

# THE EFFECTS OF REGIONAL INTEGRATION ON ECONOMIC GROWTH IN ECOWAS COUNTRIES

**Orji, Alexander C., Okafor, Samuel O., Obi, Kenneth C., & Ukeje, Chiemezie D.**

Department of Economics, Nnamdi Azikiwe University, Anambra, Nigeria

Email of corresponding Author: alexanderorji77@gmail.com

## Abstract

This study examined the effects of regional integration on economic growth of ECOWAS member countries from 2010 to 2020. Unlike previous studies that mainly utilised variables like terms of trade and export to capture regional integration, this study employed the regional integration index computed from 2010 to 2020 and made available by the African Regional Integration Index (ARII) in five dimensions to capture the effects of regional integration on economic growth of ECOWAS members. The objective of the study was to examine the effects of trade and financial integrations on economic growth using trade integration index and financial integration index as proxies for trade integration and financial integration respectively. To overcome the potential problems such as cross-sectional dependence among countries, serial correlation of the error term, and more importantly, the problem of identification and endogenous regressors that characterise some panel data regression methods like the pool mean group (PMG), fixed effect (FE) and random effect (RE), this study employed an instrumental variable (IV) regression based on the dynamic panel data (DPD) method, within the framework of the generalised method of moments (GMM-SYS). The results show that aggregate regional integration in five dimensions (composite regional integration index), though has a positive relationship with economic growth, does not exert a significant impact on economic growth of ECOWAS members. Interestingly, trade integration and financial integration, both have a significant positive impact on economic growth of ECOWAS members, meaning that ECOWAS members are better-off with integration in trade and finance. We, therefore, concluded that regional integration of ECOWAS members is more beneficial when more emphasis is placed on trade and financial dimensions. This finding has serious policy implications for regional integration and economic growth of ECOWAS member countries.

**Keyword:** ECOWAS, Economic Growth, Regional and Integration

**JEL Codes:** F02, O40, R11

## Introduction

The promotion of sustainable economic growth is one of the principal objectives of both developing and developed nations. It is a prerequisite for increasing productive employment; it is the combined result of increases in employment and increases in labour productivity. Economic growth comes from increasing the quality and quantity of the factors of production which consist of land, labour, capital and entrepreneurship. In both the developed and developing countries of the world, economic growth is a required condition for progress. This is because growth in the economy brings about an enhanced standard of living, reduction in poverty and unemployment, as well as increase in life expectancy. Achieving economic growth or pro-poor growth has remained a major challenge for developing economies (Tinta, Sarpong, Quedraogo, Al Hassan, Mensah & Onumah, 2018). According to World Bank (2019), African countries economic output was less than desirable as the continent reported marginal growth which later declined rapidly from positive growth rate in the period between 1960s and 1970s to negative growth rate in the period from 1980s and 2018 resulting in a significant economic downturn. In a bid to save such economies and contain both the exogenous and endogenous shocks, most countries in Africa began to explore various policy options like globalization and regional integration citing the rapid growth of most developing countries that opened their markets to free or international trade. According to its proponents, like Ernst (1960), regional integration allows countries to overcome these costly divisions by integrating goods, services and factors' markets, thus facilitating the flow of trade, capital, energy, people and ideas (Tinta, *et al.* 2018). It can be promoted through common physical and institutional infrastructures, it requires cooperation between countries in trade, investment, domestic regulation, transport, information communication technology (ICT), energy infrastructure,

micro economic and financial policy and provision of other common public goods, e.g. shared natural resources, security, education, and so on.

The role of regional integration which is the unification of different economies of state in order to promote and facilitates the free movement of goods within the states in the economic growth process is well established in development literature. According to its proponents, regional integration is expected to foster economic growth through the mechanics of economies of scale occasioned by common markets and production networks, as well as technology diffusion and knowledge spillovers, which free trade and investment flows are deemed to generate. The reactivation of ECOWAS regional integration efforts partly follows the initiation of a single currency in July 1991 by all member-states to strengthen monetary integration through the creation of a second monetary zone (West African Monetary Zone (WAMZ)) for Anglophone West Africa to later merge with the existing zone (West African Economic and Monetary Union (WAEMU)). Also, the introduction of the African Continental Free Trade Area (AfCFTA) in 2018, which promises a virtuous market opportunity for attaining inclusive and sustainable development across the African continent, was part of the efforts to strengthen regional integration across the African continent. Regrettably, economic growth rate of the ECOWAS member-countries in the post-integration era shows that the region may not have benefited from the dividends of regional integration. A cursory examination of the trends in regional integration and economic growth among ECOWAS countries suggests that countries with the highest integration index, on the average, may have recorded the worst economic performance. This raises a fundamental question on whether regional integration really induces economic growth in ECOWAS.

Although previous researches have tried to provide answer to this emerging quagmire, yet still, such studies were grossly inefficient owing to conflicting and contradicting reports on the effectiveness of regional integration in driving economic growth. Such results could be attributed to the choice of variables and measurement of regional integration, as well as methodological differences as most of these studies proxied regional integration by export, while some used terms of trade, which are considered to be pseudo proxies for regional integration. This present study intends to use the composite measure of African Regional Integration Index ARII which was first released in 2016, designed and developed by the joint efforts of African Union Commission (AUC), African Development Bank (AFDB) and United Nations Economic Commission for Africa to serve as an independent source of good quality data on regional integration. Furthermore, the study is based on the Dynamic Panel Data (DPD) method, within the framework of the Generalized Method of Moments (GMM). The essence is to overcome the problems associated with the pool mean group (PMG), fixed effect (FE) and random effect (RE), which are fragile for a detailed analysis of cross-sectional interdependence among countries. Most importantly, GMM generalizes the method of moments by allowing the number of moment conditions to be greater than the number of parameters. In that way, the problem of identification and endogenous regressors is overcome (Collischon & Eberl, 2020). The broad objective of this study is to examine the effect of regional integration on economic growth in ECOWAS countries while the specific objectives are to investigate the effect of regional integration index on real-GDP in ECOWAS countries and empirically assess the effect of trade integration index and financial integration index on real-GDP in ECOWAS countries.

### **Background Issues**

Theoretical evidence indicates that regional integration has the capacity to promote productivity and economic growth. The potential channels or linkages through which regional integration exerts its influence on economic growth include the acceleration of international trade, strong macroeconomic stability, sound institutions, price transparency, financial integration, regional infrastructure and free movement of people. Specifically, financial integration impacts on economic growth through the promotion of capital allocation, intensification of competition and import of financial services, greater efficiency in resource allocation, production specialization and international consumption risk sharing. On the other hand, trade integration impacts on growth through the implementation of sound policies that will either enhance or inhibit trade openness.

## Conceptual Literature

### Economic Growth

Economic growth is generally defined as an increase in gross domestic product (GDP), either in *total GDP* or in *GDP per capita*. It can also be considered as the monetary value of total production or total income for a country, and this implies that economic growth is the same as an increase in average income (Angelsen & Wunder, 2006). Accordingly, Jhingan (2012) defined economic growth as a quantitative increase in the country's output or income accompanied by an expansion in its labour force, consumption, capital and volume of trade. Todaro and Smith (2011) view economic growth as a sustained increase in the output of a country during a specific period. Here, the growth of output is considered to be long-lasting and free from any element of inflation. Thus, this study considers economic growth as measured in terms of real gross domestic product given that the real quantitative sustained in a country's output comes in absence of inflation (Todaro & Smith, 2011; Jhingan, 2012).

