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REGIONAL ECONOMIC INTEGRATION AND ECONOMIC GROWTH IN THE WEST AFRICAN MONETARY ZONE (WAMZ) COUNTRIES

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Abstract

The considerable degree of heterogeneity and economic diversifications among the countries of West African Monetary Zone (WAMZ) have led to the vulnerability of economic integration in the region. This study investigated the extent to which economic integration affected regional economic growth of the member states of WAMZ. Economic integration indexes are divided into trade and financial integration and trade integration index was further divided into export concentration and import concentration indexes. Economic growth which is the dependent variable is proxy by the growth rate of real GDP. The other variable in the model is quality of public institutions in the countries. The five variables are collected from various sources (the Penn world tables, World Bank's Governance indicators, the IMF database online and the World Bank's World Development Indicators (WDI)). The panel unit root test and cointegration test were used to test for the stationary behavior and possibility of long-term relationship among the variables. The reported models (static and dynamics) were estimated with Least Square Dummy Variables estimator and the Generalised Method of Moment estimator. The results show that there are no long-run relationships between regional economic integration and economic growth in WAMZ countries; the underlying relationships between regional economic integration and economic growth in the WAMZ can only be treated in short-term policy frameworks. It was equally found out that the countries of the WAMZ region tend to follow the demand-leading hypothesis since imports are more concentrated than exports and that the relationships among the six countries are heterogeneous, making it difficult for regional economic integration to facilitate economic growth in the region in the long-term. Based on these findings, the study recommends that: there should be an increase and strengthening of financial integration among WAMZ countries; the productive areas of member countries of WAMZ should be diversified in order to improve trade and corruption should be eradicated as a possible measure of making economic integration beneficial to member countries of WAMZ.

Keywords: Real GDP, financial integration, Trade integration, export concentration index and import concentration index

1. Introduction

Achieving deeper trade integration, through the elimination of tariff and non-tariff barriers is an important aspect of the efforts to foster policy cooperation and coordination of fiscal and monetary policies in member states to ensure greater economic integration among member states (Lopez-Cordova & Moreira, 2003). The Economic Community of West African States (ECOWAS) had made some progress towards the establishment of an Economic and Monetary Union over the years, however, the region is still characterized by marked structural divergence, low level of financial markets development, limited degree of economic diversification, reflected

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in the excessive dependence on commodity exports and strategic imports. Until the recent commodity price shock in mid-2014, most countries in the WAMZ recorded impressive growth rates over the years. The Nigerian economy, the largest economy in ECOWAS grew by 0.8 percent in 2017 after battling with recession from 2015 to early 2017. Other countries recorded relatively robust growth rates, with Ghana recording a growth rate of 5.9 percent, Sierra Leone 6 percent, Liberia 2.6 percent, the Gambia 3 percent, Ivory Coast 7.6 percent, Togo 5.0 percent and Senegal 6.8 percent. Given the limited degree of economic diversification in the region and heavy reliance on strategic imports, one would argue that the WAMZ member countries' economies are highly vulnerable to external shocks. Apart from The Gambia, other countries in the WAMZ (Ghana, Guinea, Liberia, Nigeria and Sierra Leone) are vulnerable to terms of trade shocks. There is considerable heterogeneity in the degree of vulnerability across these countries depending on the extent of economic diversification. The Export Concentration Index developed by the World Bank (2016) reveals that there is considerable heterogeneity across countries, with Nigeria recording an index of 0.73, Sierra Leone (0.66), Ghana (0.43), Liberia (0.33), and The Gambia (0.35). Moreover, intra-WAMZ trade flow was considerably low at 0.3 percent of GDP, declining from 0.7 percent of GDP in 2016, mainly due to recession in Nigeria in 2016. This low level of intra-WAMZ trade further reinforces the excessive dependence on external trade to accelerate growth in the WAMZ. Moreover, economic growth in the WAMZ is generally not inclusive, which continues to pose significant challenges for member states to alleviate poverty in the region.

Despite the various empirical efforts and policies made in the past on assessing the impact of regional economic integration on economic growth, it is still not clear how the various structural reforms adopted to promote trade and financial integration could affect productivity and economic growth in the WAMZ member states. Hence this paper attempts to resolve the problem by examining the effect of economic integration on economic growth in WAMZ member countries over the period 2001 - 2017. We shall continue our investigation by reviewing relevant literature, follow by outlining the methodology adopted to achieve the purpose of the study, results and discussion, concluding remarks and recommendations.

