each cross-section while allowing for country-specific differences. PMG allows varying short-run and long-run coefficients. This is by far the most potent characteristics of the PMG over the MG which assigns unweighted means to the coefficients of individual cross-sections in a separate regression analysis (Iheonu, Ihedimma, & Omenihu, 2017). The sensitivity analysis emanating from the lag selection criteria informs the choice of ARDL (1,1,1,1,1,1) based on the Hannan Quinn criteria. We present the PMG result in Table 11. The result exhibits notable variations subject to the method of estimation.

Table 11: **Pooled Mean Group Estimation of Financial Integration and Economic Growth**

Dependent Variable:	**ECCAS**		**ECOWAS**	
	PMG	**MG**	**PMG**	**MG**
Convergence coefficient	-0.0332 (0.0211) **	-0.0216 (0.0721)	-0.0412 (0.0137)**	-0.6622 (0.0984)
Long-run Coefficients				
ASS_{LIA}	0.5421 (0.0258) **	-0.0831 (0.0232) **	0.6564 (0.0123) **	-0.7264 (0.0481) **
LIA	-0.3487 (0.0092)*	-0.7828 (0.1163)	-0.5623 (0.0042) *	-0.4222 (0.0018) *
TRA_{OPEN}	0.7421 (0.0362)	0.4622 (0.2188)	0.6723 (0.0421)**	0.7623 (0.2311)
CAP_{INFL}	0.8945 (0.0113) *	-0.6722 (0.0123)**	0.1363 (0.0403)	-0.7622 (0.0703)
$NCRED$	0.7922 (0.0452)	0.5524 (0.1208)	0.6231 (0.0221)	0.2331 (0.3211)
Short-Run Coefficients				
ΔASS_{LIA}	0.5616 (0.0012) *	-0.4566 (0.0014) *	0.6623 (0.5723)	-0.6727 (0.0001) *
ΔLIA	-0.2226 (0.0238) *	-0. 1040 (0.0333)**	0.5229 (0.4522)	0.5627 (0.5527)
ΔTRA_{OPEN}	-0.4542 (0.0121)	0.7655 (0.5393)	0.4526 (0.7721)	0.7782 (0.3342)
ΔCAP_{INFL}	0.6398 (0.0113) **	0.6445 (0.2222)	0.6782 (0.0062)*	0.5728 (0.4728)
$\Delta NCRED$	-0.6398 (0.0138)	0.3324 (0.8992)	0.5692 (0.0011)*	0.7682 (0.6782)
Auxiliary Parameters				
Hausman Test	5.85 {0.542}		6.11 {0.175}	
N	11		15	
Observed Sample	374		510	

Source: Authors, 2020

Note: All equations in the trade blocs include a constant country-specific term.Prob. Values are in Parentheses, N is the numbers of countries in a trade bloc. $* \ P < 0.01$, $** \ P < 0.05$ respectively. The short-run result is the average derived from the short-run estimate for each different cross-section.

In the Economic Community of Central African States (ECCAS) growth-financial integration relationship, the PMG estimation result shows that foreign liabilities as a percentage of GDP is negative and statistically significant at 1% level of significance. Thus, implying that a percentage increase in foreign liabilities as a percentage of GDP will lead to 0.3487 percentage decrease in real per capita GDP in ECCAS in the long run. However, total foreign asset and liabilities, trade openness, capital inflow and nominal credit to private sector all as a ratio of GDP are positive and statistically significant at 5% level of significance respectively. This implies that a percentage increase in total foreign asset and liabilities, trade openness, capital inflow and nominal credit to private sector all as a ratio of GDP will induce 0.5421, 0.7421, 0.8945 and 0.7922 percentage increase in real per capita GDP in ECCAS in the long run respectively. Nevertheless, short-run estimates show that in the ECCAS growth-financial integration relationship, foreign liabilities, trade openness and credit to private sector all as a percentage of GDP are negative and statistically significant at 5% level of significance. Thus, implying that a percentage increase in foreign liabilities, trade openness and credit to private sector all as a percentage of GDP will lead to 0.2226, 0.4542 and 0.6398 percentage decrease in real per capita GDP in ECCAS. Also, total foreign asset and liabilities and credit to the private sector all as a ratio of GDP are positive and statistically significant at 1% and 5% level of significance respectively. This implies that a percentage increase in total foreign asset and liabilities, and credit to the private sector all as a ratio of GDP will induce 0.5616 and 0.6398 percentage increase in real per capita GDP in ECCAS.

In the Economic Community of West Africa States (ECOWAS) version of the growth-financial integration long-run relationship, the PMG estimation result shows a similar result to that of the ECCAS. Foreign liabilities as a percentage of GDP is inversely related to real per capita GDP and statistically significant at 1% level of significance. Thus, implying that a percentage increase in foreign liabilities as a percentage of GDP will lead to 0.4222 percentage decrease in real per capita GDP in ECOWAS in the long run. However, total foreign asset and liabilities, trade openness, capital inflow and nominal credit to private sector all as a ratio of GDP are positive and statistically significant at 5% level of significance respectively. This implies that a percentage increase in total foreign asset and liabilities, trade openness, capital inflow and

nominal credit to private sector all as a ratio of GDP will stimulate 0.6564, 0.6723, 0.1363 and 0.6231 percentage increase in real per capita GDP in ECOWAS in the long run respectively. In addition, short-run estimates show that in the ECOWAS growth-financial integration relationship, only capital inflow and credit to private sector all as a percentage of GDP linearly(positive) and statistically determine growth at a significance level of 5%. Thus, implying that a percentage increase in capital inflows and credit to the private sector all as a percentage of GDP will lead to 0.6782 and 0.5692percentage increase in real per capita GDP in ECOWAS. However, total foreign asset and liabilities, foreign liabilities and trade openness all as a percentage of GDP do not statistically determine real per capita GDP in ECOWAS in the short run.