### Regional Integration

Regional integration refers to a process of strengthening interconnectivity encompassed by the economies of a region through enhanced collaboration with the backing of unified policies and initiatives (Coleman & Underhil, 2012). Regional integration helps countries overcome divisions that impede the flow of goods, services, capital, people and ideas. These divisions are a constraint to economic growth, especially in developing countries. Regional economic integration aims to create larger, more attractive markets, link landlocked countries to international markets and support intra-African trade. De-Lombarede and Van-Longenhove (2007) describe it as a worldwide phenomenon of territorial systems that increases the interactions between their components and creates new forms of organization, co-existing with traditional forms of state-led organization at the national level. More operationally, regional integration is the joining of individual states within a region into a larger whole, and the degree of integration depends upon the willingness and commitment of independent sovereign states to share their sovereignty (Claar & Noelke, 2010).

### Regional Integration: ECOWAS in perspective

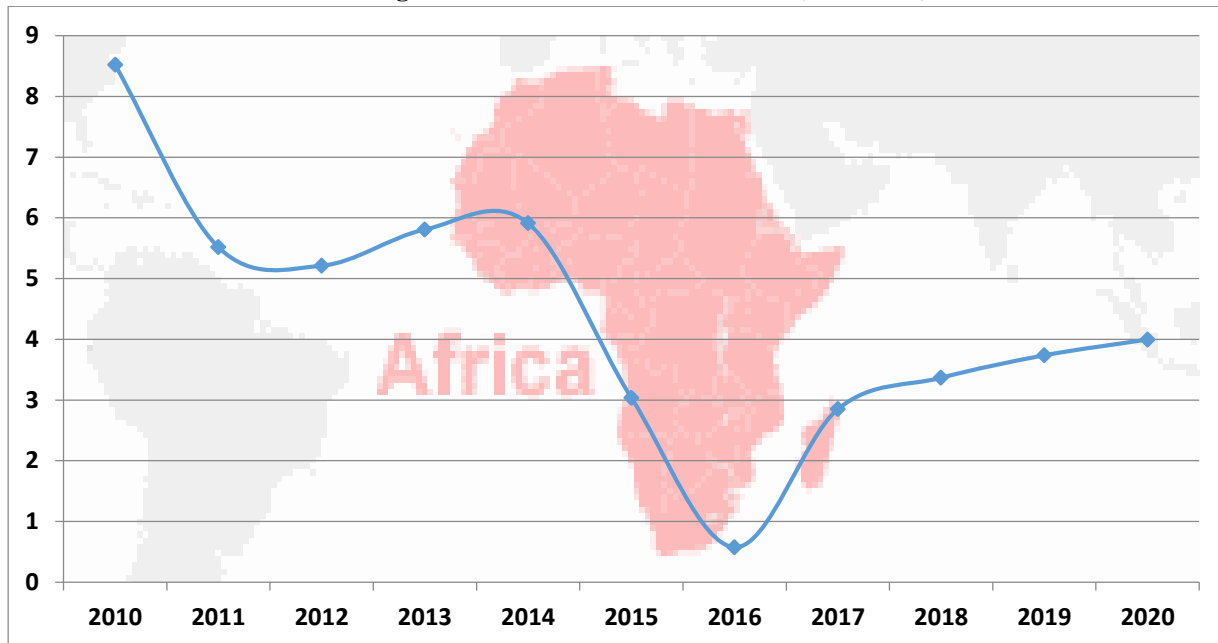
The Economic Community of West Africa States (ECOWAS) was established in 1975 with the aim of achieving a monetary union for the sub-region. ECOWAS consists of 15 countries that were colonized by the British, French and Portugal. Considered one of the pillars of the African Economic Community, ECOWAS was set up to foster the ideal of collective self-sufficiency for its member states. As a trading union, it is also meant to create single, large trading bloc through economic cooperation. The vision of ECOWAS is the creation of a borderless region where the population has access to its abundant resources and is able to exploit same through the creation of opportunities under a sustainable environment. ECOWAS was aimed at the creation of an integrated region where the population will enjoy free movement, have access to efficient education and health systems and engage in economic and commercial activities while living in dignity in an atmosphere of peace and security. ECOWAS is meant to be a region governed in accordance with the principles of democracy, rule of law and good governance. Considerable efforts have now been made in harmonizing macroeconomic policies and private sector promotion towards achieving economic integration. These efforts have given rise to some initiatives which include implementation of the roadmap for the ECOWAS single currency programme, monitoring and evaluation of performance and macroeconomic convergence, management of the ECOWAS Macroeconomic Database & Multilateral Surveillance System (ECOWAS) as well as co-operation with other regional and international institutions.

### Economic Growth in ECOWAS

The Economic Community of West African States (ECOWAS) as a regional organization aims at the promotion of economic integration in all fields of economic activity, particularly industry, transport, telecommunications, energy, agriculture, natural resources, commerce, monetary and financial questions, social and cultural matters. ECOWAS fosters economic growth and poverty reduction through decreasing regional barriers to trade, such as impediments to goods crossing borders, inefficient transport corridors, and lack of access to power. It also works to standardize trade and border policy in all member countries. Positive strides have been made in the harmonization of macroeconomic

policies, the implementation of the Common External Tariff (CET), multilateral surveillance, research and youth empowerment, trade liberalisation, Customs union, favourable industrial policy, mines development, agriculture and environment, infrastructure-transport, telecommunications and energy. There is also the march towards the creation of a single currency by 2021, and the adoption of a single biometric identity card. There now exists a boosted capacity for organising an efficient regional response against challenges such as diseases, natural disasters and terrorism.

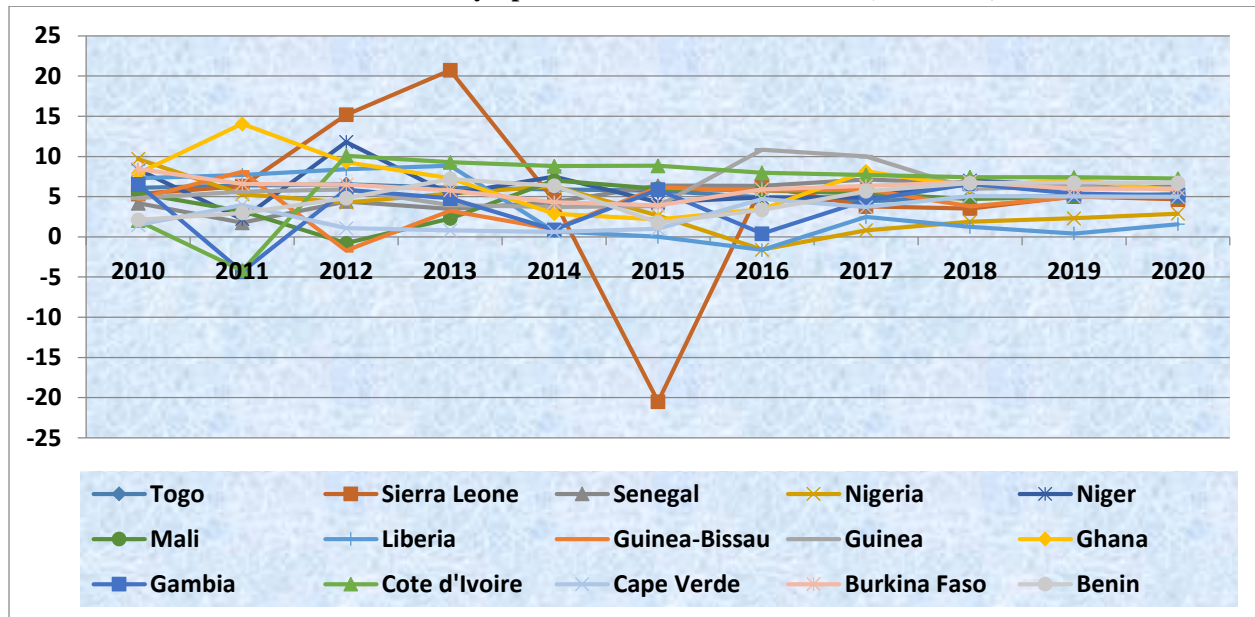
**Average Economic Growth in ECOWAS (2010-2020)**