II. Literature Review

(a) Profile of West African Economy

The agriculture sector is crux to food security and broad-based economic growth target, occupying about 36% of the region's GDP and 60% of the active labour force. Agricultural exports generate around USD 6 billion annually, or 16.3% of all products and services exported from the sub-region. Nevertheless, the sector remains constrained by low productivity and major environmental challenges. A 25% decline in rainfall over the last 50 years has had serious consequences for dryland areas. Per-hectare yields for most crops are among the lowest in the world, only increasing by an average of 42% between 1980 and 2016, and accounting for just 30% of the increase in agricultural and food production. West Africa's agricultural production performance over the past 30 years has been mixed. In general, production of basic food staples has shown the highest increase per capita. Some crop and livestock products with the most dynamic markets, such as meat, dairy products, rice and vegetable oils, grew much less and were

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not able to meet increasing demand. Maize, yams, cassava and cowpeas exhibited the strongest growth (3% per capita per year and above), followed by oil crops and vegetables, at annual per capita growth rates of 1% to 2%. Per capita production of millet, sorghum, rice and fruits increased by less than 1% annually for the region as a whole, while that of meat, milk and sugarcane actually declined over the last thirty years. Agriculture's share of GDP is only slightly above that of East Asia, the Middle East, and North Africa, although the latter regions have per capita incomes that are three times higher than that of sub-Saharan African countries (Badiane, 2016).

The production base of West African countries is globally weak, characterized by obsolete capital and facilities, and the region is one of the least integrated into the global value chains (GVCs), particularly for processing activities as highlighted in the 2014 African Economic Outlook. This situation is a consequence of the industrial crisis that followed the tariff barriers from the 1980s, and the wars and conflicts that occurred in several countries in the region.

Manufacturing, which has been the key driver of growth and structural transformation in Asia, has underperformed in West Africa. More importantly, the share of the industrial sector in GDP only increased in 7 of the 15 countries between the 1980s and the 2000s and remains, on average, at 23%. Within the sector, the main growth drivers have been extractive industries - mining and oil - which are capital-intensive but generate little employment. According to UNIDO and UNCATD (2011), the share of manufacturing in GDP declined from 13% in 1972 to 5% in 2016 for the region as a whole. In 2014, the rebasing of Nigerian GDP revealed that the country was actually experiencing an industrial renewal. With the new computations, the share of manufacturing industries in GDP sharply increased from 2.4% in 2008 to 9% in 2015. Given the predominance of the Nigerian economy in the West African region, these recent developments reflect an increased contribution of non-extractive industries in the entire region. With Nigeria, the share of manufacturing industry in the regional GDP increased from 5.9% in 2005 to nearly 9% in 2015. However, when excluding Nigeria, that share decreased from 11.2% to 8.5% over the same period.

According to official statistics, the services sector continues to dominate the economy, accounting for 42% of GDP on average during 2000-09 for the ECOWAS countries, followed by agriculture (36%) and industry (23%). The share of the services sector is higher than that seen in other developing regions, taking into account differences in per capita income. For example, the average share of the services sector in West Africa is only slightly lower than in Latin America, which has an average per capita income that is nearly eight times higher. While the growth of the services sector has been driven to some extent by the recent dynamism in finance, telecommunications and tourism, the dominant trend has been the growth of the informal economy.

(b) Empirical Literature

A few studies have investigated the indirect effect of financial integration on economic growth through its influence on productivity growth. Gehringer (2013) employed two measures of financial openness as proxy for financial integration: using the IMF data on Exchange Arrangements and Exchange Restrictions to construct an index of financial integration using

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principal components analysis, and a second measure computed as the ratio of stock of total liabilities to GDP. The study finds that financial openness has a strong positive effect on economic growth, productivity growth and capital accumulation. At the micro level, the evidence suggests a similarly mixed picture on the effect of financial integration on productivity. For example, Lopez-Cordova & Moreira (2003) illustrate that the presence of foreign firms have had a significant impact on their buyers and sellers in Mexico. The situation is however different in Brazil which reveals an insignificant overall impact on productivity levels and negative effect on productivity growth. Other scholars find evidence suggesting that the presence of foreign firms in host countries can generate technology spillovers (e.g. Javorcik, 2004). In a similar vein, Gehringer (2015) find positive productivity effects of financial integration. However, there are differences in productivity effects between the manufacturing and services sectors.