The Hausman test resolves the ambiguity of efficiency between the PMG and MG estimator as an estimation procedure in ECCAS and ECOWAS growth-financial integration relationship. PMG estimators are more powerful compared to the MG within a long-run homogeneity criterion (Blackburne & Frank, 2007). The result of the Hausan test in Table 11 favours long-run homogeneity since we fail to reject the null at any level of significance. By implications, the PMG estimator is the most appropriate. The convergence term determines the equilibrating conditions in the financial integration induced growth in ECCAS and ECOWAS countries. It is appropriately signed and significant at 5% with a convergence coefficient of 0.0332 and 0.6722.

5.0 Conclusion

In this paper, we used a comprehensive cross-country dataset of *de jure* and *de facto* measures of financial integration and real per capita GDPto explain the structural dynamics of four of Africa regional trade bloc's growth outcomes as induced by their heterogeneous approaches to financial integration. We rely on the dynamicSystem Generalised Method of Moment (GMM) and the Pooled Mean Group (PMG) estimation procedure to study these relationships. The PMG allows us to account for the short-run and long-run dynamics of the financial integration-growth puzzle in two of the trade blocs. Findings revealed that total foreign asset and liabilities and foreign liabilities all as a percentage of GDP are inversely related to real per capita GDP in the Common Market for Eastern Southern Africa (COMESA).Other results show that trade openness, capital inflow and nominal credit to private sector all as a ratio of GDP positively induce changes in real per

capita GDP in COMESA. These results corroborate the findings of Kimbugwe *et al.*(2012); Martina (2008); Hoekman *et al.*(2017) who find an analogous result in their respective studies using the *de facto* measure for regional financial integration for broader gains of growth and development. In the Community of Sahel-Saharan States (CEN-SAD), we found that foreign liabilities as a percentage of GDP hurts growth. Other findings show that total foreign asset and liabilities, trade openness, capital inflow and nominal credit to private sector all as a ratio of GDP aid real per capita GDP growth in CEN-SAD. These findings align with the findings of Coeurdacier, Rey, & Winant (2019); Lucey and Zhang (2011); Vo and Daly (2007).

In the Economic Community of Central African States (ECCAS), growth-financial integration relationship showed that foreign liabilities as a percentage of GDP hurts real per capita GDP in the long run. However, total foreign asset and liabilities, trade openness, capital inflow and nominal credit to private sector all as a ratio of GDP aid real per capita GDP growth in the long run. Nevertheless, short-run estimates show that foreign liabilities, trade openness and credit to the private sector all as a percentage of GDP hurts real per capita GDP in ECCAS. Also, total foreign asset and liabilities and credit to the private sector all as a ratio of GDP aids real per capita GDP in ECCAS. The long-run results are in tandem with the findings of Muthoga, Obere, Mburru and Mukwate-Muchai (2013)while short-run results conform with those from Ahmed (2016); Alagidede *et al.*(2020). In the Economic Community of West Africa States (ECOWAS) version of the growth-financial integration long-run relationship, foreign liabilities as a percentage of GDP is inversely related to real per capita GDP in the long run. However, total foreign asset and liabilities, trade openness, capital inflow and nominal credit to private sector all as a ratio of GDP is positively related to real per capita GDP in ECOWAS in the long run. In addition, short-run estimates show that in the ECOWAS growth-financial integration relationship, only capital inflow and credit to the private sector all as a percentage of GDP is positively related to real per capita GDP in ECOWAS. The financial integration-growth nexus findings in ECOWAS mirrors those of Ekpo and Chuku (2017); Frey and Volz (2013). The paper concludes that trade integration affects economic growth heterogeneously and in various magnitudes and direction in each trade block. This infers that there is no "one cap fits all" approach in the use of financial integration for promoting growth in Africa. It is therefore recommended that each trade block should identify its individual peculiarities for improving growth through financial integration. Government of member nations of the trade blocs should gear effort towards improving financial integration in

the respective regional blocs in order to optimise benefits from trade and accelerate economic growth to an enviable level.

Declaration of Interest Statement

The authors have no interest to declare.

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Appendix 1

List of Regional Economic Communities

Region	Start Year	Membership	Efforts of Integration
Central Africa			
*ECCAS	1985	11 countries	Free Trade Area
CEMAC	1999	06 countries	Monetary cooperation
East Africa			
*COMESA	1994	19 countries	Free Trade/Custom Union
EAC	2000	6 countries	Free Trade/Custom Union
IGAD	1996	08 countries	Regional cooperation
North Africa			
AMU	1989	05 countries	Free Trade
*CEN-SAD	1998	27 countries	Free Trade
South Africa			
*COMESA	1994	19 countries	Free Trade/Custom Union
SACU	1910	05 countries	Free Trade/Custom Union
SADC	1981	15 countries	Free Trade
West Africa			
*ECOWAS	1975	15 countries	Free Trade/Custom Union
WAEMU	1994	08 countries	Monetary cooperation
WAMZ	2000	06 countries	Monetary cooperation