Source: African Development Bank (2020)

Historical data have shown that the average economic performance of ECOWAS has trended downwardly from 2010 to 2020. For instance, the average annual growth of GDP of the ECOWAS region deteriorated from 8.51% in 2010 to 3.99% in 2020. Specifically, the period between 2010 and 2013 witnessed a drop in the average economic performance of ECOWAS from 8.51% to 5.80% and a sharper decline in the period between 2014 and 2016 from 5.91% to 0.57%. This period of a drop in the economic performance of ECOWAS coincided with the period of economic recession witnessed in Nigeria, which may have been provoked by the oil price shocks in the international market during the same period, and the fact that Nigeria accounts for about 75% of the ECOWAS regional GDP (ARII, 2020). However, the economy of ECOWAS witnessed a recovery between 2017 and 2020 when the regional GDP grew (though marginally) from 2.84% to 3.99%. In a country-specific analysis of ECOWAS growth performance, Figure 11 shows that Senegal is the least performing country with an annual average growth rate of 2.94%, followed by Guinea (3.36%), Cote d' Ivoire (3.63%) and Niger (3.78%) between 2010 and 2020, while Mali has the highest growth performance with an annual average growth rate of 6.76% within the same period. Other countries in the league of relatively high growth performance above 6% include Nigeria (6.59%), the Gambia (6.23%), Liberia (6.07%) and Sierra Leone (6.05%). Others include Benin (5.58%), Cape Verde (5.17%), Burkina Faso (4.99%), Togo (4.94%), Ghana (4.45%) and Guinea-Bissau (4.26%).

**ECOWAS Country-Specific Economic Performance (2010-2020)**



Source: African Development Bank (2020)

Also, some ECOWAS countries have, at some point, experienced reasonably high growth, while some have also witnessed negative growth performance between 2010 and 2020. Countries that have witnessed higher growth include Sierra Leone with an annual growth rate of 20.72% in 2013, while Ghana witnessed the highest growth (14.05%) in 2011. Others that have witnessed relatively higher growth include Niger (11.8%) in 2012, Guinea (10.82%) in 2012 and Cote d' Ivoire (10.10%) in 2012. Interestingly, Sierra Leone, which had the highest growth (20.72%) in 2013 also witnessed the worst growth performance in 2015 with a negative growth of up to -20.49%, while the Gambia and Cote d' Ivoire had negative growth in 2011 up to -4.33% and -4.20% respectively. Others with negative growth include Guinea-Bissau (-1.71%) in 2012 and Liberia (-1.63%) in 2016.

**Trade Integration within ECOWAS**

The main objective of pursuing trade and market integration in Africa is to boost intra-African trade and investments. When trade flows are faster and more cost-effective, business and consumers in the regions benefit as it creates employment, industrial linkages, economic diversification and structural transformation that, by extension, generate sustainable development on the continent (AfDB, 2016). In 2014, the share of intra-African exports was about 16% of total exports, compared to 18% for Latin America, 54% for Asia, and 66% for Europe (United Nations Conference on Trade and Development [UNCTAD], 2016). Notwithstanding that intra-African trade remains lower than optimal, it is a fact that intra-African trade is far more diversified and have higher shares of manufactured goods than primary commodities exported within the continent, 34% versus 11%, respectively. Boosting intra-African trade, therefore, has the potential to contribute to further specialization, diversification and structural transformation in Africa. In recent years, an encouraging upsurge in efforts to boost intra-African trade has been observed among African countries. The Action Plan for Boosting Intra-African Trade (BIAT), TFTA, and the recently launched negotiation for CFTA are specific steps to establish the African Economic Community – and thus, stimulate the trade of goods and services through regional integration agreements designed to eliminate tariff and non-tariff barriers. Although a number of trade and market integration-related agreements, protocols and conventions have been signed among member States in their respective regional economic communities, several factors have contributed to its slow implementation. Among the main trade barriers, are poor infrastructure developments, maintenance and connectivity, and conflicts and security issues in sub-regions.

### **Financial Integration within ECOWAS**

Financial integration within this region allows for a pooling of efforts to improve financial systems and encourages best practices to be shared across the region. Furthermore, deeper financial integration in the region would complement other initiatives such as free trade and monetary union, both of which rely on and facilitate financial integration. Financial integration is achieved through regional integration agreement. This is possible through the elimination of cross-border restriction of financial openness. Financial integration also comes through the existence of foreign banks in the domestic economy and/or vice versa. ECOWAS has interlinking of banking institutions in member states. For example, the West African Economic and Monetary Union (WAEMU) came into existence in 1994 to deepen economic integration and exists as a sub-regional grouping within the ECOWAS. The remaining ECOWAS member states, except Cape Verde, are in the process of establishing a Monetary Union under the constituency known as the West African Monetary Zone. According to the ECOWAS Single currency roadmap, the second monetary zone was scheduled to be launched in 2015 for the eventual merger of the two by 2020 with a common currency (UNECA, 2020). The initial date for the launch of the single currency was January 2003. However, the launching has been postponed several times due to member States' inability to fulfill the set macroeconomic convergence criteria (WAMI, 2016).

### **Theoretical Framework**

#### **Neoclassical Growth Theory**

The neoclassical growth theory pioneered by Solow (1956) predicts that in steady-state equilibrium, the level of GDP per capita will be determined by the prevailing technology and the exogenous rates of saving, population growth and technical progress. Its key assumption is that technical change is exogenous and that the same technological opportunities are available across countries. This implies that the steady state growth solely depends on exogenous population growth and exogenous technical progress. Under the neoclassical growth theory, regional integration, economic policy measures and other institutional aspects have no effect on the steady state growth rate, which is solely determined by the exogenous rate of technological progress. Institutional changes, increases in efficiency or changes in investment ratios following regional integration have only temporary effects on the growth rate. Temporary growth effects occur as a consequence of shifts in the general level of productivity attributed to the formation, deepening or widening of a regional integration agreement. The productivity shift in turn induces accelerated physical capital formation that gradually diminishes towards its long term steady state. Hence, regional integration is seen as any other major economic policy change that affects economic growth only on the transition path leading towards the steady-state. The neoclassical growth theorists consider the problem of underdevelopment in the developing economies as endogenously motivated mainly by excessive government intervention and poor economic policy formulations. As a result, the neoclassical free-market theory asserts that opening up an economy through liberalization of national markets call for additional domestic and foreign investment, and thus increases the rate of capital accumulation (Todaro & Smith, 2011).

#### **Regional integration theory (RIT)**

Regional integration theory (RIT) seeks to explain the establishment and development of regional international organizations (RIOs). Regional integration theory focuses on the (comparative) development and dynamics of regional integration. It describes and explains the development and dynamics of regional integration along three dimensions: (functional) scope, level (of centralization), and (territorial) extension (e.g. Schmitter, 1969; Lindberg and Scheingold, 1970; Börzel, 2005; Leuffen et al., 2013). Scope refers to the distribution of policy-making competences between the member states and the regional international organizations. Level denotes the distribution of decision-making competences within the regional international organizations between governments and non-governmental regional international organizations while extension refers to the number of integrated countries or the coverage of the region by the regional international organizations and its integrated policies. These three dimensions mirror the concepts of deepening (level), widening (extension), and broadening (scope), which are widely used to describe the multidimensional process of integration. In summary, regional integration theory believes that regional integration promotes substantial economic gains. Regional integration allows countries to improve market

efficiency, share the costs of public goods or large infrastructure projects, decide policy cooperatively and have an anchor to reform, have a building block for global integration and reap other non-economic benefits, such as peace and security.