One problem overlooked in the above studies is the fact that the relationship between financial integration and productivity and economic growth may not be linear as assumed but could also depend on the quality of institutions and level of development. A few studies have echoed this view, and the findings generally suggest that the growth effects could depend on the level of development of financial markets. Masten et al. (2008) have utilized a threshold modelling technique to determine whether there are nonlinearity and threshold effects of financial development and international financial integration on economic growth. The study shows significant nonlinear effects and illustrates that the effect of financial integration depends on the level of financial development. Coulibaly (2015) arrives at the same conclusion, using the panel smooth transition regression approach for a sample of sub-Saharan Africa countries. This study illustrates that the marginal effect of financial integration on growth depends on the level of financial development, the quality of institutions and degree of trade openness. While Ibrahim et al. (2016) find a positive effect of financial integration on economic growth, the relationship does not hold true in countries with low levels of development and in highly developed countries. The authors underscore the view expressed by previous studies that domestic absorption capacity is important to enable countries gain from financial market integration.

At the macro-level, there is evidence suggesting the positive effect of trade integration on productivity growth. For example, Dabla-Norris et al. (2015) use aggregate productivity growth data to investigate the effects of structural reforms on productivity growth. The study finds that trade liberalization accelerates productivity growth in the lower income countries. At the firm level, the study by the ECB (2017) uses a panel fixed effects model on a sample of 13 manufacturing industries to explore the effect of international trade, through the imports and exports channels and global value chains related trade on productivity in 40 countries (advanced and emerging countries). The results show strong positive effect of international trade on labour productivity. Similarly, Lopez-Cordova & Moreira (2003) finds strong trade related gains especially through imports.

On economic integration and the influence of per capita income in the economic Community of West Africa State, Jones (2014) examined the impact of economic integration on the convergence of ECOWAS per capita income. The study adopted cross sectional data and time series analysis with some econometric pre and post data test. The result indicated that ECOWAS

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as a form of convergence body, there is high tendency for income per head to converge and boost the level of income within the member states. This led Jones (2014) to ends his statement that member states should put a good fight, in term of policy formulation and implementation in solidifying the body as its positive outcomes are well felt among the members. In support of Jones' work, Anyanwu (2015) researching on the benefit of integration on trade and output on two Africa bodies namely WAEMU (West African Economic and Monetary Union) and ECOWAS (Economic Community of West African States). The postulated outcome is that monetary union has positive influence on bilateral trade and output (economic growth). The suggestions and recommendations made by the author is that there is great need to improve fiscal discipline, price stability and intra-trade agreement among the members.

There is no general consensus in the empirical evidence on the influence of financial integration on growth. For example, (Bekaert et al., 2005; De Nicolo & Juvenal, 2014; Henry, 2000; Klein & Olivei, 2008; Vithessonthi & Tongurai 2012) documented evidence exist that there a positive relationship between financial integration and growth rate. Conversely, negative relationships were recorded between financial integration and growth level from works done by (Ahmed, 2013, 2016; Gourinchas & Jeanne, 2013). Moreover, other studies cited insignificant relationship between financial integration and economic progress in some economies such studies are (Edison et al., 2002; Grilli & Milesi-Ferretti, 1995; Ahmed and Mmolainyane 2015).

In summary, the economic literature shows a strong positive effect of trade and financial integration on productivity and economic growth. However, it further suggests the need to explore possible nonlinearities and determine whether threshold effects of financial integration that depend on some measures of domestic absorption capacity such as the level of financial development. There is scarce evidence on how trade policies contribute to productivity improvements.