### **Empirical Literature Review**

Anadi (2005) investigated regional integration in Africa: The case of ECOWAS. The study attempted to describe, evaluate and analyze the inter-locking web of factors that promote and/or inhibit meaningful regional economic integration in West Africa. While combining the analytical tools of the inter-disciplinary approach, the work elucidates the seemingly difficulty in attaining meaningful regional economic integration in West Africa due to decades of structural disequilibria. The study posits a significant incongruity and obvious incompatibility between the long-term challenges of regional economic integration programmes on the one hand, and the urgent national needs of member states of ECOWAS on the other. It maintains that West African economies before and after independence and substantially to the present remained structurally truncated and functionally disarticulated to attain any meaningful balanced and diversified development. The study contends that the economic basis of the West African states have so far proved grossly inefficient to shoulder the burden of real adjustments needed for a practical implementation of the key regional economic integration programmes. The consequence is a gradual but steady erosion of the capacity and psychological commitment of member states of ECOWAS in the implementation regional economic integration programmes.

Juraev (2013) carried out a study on financial integration and economic growth. The study examined the possible impact of financial integration under different economic conditions, such as financial and equity market development and trade openness. The study applied a mixture of models, namely General Methods of Moments (GMM), Ordinary Least Squares (OLS), two-stage least squares (TSLS), transformed OLS, and Panel data approach with 14 financial integration measures, including three new ones over 217 countries between 1970 and 2012. The results confirm that countries with high current account surplus are better off under financial integration, particularly with less inflation and less strict rule-of-law. According to the study, financial development damages economic growth in financial repressed markets, unless financial integration measures are practiced simultaneously. Again, foreign bank presence, although positively correlated with financial development, affects negatively on economic growth, particularly under higher financial openness.

Bong and Premaratne (2018) examined whether regional integration promotes economic growth as well as investigate whether the economic and social factors affect economic growth in Southeast Asia using panel data over 43 years from 1970 to 2013. The study employed a cross-country growth model using a generalized method of moments (GMM) within the framework of the dynamic panel data regression to empirically examine the impact of regional integration on economic growth. The results suggest that regional integration had a significant effect on economic growth. More specifically, the results imply that to enhance regional integration and economic growth in the region, public institutions should work towards eliminating corruption and stabilizing the macroeconomic environment and ensuring political stability while promoting international trade among member countries.

Calderon and Cantu (2019) examined the growth effects of different dimensions of international trade integration notably, volume, diversification, and natural resource dependence in Sub-Saharan Africa. Specifically, the study empirically investigated the impact of trade integration on growth per worker and the sources of growth; that is, growth of capital per worker and total factor productivity growth. The analysis was based on a sample of non-overlapping five-year period observations for 173 countries from 1975 to 2014. The study, through econometric evidence, shows that increased trade openness, greater export production diversification, and reduced export dependence from natural resources will have a positive causal impact on economic growth.

Ezzeddine and Hammami (2019) investigated the effects of international financial integration on economic growth in Tunisia. The study contributed to the empirical literature by examining the circumstances of international

financial integration (IFI) and promoting growth over the period 1970 - 2012, using the error correction model (ECM). The result of the study is consistent with the reality given that in the short run, the integration policy of Tunisia in the global financial market has not been beneficial for growth, which is not the case in the long term. However, the study showed that, in the long term, growth is elastic when compared to foreign direct investment (FDI) which justifies the conclusion that financial integration in the case of Tunisia, in the long run, is real but not in the short run.

Akpan (2020) investigated economic integration in West Africa. The study reconsidered other factors outside the convergence criteria for the West African Monetary Zone (WAMZ) region and the link between the Francophone countries with France. Employing stylized facts and preliminary panel results, the study found unsettled important issues like political will, huge infrastructural deficit and fiscal imperatives as the region moves towards economic integration. It further examined the integration efforts of ECOWAS which was established in 1975 and argued that the stylised facts suggest that there are still fundamental challenges if the union has to be a reality. Based on the issues examined above, the study concludes that economic integration is not a smooth journey; hence the experience of Europe is worth emulating.

Hong Vo, The Vo and Minh Ho (2020) examined the potential link between economic growth and financial integration in China using data from 1982 to 2017. The study was conducted to find out whether financial integration fosters Chinese economic growth. The study employed the Auto-Regressive Distributed Lag (ARDL) model while utilizing the most updated data on a globalization (or integration) index. The study also followed two distinct aspects of financial integration, the de facto (proxied for economic activities) and the de jure (proxied for the Government policies leading to integration). Findings from the study indicate that the presence of a long-term co-integration between financial integration de facto and economic growth in China. Also, bidirectional causality was confirmed between financial integration and economic growth in China using the Granger causality test.

### Methodology

Following the theoretical underpinnings of economic growth and regional integration as discussed earlier, the core issue in this section is to develop a model involving some sets of equations that connect the relevant variables identified as key factors within the context of regional integration and economic growth in ECOWAS. The dependent variable is represented by real gross domestic product (real-GDP); while the core explanatory variables include composite regional integration index (CRII), trade integration index (TII), financial integration index (FII) and domestic value-added (DVA), which measures the performance of global value chains. The domestic value-added captures the gains associated with exporting which accrue to domestic labour and capital, as well as the share of exported products that are not finished product and will be imported from other countries to be processed before being exported (Tinta, Sarpony, Quedraogo, Al Hassan, Mensah and Onumah. 2018). In line with the literature (Andersen & Babulal, 2008; Pam, 2017; Yaya, 2017; Tinta, 2018), some control variables which are significant determinants of economic growth have been incorporated such as the gross capital formation (GCF), foreign direct investment (FDI), real exchange rate (EXR), human capital index (HCI) which is the core of the Lucas model; and institutional quality (INST) which measures the quality of public administration in the individual country. GCF and FDI measure the level of investment in the country. The EXR measures the competitiveness of the domestic currency of the individual country. Therefore, in line with the foregoing, and the specific objectives of this study, our models follow, with modifications, the model specified by Tinta, *et al.* (2018) as follows:

$$\begin{aligned}
 GDP_{it} &= f(GDP_{it-1}, CRII_{it}, HCI_{it}, GCF_{it}, DVA_{it}, FDI_{it}, EXR_{it}, INST_{it}) & 1 \\
 GDP_{it} &= f(GDP_{it-1}, TII_{it}, FII_{it}, HCI_{it}, GCF_{it}, DVA_{it}, FDI_{it}, EXR_{it}, INST_{it}) & 2
 \end{aligned}$$

Where  $GDP_{it-1}$  is a period lag of the dependent variable (GDP) which is the core of the Dynamic Panel Data (DPD) model structure;  $GDP_{it}$ ,  $CRII_{it}$ ,  $TII_{it}$ ,  $FII_{it}$ ,  $HCI_{it}$ ,  $GCF_{it}$ ,  $DVA_{it}$ ,  $FDI_{it}$ ,  $EXR_{it}$ , and  $INST_{it}$  are as previously defined. The subscripts  $i$  represents the individual country (cross-sections: i.e.  $i = 1, 2, 3, \dots, 15$ ;  $N = 15$  ECOWAS members) and

$t$  represents the time dimensions (2010 – 2020: i.e.  $t = 1, 2, 3, \dots, 11$ ;  $T = 11$ ). Specifying Equations 1 and 2 in their full econometric forms and applying the natural logarithm transformation of both sides of the equations, we arrive at Equations 3 and 4 as follows:

$$LGDP_{it} = \alpha_0 + \alpha_1 LGDP_{it-1} + \alpha_2 LCR_{it} + \alpha_3 LHCI_{it} + \alpha_4 LGCF_{it} + \alpha_5 LDVA_{it} + \alpha_6 LFDI_{it} + \alpha_7 LEXR_{it} + \alpha_8 LINS_{it} + \mu_{it} \tag{3}$$

$$LGDP_{it} = \beta_0 + \beta_1 LGDP_{it-1} + \beta_2 LTI_{it} + \beta_3 LFII_{it} + \beta_4 LHCI_{it} + \beta_5 LGCF_{it} + \beta_6 LDVA_{it} + \beta_7 LFDI_{it} + \beta_8 LEXR_{it} + \beta_9 LINS_{it} + v_{it} \tag{4}$$

Where  $\alpha_i$  ( $i = 0, 1, 2, \dots, 9$ ) and  $\beta_i$  ( $i = 0, 1, 2, \dots, 10$ ) are the parameters from Equations 3 and 4 respectively;  $\mu_{it}$  and  $v_{it}$  are the uncorrelated random disturbance terms (with the usual properties of  $N(0, \sigma^2)$ ) from each model, and  $L$  is the natural log notation. Note that all variables appear in natural log form, the aim of which is to standardise the corresponding data. This is necessary to eradicate the elements of heteroskedasticity and a high degree of variability that are prevalent across the relevant cross-sections, as well as allow for easy interpretation of the models' coefficients as elasticities.

### A Priori Expectation

In line with the theoretical framework and literature in general, all the regressors from both Equations 3 and 4 are theoretically expected to exert a positive impact on economic growth. This relationship is further clarified under subsection below. The *a priori* expectations of the models' parameters are summarized in Table 1 as follows:

**Table 1: Summary of A Priori Expectations**

Regressors	Eq. 3.4 DV: $LGDP_{it}$	Eq. 3.5 DV: $LGDP_{it}$
$LGDP_{it-1}$	$+\alpha_1$	$+\beta_1$
$LCR_{it}$	$+\alpha_2$	---
$LTI_{it}$	---	$+\beta_2$
$LFII_{it}$	---	$+\beta_3$
$LHCI_{it}$	$+\alpha_3$	$+\beta_4$
$LGCF_{it}$	$+\alpha_4$	$+\beta_5$
$LDVA_{it}$	$+\alpha_5$	$+\beta_6$
$LFDI_{it}$	$+\alpha_6$	$+\beta_7$
$LEXR_{it}$	$+\alpha_7$	$+\beta_8$
$LINS_{it}$	$+\alpha_8$	$+\beta_9$

Source: Authors' Compilation, 2021

### Estimation Technique and Procedure

The study would be based on Dynamic Panel Data (DPD) regression covering all ECOWAS countries, which are geographically located within the area west of the African continent. In other words, the ECOWAS consists of all the countries which are located in the Western part of the African continent (United Nations Statistics Division, 2013). Given that the error term in Equation 1 captures unobserved heterogeneity specific to countries, but are time-invariant (e.g. welfare system, geographical and environmental differences), the error term is specified as follows:

$$\mu_{it} = \lambda_j + Y_t + \varepsilon_{it} \tag{5}$$

Therefore, the likelihood of endogeneity coupled with the interdependence between unobserved country-fixed effects and the error term suggests that the assumption of orthogonality may not be satisfied; hence the consistency of fixed effect (FE) or random effect (RE) estimator becomes questionable. To overcome this problem, it is imperative to explicitly account for any possible endogeneity of regressors using the Instrumental Variable (IV) estimator. Thus, this study employed the Generalized Method of Moments (GMM). The choice of GMM is based on

the premise that it considers the short-run effects while accounting for the time-series dimension of the dataset; it incorporates unobserved country-specific effects and solves the problem of endogeneity as it treats all regressors as endogenous.

**Estimation Results**

**Summary of Descriptive Statistics**

In this subsection, we present the summary of descriptive statistics based on the basic measures of dispersion and central tendencies. According to Table 2, the mean value of GDP growth across the selected countries is 2.28%. With a standard deviation of 3.78%, there is a high disparity in growth performance across the selected countries, meaning that some countries have relatively higher growth rates than others. The maximum and minimum values of GDP growth across the selected countries are 18.07% and -22.19%, respectively which were both observed from Sierra Leone. The average percentage share of gross fixed capital formation (GCF) to GDP of the selected countries is 21.78% with a standard deviation of 6.56%, suggesting a similar trend pattern in the percentage share of GCF to GDP of selected countries. The highest and lowest shares of the GCF to GDP are 52.42% and 1.25% coming from Guinea and Cape Verde, respectively. The mean value of the human capital index (HCI) across the selected countries is 0.37 on a scale of 0 to 1. With a standard deviation of 0.04, there is evidence of closeness in the trends of HCI across the selected countries. The maximum and minimum values of HCI across the selected countries are 0.45 and 0.29, observed from Ghana and Nigeria, respectively. Also, the composite regional integration index (CRII), which is an aggregate measure of the influence of the five dimensions of regional integration, has a mean value of 0.42 on a scale of 0 to 1 and a standard deviation of 0.13. This shows that the selected countries share divergence scores on the composite regional integration index. The maximum and minimum values of CRII from Cote d’Ivoire and Guinea are 0.66 and 0.10 respectively. The mean value of the trade integration index (TII) is 0.41 on a scale of 0 to 1 and a standard deviation of 0.26, indicating that a wider variation exists across the selected countries in terms of TII. The maximum and minimum values of the TII were 1.00 and 0.00 observed in Nigeria and the Gambia, respectively.

In passing, it should be noted that due to the wider spread of relevant data across the selected ECOWAS countries in this study, the natural logarithm transformation of variables becomes necessary to reduce the likelihood of heteroskedasticity in econometric analyses going further.

**Table 2 Summary of Descriptive Statistics**

<b>Variable</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Minimum</b>	<b>Maximum</b>
GDP	2.278594	3.781823	-22.18762	18.06517
GCF	21.77730	6.561761	1.251276	52.41832
HCI	0.368796	0.040719	0.297922	0.450056
CRII	0.415000	0.130035	0.100000	0.660000
TII	0.413750	0.263529	0.000000	1.000000
FII	0.510606	0.347156	0.000000	1.000000
DVA	22.13231	6,483885	3.669052	35.23447
EXR	1534.995	2653.726	1.431025	10772.03
FDI	18.28966	26.66179	-53.61357	159.6960
INS	23.65079	11.51403	2.285714	54.19048
<b>Obs.</b>	<b>132</b>	<b>132</b>	<b>132</b>	<b>132</b>

Source: Authors’ Computation using Eviews 12

**Correlation Analyses of Regressors**

Table 3 presents the results of the correlation analysis of regressors of Models 1 and 2. The correlation test is particularly carried out to ensure that the multicollinearity problem is not severe. Expectedly, no two explanatory variables of both models are correlated to a higher degree, meaning that the specified models are not plagued by multicollinearity issues.