III. Methodology

The theoretical underpinning for this study is the endogenous growth model. Unlike the neoclassical growth literature which assumes an exogenous technical progress, the endogenous growth theory endogenizes technical progress to explain the drivers of long-term economic growth. Within this theory, Rivera-Batiz and Romer (1991) illustrates that the growth effects of economic integration would stem from expansion of the size of the market. In particular, through the trade and financial channels, regional economic integration can influence long-run rate of growth through learning–by-doing and innovation gains (Lopez-Cordova and Moreira, 2003). Similarly, Young (1991) considers an endogenous growth model that explains improvements in productivity through learning by doing, which assumes that productivity gains generated by learning can potentially spill over across sectors in the economy. Another potential mechanism through which trade improves productivity and economic growth is via innovation gains generated from foreign trade. It is argued that foreign trade facilitates the flow of technology knowledge, which accelerates innovation and promotes productivity and growth (Grossman and Helpman, 1991; Grossman and Helpman, 1994).

A second channel through which economic integration could influence productivity or long-run growth is through increased financial integration. Ibrahim et al (2016) stresses three channels

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through which international financial integration could stimulate economic growth. First, international financial integration improves global capital allocated efficiency through the flow of financial resources, which are directed to the most productive investment opportunities, which ultimately promotes economic growth. Financial capital liberalization could enhance productivity through increased inflow of foreign capital, which mitigates financial constraints inherent in most countries and provide valuable resources that recipient countries can channel into productive investments (Acemoglu & Zibibotti, 1997; Gehringer, 2014).

Given these theoretical arguments, the study specifies a growth model that hinges on trade, financial integration and quality of institutions of WAMZ member countries based on five variables collected across six countries for seventeen (17) years. The variables/proxies are growth rate of GDP (PCR_{it}) of the six countries, Global Competitive Index (GCI_{it}), Financial Market Development (FSE_{it}), Export Concentration Index (ECI_{it}) and Import Concentration Index (ICI_{it}). The function relationship of the variables/proxies is as follow;

$$PCR_{it} = f(GCI_{it}, FSE_{it}, ECI_{it}, ICI_{it}) \quad (1)$$

For precision the model is stated in static and dynamic specifications. The static model is divided into two specifications enabling us to account for heterogeneity and homogeneity in the model. The fixed effect specification is used to account for the homogeneity inherent in the variables/proxies and the random effect specification is used to account for the heterogeneity inherent in the variables/proxies.

Random Effect Specification

Pooled Regression Model

$$Y_{i,t} = X'_{i,t}\beta + \delta + \mu_i + \pi_{i,t} \quad (2)$$

Where

$Y_{i,t}$ is vector of dependent variable (PCR_{it}); $X'_{i,t}$ is matrix of independent variables (GCI_{it}, $FSE_{it}, ECI_{it}, ICI_{it}$); δ is the common intercept across countries and the disturbance term is $\varepsilon_{i,t} = \mu_i + \pi_{i,t}$. Model (2) is sometime called error component model because the $\varepsilon_{i,t}$ term is decomposed. The random individual differences are separated into two parts: the fixed part, δ, represent the population average and μ_i represent the random difference, or called random effect. μ_i is the random heterogeneity specific to the cross-section information or observation (country effect) which is independent of time (constant through time). Unlike the model (3) (fixed effect model), the number of parameters to be estimated is reduced.

The major assumption of model (2) is that $\mu_i \neq X'_{i,t}$ (Olubusoye, Salisu, & Olufin, 2015).

Fixed Effect Model

$$Y_{i,t} = X'_{i,t}\beta + \varepsilon_{i,t} \quad (3)$$

$$\varepsilon_{i,t} = \alpha_i + \gamma_t + \eta_{it} \quad (4)$$

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Where: α_i is the unobserved cross sectional specific effects;
γ_t is the unobserved time specific effects; η_{it} is the common cross section time series effect
$Y_{i,t}$ is the dependent variable in the models; $X'_{i,t}$ is the matrix of the independent variables and control variables in the models; The major assumption of model (3) that is $\mu_i = X'_{i,t}$. That is all behavioural difference between individual, referred to individual heterogeneity, and are assumed to be captured by the intercept. That is the individual effects or intercept are treated as variables since it accounts for the difference among countries, (Olubusoye, Salisu, & Olufin, 2015).