**Table 3: Correlation analysis of Model one Regressors**

<b>Model 1</b>	LGDP	LGCF	LHCI	LCRII	LDVA	LEXR	LFDI	LINS	
LGDP	1.0000								
LGCF	0.0202	1.0000							
LHCI	0.0116	0.1942	1.0000						
LCRII	0.0624	0.0265	0.2386	1.0000					
LDVA	0.0028	0.1233	0.2006	0.5420	1.0000				
LEXR	0.0029	0.1375	-0.3845	-0.5305	-0.2814	1.0000			
LFDI	0.1708	-0.0229	0.1154	-0.4355	-0.3172	0.0122	1.0000		
LINS	0.0169	-0.0216	-0.1227	-0.4809	-0.2905	-0.0220	0.2804	1.0000	
<b>Model 2</b>	LGDP	LGCF	LHCI	LTII	LFII	LDVA	LEXR	LFDI	LINS
LGDP	1.0000								
LGCF	0.0584	1.0000							
LHCI	0.0546	0.2411	1.0000						
LTII	0.1770	-0.0662	-0.0678	1.0000					
LFII	0.0025	0.4343	-0.0301	0.0822	1.0000				
LDVA	0.4051	-0.1129	0.1123	0.6843	-0.1458	1.0000			
LEXR	0.0910	0.1735	-0.4033	0.1655	0.7695	-0.1838	1.0000		
LFDI	0.0472	0.0889	0.2782	-0.0953	-0.2490	0.1127	-0.4261	1.0000	
LINS	0.0907	-0.0138	-0.0663	-0.2507	-0.3530	-0.2361	-0.3635	0.1154	1.0000

Source: Authors' Computation using Eviews 12

**Results of Estimated System GMM Models**

Having established the appropriateness of the GMM-SYS model for this analysis, we proceeded to the main estimation of the GMM-SYS models of the study. The estimation employed internal instruments which are the lagged values of the regressors and regressands of the dynamic GMM-SYS models. The GMM-SYS instruments for the level estimation include a period lag of the first differenced regressors alongside lag 2 of the differenced dependent variables, while the instruments of the first difference estimation include a period lag of the level regressors plus lag 2 of the level dependent variables. This is to ensure that the problem of weak instruments which usually results from persistent regressors does not affect the results. Both models have GDP as the dependent variable, but Model 1 captures the impact of regional integration by aggregating the five dimensions of regional integration while Model 2 singled out the trade and financial integrations which are part of the five dimensions of regional integration. The rationale for the extraction of trade and financial integrations, apart from examining their influence on the economic growth of ECOWAS member countries, is to also verify the validity of the highly celebrated trade- and finance-led growth hypotheses.

Following the results in Table 4, the estimated GMM-SYS models in Columns 2 and 3 are considered robust with consistent coefficients, given that the result of the Durbin-Wu-Hausman tests justify the use of dynamic IV regression (i.e., GMM-SYS) since the null hypotheses of all exogenous regressors were rejected at the 5% level of significance for Models 1 and 2, meaning that all regressors in both models are endogenous. In addition, the results of the Sargan over-identification tests show evidence of no controversy between the regressors and the instruments used for Models 1 and 2. Expectedly, the AB tests of serial correlation revealed that both models suffer first-order serial correlation, but no second-order serial correlation exists in both models. Also, the models are well specified since the same control variables, appearing in Models 1 and 2, retained their *a priori* signs and significance. Other relevant test statistics such as the Adjusted R-squared and F-statistics also confirm the robustness of the estimated models.

**Table 4: Results of the GMM System Estimation ( $T = 11, N = 15$ )**

<b>Dependent Variable: LGDP</b>		
<b>Variable</b>	<b>Model 1 (GMM-SYS)</b>	<b>Model 2 (GMM-SYS)</b>
C	-6.126923 (0.7808)	1.566634 (0.9840)
LGDP(-1)	0.268108** (0.0008)	0.387496** (0.0000)
LGCF	0.224324* (0.0319)	0.206690* (0.0397)
LHCI	0.185557* (0.0466)	0.100126* (0.0462)
LCRII	0.309921 (0.6811)	---- ----
LTII	---- ----	0.282444* (0.0107)
LFII	---- ----	0.331283* (0.0241)
LDVA	0.291224* (0.0201)	0.243855* (0.0325)
LEXR	0.370242* (0.0194)	0.310451* (0.0256)
LFDI	0.428637** (0.0061)	0.364820* (0.0171)
LINS	0.094112 (0.3802)	0.115822 (0.7461)
Sargan Over-Identification Test	1.2891 (0.3211)	1.3640 (0.2926)
Durbin-Wu-Hausman Test	0.6580 (0.0228)	0.8492 (0.0201)
AB Test for AR(1)	5.7214 (0.0015)	4.6273 (0.0038)
AB Test for AR(2)	0.6814 (0.7820)	0.7528 (0.5219)

NB: \*\* (\*) denote significance at the 1% (5%) levels.

All figures in Parentheses are the P-values.

The estimation is based on two-steps System GMM and the instruments used are a period lag difference and a period lag level of independent variables and lag 2 of dependent variables.

Durbin–Wu–Hausman and Sargan Tests are based on asymptotic Chi-square distribution.

Source: Authors’ Computation using Eviews 12

The results in Table 4 reveal that all the regressors of both models conform to theoretical expectations. The coefficient of a period lag of LGDP (i.e. LGDP (-1) is positive and significant, suggesting that even though the pace of growth is low across the 15 ECOWAS member countries, economic growth, on average, is persistent and sustainable across countries of the ECOWAS region. This implies that the past growth of the economies of ECOWAS countries has a strong positive hold on the future economic growth of the region.

### Discussion of Findings

This study is an investigation of the impact of regional integration on the economic growth of ECOWAS countries. Two models of real GDP were estimated – Model 1 particularly estimated the aggregate regional integration in five

dimensions (composite regional integration index) alongside the aforementioned control variables, while Model 2 replaced the composite regional integration index with trade integration index and financial integration index in line with the main objectives of the study. The study included all the 15 ECOWAS members and covered a period from 2010 to 2020 giving us a panel structure of form  $N = 15$  and  $T = 11$ . To ensure the robustness and reliability of the estimations, the System GMM model framework was employed.

First, the results show that regional integration in five dimensions (composite regional integration index) does not significantly impact the economic growth of ECOWAS countries, though a positive association exists between economic growth and regional integration. This finding is in support of the finding reported by De Melo, et al. (1993) whose finding suggests that that regional integration had no impact on economic growth in the developing countries. The finding also supports Landau (1995) and Badinger (2001) who found no evidence of long-term growth effects of regional integration agreement among countries within the European Union; Vanhoudt (1999) who found no evidence of positive or negative growth effects of regional integration agreement for the European Commission members; Te Velde (2008) who could not establish the positive effects of regional integration on growth at the aggregation level. However, this stands in contrast to the finding reported by Kamau (2010) who confirmed a significant positive relationship between regional integration and economic growth in COMESA, EAC and SADC; Bong and Premaratne (2018) who reported that regional integration had a significant effect on economic growth in Southeast Asia; Park and Claveria (2018) whose results suggest a significant and positive development impact of regional integration in 156 countries; and Tinta, et al. (2018) who concluded that regional integration can promote the economic potentials of ECOWAS members. It is important to note that the positive but insignificant influence of composite regional integration on the economic growth of ECOWAS countries as revealed by this study, could be attributed to the fact that most of the ECOWAS members score very low or zero in various dimensions of regional integration and are yet to fully optimize the growth benefits of full regional integration in five dimensions.

Second, the results show that trade integration and financial integration both have a significant positive impact on the economic growth of ECOWAS countries in line with theoretical expectations as well as in support of trade- and finance-led growth hypotheses. This finding is particularly interesting given that regional integration in five dimensions does not significantly impact the economic growth of countries in the ECOWAS region. This outcome is not peculiar to us because historical data have shown that most ECOWAS members have high integration in trade and finance. Our results support the results of most previous studies on the growth effect of trade and financial integration. For instance, Kamau (2010) also revealed that economic integration and trade, separately and jointly, have a positive and significant impact on economic growth in COMESA, EAC and SADC. However, our finding goes contrary to the finding reported by Park and Claveria (2018) that control of trade and financial openness is vital for improving the development impact of regional integration in the sampled 156 countries; Tinta, et al. (2018) who also, concluded that international trade is not the better solution for ECOWAS countries to boost economic growth. Our finding on trade integration and economic growth is supported by Levine and Renelt (1992), Dollar (1992), Barro and Sala-I-Martin (1995), Sachs and Warner (1995), Edwards (1998) and Greenaway, et al (1998) who found that trade distortions due to the intervention of the State led to low growth rates.

Also, Haveman, et al. (1998); Frankel and Romer (1999); Rodriguez and Rodrik (2000); Noguer and Siscart (2005); Baldwin (2008); Nuh (2011); Adom (2012); Tahir and Khan (2014); Hubert and Satoshi (2016); Arunann, Abu and Puaah (2016); and Calderon and Cantu (2019) all supported the trade-led growth hypotheses by concluding that trade promotion holds the key to economic growth. On the relationship between financial integration and economic growth, several previous studies reported in affirmative to our findings. Quinn (1997) is one of the foremost influential studies to have reported a positive and significant relationship between financial integration and economic growth. Others like Edison, et al. (2002); Brezigar-Masten, et al. (2008); Osada and Saito (2010); Schularick and Steger (2010); Juraev (2013); Saafi, et al. (2016); Kouki and Rezgui (2017); and Hong Vo, et al. (2020) all reported in affirmative to our finding as well as in line with the finance-led growth hypotheses. On the

contrary, Rodrik (1998) found no significant effects of capital account liberalisation on economic growth as against our finding.

## **Conclusion and Recommendation**

### **Conclusion**

The growth effect of regional integration is well documented in development literature. However, economic growth has remained a major challenge of contemporary economies, particularly those of developing countries. The results show that regional integration in five dimensions (composite regional integration index), though have a positive relationship with economic growth, but do not exert a significant effect on economic growth of ECOWAS members. Interestingly, trade integration and financial integration, both have a significant positive impact on economic growth of ECOWAS members, meaning that ECOWAS members are better-off with integration in trade and finance. Other significant drivers of economic growth in ECOWAS region include gross fixed capital formation, human capital, domestic value-added, foreign direct investment, and exchange rate. We, therefore, conclude that regional integration of ECOWAS members is more beneficial when more emphasis is placed on trade and financial dimensions. This finding has serious policy implications for ECOWAS regional integration and economic growth of member countries.

### **Recommendation**

Based on the findings of this study, the following recommendations are made:

- i.** Our findings do not favour aggregate regional integration in five dimensions as this does not significantly impact economic growth of ECOWAS members.
- ii.** Policymakers in ECOWAS countries should be aware that greater emphasis on trade and financial dimensions of regional integration is more beneficial to economic growth in the regional. First, to improve on trade integration dimension, it will benefit ECOWAS members if they could religiously subscribe to the implementation of the African Continental Free Trade Area (AfCFTA), which promises a virtuous market opportunity for attaining inclusive and sustainable development across the African continent. Second, financial integration can be improved upon if ECOWAS members can strengthen the regional convertibility of their national currencies.
- iii.** Real investment in human capital is necessary for ECOWAS countries to boost economic growth. To ensure that human capital is developed, serious attention and funding should be given to the key components of human capital which are education and health of the population.
- iv.** To improve the level of gross capital formation across ECOWAS members, there is a need to allocate more resources to capital projects that will improve the productive capacities of their economies as this will translate to meaningful economic growth.
- v.** Attraction of foreign direct investment should be at the centre of growth policies of ECOWAS countries. Relevant incentives and conducive business environment should be emphasised more on so as to generate adequate foreign investment inflows into the various ECOWAS countries.

## REFERENCES

- Adom, A. D. (2012). Investigating the impacts of intraregional trade and aid on per capita income in Africa: Case study of the ECOWAS. *Economics Research International*. Vol. 2012 DOI: <https://doi.org/10.1155/2012/297658>
- African Regional Integration Index (ARII) (2020). Regional integration matters. <https://www.integrate-africa.org/>
- African Development Bank (AfDB) (2020). Socio-economic database, link at: <https://dataportal.opendataforafrica.org/nbyenxf/afdb-socio-economic-database-1960-2021>
- Akpan, H. E. (2020). Economic Integration in West Africa: A Reconsideration of the Evidence. In Edomah, N. (Eds.), *Regional development in Africa*. Retrieved from Ebook Library.
- Andersen, L., & Babula. (2008). The link between openness and long-run economic growth. *Journal of Commerce and Economics*, 4(2), 209-313.
- Arunnan, B., Abu, M. S. & Puaah C. (2016). The relationship between trade integration and economic growth: Case of ASEAN-5 Countries. *Global Economy Journal*, De Gruyter, 16(4), 745-768.
- Badinger, H. (2001). Growth effects of economic integration: The case of the EU member states (1950- 2000). *IEF Working Papers*, 40.
- Barro, R. and Sala-i-Martin, X. (1995). *Economic growth*. Mc Graw Hill: New-York.
- Bong, A. & Premaratne, G. (2018). Regional integration and economic growth in South Asia. *Global Business Review*, 19(6), 1-13.
- Brezigar-Masten, A., Coricelli, F. & Masten, I. (2008). Non-linear growth effects of financial development: Does financial integration matter? *Journal of International Money and Finance*, 27(2), 121-135.
- Calderon, C. & Cantu, C. (2019). Trade Integration and Growth: Evidence from Sub-Saharan Africa. *World Bank Policy Research Working Paper*, No. 8859.
- Carbaugh, J. (2004). *International economics*. Australia: Thompson Publishers.
- Claar, S. & Noelke, A. (2010). *Deep integration*. Washington, hallmark press.
- Ezzeddine, S. & Hammami, S. (2017). The effects of international financial integration on economic growth case of Tunisia. *Journal of the Knowledge Economy*, 10(2), 868-877.
- Frankel, J. & Romer, D. (1999). Does trade cause growth? *American Economic Review*, 89(3), 379-399.
- Haas, E. B. (1971). The United Nations and regionalism. *International Relations*, 3(10), 795-815.
- Hubert, E. & Satoshi, I. (2016). The evolution of industrial networks in east Asia: Stylized facts and role of trade facilitation policies. In *Production Networks and Enterprises in East Asia: Industry and Firm-level Analysis*, 2016, 113-138: Chapter 5, Springer: Japan.
- Jhinghan, M. (2012). *Modern microeconomics*. 4<sup>th</sup> edition, Vrinda publication limited.
- Tahir, M., & Khan, I. (2014). Trade openness and economic growth in the Asian region. *Journal of Chinese Economic and Foreign Trade Studies*, 7(3), 136–152.
- Te Velde, D. (2008). *Regional integration, growth and convergence: Analytical techniques and preliminary result* (World Bank Working Paper, pp. 1–30). Washington, DC: The World Bank.
- Tinta, A. A., Sarpong, D. B., Ouedraogo, I. M., Al Hassan, R., Mensah-Bonsu, A. & Onumah, E. E. (2018). Assessing the Impact of Regional Integration and International Trade on Economic Growth and Food Security in ECOWAS. *Global Journal of Management and Business Research: B Economics and Commerce*, 18(2), 33-44.
- Todaro, M.P. & Smith, S.C. (2011). *Economic development*. 11<sup>th</sup> Edition. England: Pearson Education Limited.
- UNECA, AfDB, AUC (2016). *Africa regional integration index 2016 report*. Addis Ababa: UNECA.
- Vanhoudt, P. (1999). Did the European unification induce economic growth? In *Search of Scale Effects and Persistent Changes*. *Weltwirtschaftliches Archiv*, 135(2), 193-219.
- World Bank (2019). *World development indicators*. (Accessed June 15, 2020) from <http://www.worldbankgroup.org>
- World Bank (2020). *World development indicators*. (Accessed July 20, 2020) from <http://www.worldbankgroup.org>