Dynamic Specification

The dynamic specification is characterized by the introduction of the lag of the dependent variable (catch-up effect or the previous information of productivity growth) into the static model. The introduction of the lag of the dependent variable into the model will result in the prevalence of autocorrelation ($y_{i,t} = \omega_{i,t}$ whereas we expected $y_{i,t} \neq \omega_{i,t}$) and the unobserved mean effects as well as interaction effects characterizing the heterogeneity among the units, Applying the estimators of equation (2) and (3) will yield bias estimate and inconsistent parameter even if the $\omega_{i,t}$ is serially correlated, (Baltagi, 2008). To upend for the scenario painted above and then estimated the dynamic behaviour of economic relationship among the variables/proxies employed in this study, the panel dynamic model is casted as follow

$$y_{i,t} = \delta y_{i,t-1} + X'_{i,t}\beta + \mu_i + \omega_{i,t} \qquad (4)$$

Equation (4) follows the work of Arellano and Bond (1991) Generalized Methods of Moment (GMM) also called the difference GMM and Blundell-Bond (1998) system GMM.

IV. Results

Table 1: Descriptive Statistics

	PCR	FSE	ECI	ICI	GCI
Mean	4.33	7.70	0.50	0.25	25.35
Median	4.83	7.07	0.45	0.15	22.01
Maximum	26.42	20.16	0.88	0.86	59.33
Minimum	-31.33	1.08	0.19	0.059	0.51
Std. Dev.	6.35	4.44	0.19	0.23	15.46
Skewness	-1.739	0.64	0.57	1.48	0.73
Kurtosis	14.73	2.76	2.27	3.86	2.56
Jarque-Bera	635.89	7.25	7.78	40.29	9.98
Probability	0.00	0.03	0.02	0.00	0.01
Observations	102	102	102	102	102

Source: Authors computation estimated from Eview 9.0

The summary statistics for the descriptive analysis of the five variables in the panel framework is presented on Table 1. The statistics presented are the mean, median, maximum and minimum values of the variables, the standard deviation, measures of skewness and kurtosis and the test statistics form of normal distribution. The results show that the average or mean growth rates for

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national output, financial indicator, export concentration indicator, import concentration indicator and global competitive indicator for the six countries are 4.33, 7.70, 0.50, 0.25 and 25.35, respectively. The 4.33 growth rates imply that the economic output of the region grew significantly from 2001 and 2017. Financial system efficiency or soundness of contribution to total output of the region is very weak as it averages only about 7.70% within 17 years. The value of exported products of the region are highly concentrated to fewer goods while imports are concentrated on more products and partners. The indices revealed that trade and financial integration within the region are below average. The reported Jarque-Bera statistics and probability suggests that the rejection of the normal distribution hypothesis, implying that none of the series in the panel framework is normally distributed. As such, there is a need to the test for stability or the stationary properties of the variables with a more robust model to ascertain their stability level.

Table 2: Panel Unit Root Test

Part I: Levin, Lin & Chu				**Part II: Im, Pesaran and Shin**		
Series	**Computed Val.**		**Order**	**Computed Val.**		**Order**
	Level	**1st-Diff.**	**I(d)**	**Level**	**1st-Diff.**	**I(d)**
PCR_{it}	2.6206***	2.4199***	I(0)	0.5314	4.0925***	I(0)
FSE_{it}	1.9940**	2.1667**	I(0)	1.3289*	3.8278***	I(1)
ECI_{it}	1.8456**	9.1612***	I(0)	1.0845	9.3372***	I(1)
ICI_{it}	0.1203	6.9176***	I(1)	0.5993	7.9083***	I(1)
GCI_{it}	1.0822	4.3472***	I(1)	0.5522	4.5241***	I(0)

Part III: Intermediate ADF test results						
	GAM	**GHA**	**GUI**	**LIB**	**NIG**	**SRL**
PCR_{it}	I(1)	I(1)	I(2)	I(0)	I(2)	I(1)
FSE_{it}	I(2)	I(1)	I(0)	I(1)	I(1)	I(1)
ECI_{it}	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)
ICI_{it}	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)
GCI_{it}	I(2)	I(1)	I(1)	I(1)	I(1)	I(1)