**Appendices**

Date: 08/16/21 Time: 14:24 Sample: 2010 2020							
	GDP	GCF	HCI	CRII	TII	FII	DVA
Mean	2.278594	21.77730	0.368796	0.415000	0.413750	0.510606	22.13231
Median	2.348033	20.82581	0.369525	0.430000	0.380000	0.645000	22.37416
Maximum	18.06517	52.41832	0.450056	0.660000	1.000000	1.000000	35.23447
Minimum	-22.18762	7.275381	0.297922	0.100000	0.000000	0.000000	3.669052
Std. Dev.	3.781823	6.561761	0.040719	0.130035	0.263529	0.347156	6.483885
Skewness	-1.487722	1.181233	0.052591	-0.413354	0.595965	-0.261392	-0.590847
Kurtosis	17.52349	6.666101	1.822845	2.729070	2.781348	1.448148	3.940091
Jarque-Bera	1208.818	104.6185	7.682163	4.162668	8.076774	14.74851	12.54096
Probability	0.000000	0.000000	0.021470	0.124764	0.017626	0.000627	0.001891
Sum	300.7744	2874.604	48.68104	54.78000	54.61500	67.40000	2921.465
Sum Sq. Dev.	1873.586	5640.429	0.217205	2.215100	9.097619	15.78775	5507.340
Observations	165	165	165	165	165	165	165

**Correlation**

	LGDP	LGCF	LHCI	LCRII	LDVA	LEXR	LFDI
LGDP	1.000000	0.020176	-0.011629	-0.062399	0.002866	-0.002828	0.170830
LGCF	0.020176	1.000000	0.194217	0.026492	0.123254	0.137506	-0.022923
LHCI	-0.011629	0.194217	1.000000	0.238576	0.200603	-0.384540	0.115395
LCRII	-0.062399	0.026492	0.238576	1.000000	0.541984	-0.530480	-0.435475
LDVA	0.002866	0.123254	0.200603	0.541984	1.000000	-0.281417	-0.317161
LEXR	-0.002828	0.137506	-0.384540	-0.530480	-0.281417	1.000000	0.012166
LFDI	0.170830	-0.022923	0.115395	-0.435475	-0.317161	0.012166	1.000000
LINS	-0.016936	-0.021567	-0.122683	-0.480912	-0.290500	-0.021950	0.280414

Dependent Variable: LGDP Method: Panel Least Squares Date: 08/18/21 Time: 02:35 Sample (adjusted): 2011 2020 Periods included: 10 Cross-sections included: 15 Total panel (balanced) observations: 165				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGDP(-1)	0.747685	0.120960	6.112527	0.0000
LGCF	-0.135687	0.379040	-0.357975	0.7215
LHCI	1.417958	1.095791	1.294005	0.2000
LCRII	-0.026799	0.443797	-0.060387	0.9520
LDVA	0.149465	0.304743	0.490463	0.6254
LEXR	0.028144	0.070642	0.398405	0.6916
LFDI	0.105007	0.130393	0.805312	0.4234
LINS	-0.061284	0.204527	-0.299639	0.7654
C	1.544171	2.061531	0.749041	0.4564
R-squared	0.521203	Mean dependent var	0.910870	
Adjusted R-squared	0.496658	S.D. dependent var	0.899559	
S.E. of regression	0.843542	Akaike info criterion	2.605752	
Sum squared resid	49.09781	Schwarz criterion	2.877680	
Log likelihood	-92.62433	Hannan-Quinn criter.	2.714610	
F-statistic	2.320782	Durbin-Watson stat	1.218734	
Prob(F-statistic)	0.028740			

Dependent Variable: LGDP Method: Panel Least Squares Date: 08/18/21 Time: 02:36 Sample (adjusted): 2011 2020 Periods included: 10 Cross-sections included: 15 Total panel (balanced) observations: 165				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGDP(-1)	0.549159	0.125988	4.351939	0.0000
LGCF	0.123912	0.383474	0.323129	0.7478
LHCI	-17.50181	4.540903	-3.854257	0.0003
LCRII	4.182141	1.259768	3.319771	0.0016
LDVA	1.528268	0.548417	2.786689	0.0072
LEXR	0.931898	0.571453	1.630752	0.1084
LFDI	0.109385	0.130075	0.840937	0.4038
LINS	-0.977745	0.331742	-2.947304	0.0046
C	-20.62765	6.788795	-3.038484	0.0036
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.543573	Mean dependent var	0.910870	
Adjusted R-squared	0.394054	S.D. dependent var	0.899559	
S.E. of regression	0.700239	Akaike info criterion	2.341766	
Sum squared resid	28.43944	Schwarz criterion	2.946050	
Log likelihood	-71.32886	Hannan-Quinn criter.	2.583672	
F-statistic	3.635475	Durbin-Watson stat	1.313452	
Prob(F-statistic)	0.000077			

Dependent Variable: LGDP Method: Panel Generalized Method of Moments Transformation: First Differences Date: 08/18/21 Time: 02:30 Sample (adjusted): 2012 2020 Periods included: 9 Cross-sections included: 15 Total panel (balanced) observations: 165 White period instrument weighting matrix White period standard errors & covariance (d.f. corrected) Instrument specification: @DYN(LGDP,-2) LGCF(-1) LHCI(-1) LCRII(-1) LDVA(-1) LEXR(-1) LFDI(-1) LINS(-1) Constant added to instrument list				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGDP(-1)	0.458897	0.160645	2.565906	0.0100
LGCF	-0.806223	9.617489	-0.083829	0.9335
LHCI	-58.03068	48.10769	-1.206266	0.2326
LCRII	6.216881	10.73437	0.579156	0.5647
LDVA	0.103659	4.412997	0.023489	0.9813
LEXR	-2.347688	7.590942	-0.309275	0.7582
LFDI	-0.203694	2.446408	-0.083262	0.9339
LINS	-7.024022	6.699144	-1.048495	0.2988
Effects Specification				
Cross-section fixed (first differences)				
Mean dependent var	-0.035435	S.D. dependent var	0.759180	
S.E. of regression	2.279883	Sum squared resid	301.4764	
J-statistic	2.285738	Instrument rank	11	
Prob(J-statistic)	0.515259			

System Residual Normality Tests				
Orthogonalization: Cholesky (Lutkepohl)				
Null Hypothesis: residuals are multivariate normal				
Date: 08/18/21 Time: 02:25				
Sample: 2012 2020				
Included observations: 117				
Component	Skewness	Chi-sq	df	Prob.
1	0.046707	0.022543	1	0.8807
2	0.509262	2.679926	1	0.1016
Joint		2.702469	2	0.2589
Component	Kurtosis	Chi-sq	df	Prob.
1	2.362897	1.048575	1	0.3058
2	2.814590	0.088807	1	0.7657
Joint		1.137382	2	0.5663
Component	Jarque-Bera	df	Prob.	
1	1.071118	2	0.5853	
2	2.768733	2	0.2505	
Joint	3.839851	4	0.4281	