Source: Estimated from Eview 9.0

The unit root test is reported on table 2. The table is divided into three parts; part one is the unit roots results from Levin, Lin & Chu group test, part two is the summary statistics from Im, Pesaran & Shin group test and part three is the individual unit root test from Im, Pesaran & Shin method. The result from the three test methods are considered because none of them is free from errors. In other words, since all these approaches have their limitations, when they are combined in a single study, one can get additional comfort from any decision reached. The null hypothesis in all three cases tests states that the series or variables have unit root, (i.e., common unit root process for part I & II and individual unit process for part I). Results from the three different approaches are conflicting, although they reveal broad patterns in the stationarity or otherwise of the series. The results imply that output growth, financial integration index and export

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concentration index are stable/stationary (no unit root or I(1)) in the common unit root process, however Im, Pesaran & Shin could not verify the results on financial integration index, export concentration index and global competitive index. The variables in the group unit root process have mixed order of integration (I(0) and I(1)), and not verified by the alternative test in some cases. The individual unit processes show a somewhat different conclusion as expected. All the variables in Sierra Leone and Ghana have unit root (I(1), processes). Liberia's output growth does not exhibit any unit root properties while FSE, ECI, ICI and GCI all have unit roots, (I(0) and I(1) unit root processes in Liberia). In the Gambia, Guinea and Nigeria some of the variables have I(0), I(1) and I(2) unit processes. However, FSE in Guinea is stable and PCR in Nigeria and Liberia, FSE and GCI in the Gambia is very unstable I(2) unit root processes. The conclusion here is that the variables in the WAMZ are not stable or have unit roots, since most of the test results are not verifiable by the alternative test method employed. However, there is need to test whether there is any possible long-term relationship (cointegration) among them or whether they can co-integrate in the long-run. One suggestion to overcoming the cointegration observed in the datasets, could be the use of differencing. However, this approach could result in the loss of important statistical information in the dataset.

Table 3: Results of Cointegration Analysis

Pedroni-Panel-Cointegration-Test (Within-dimension)							
Panel-Stats,	**Statistic**	**Prob.**	**Statistic**	**Prob.**	**Group-Stat.**	**Statistic**	**Prob.**
Panel-V	-0.688	0.753	-0.812	0.792	**Group-Rho**	2.579	0.9950
Panel-Rho	1.241	0.893	1.545	0.939	**Group-PP**	1.603	0.9456
Panel-PP	-0.625	0.266	1.184	0.882	**Group-ADF**	0.247	0.5976
Panel-ADF	-0.920	0.179	0.199	0.579			

Source: Estimated from Eview 9.0

The cointegration result is reported in table 3, The methods used for unit roots processes could not establish a sound argument of no unit roots. However, the results are not useless since economic variables that are not stationary tend to be cointegrated, (Demetriades and Hussein, 1996; Waqabaca, 2004 and Iyke, 2013). Equally, several studies have shown cointegration relationships among none stationary series (Luintel & Khan, 1999; Agbetsiafa, 2004; and Odhiambo, 2008). Results on table 3 established implies the absence of any cointegration relationship (no possibility of long-run relationship) between the variables in our panel framework for the WAMZ countries. This conclusion clearly visible in Table 3, which suggests that we could cannot fail to reject the null hypothesis of no cointegration in our variables.

Test for Estimators

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Table 4: Pooled Regression Model

Variable	Coefficient		Prob.	
C_{it}	3.249618***		0.0000	
FSE_{it}	0.089189***		0.0000	
ECI_{it}	1.520933***		0.0000	
ICI_{it}	-1.404091**		0.0000	
GCI_{it}	-0.0014302		0.617	
R^2	0.7550	F-statistic	101.09 (0.0000)	
Adj_R^2	0.7450	Durbin-Watson		2.0279142

Source: Estimated from STATA 13.0

Table 4, presents the results from the pooled regression estimates using Ordinary Least Square (OLS), with an intercept term. The reported diagnostic properties of the model are very impressive with a very high R^2 as well as the adjusted R^2, F-Statistics is highly significant suggesting that all the variables are jointly significant and the residual free from the 1st Markov autocorrelation. The coefficients are equally very impressive as all the variables are correctly signed and statistically significant. The acceptability of the model will be ascertained by the levene, (1960) robust test statistics of constant variance in the error across the six countries (Null Hypothesis: Variance across are the same or equal). The levene's robust test statistic is reported in table 5. The coefficient on measure of financial integration and export concentration index are positive and statistically significant over all levels. The coefficient on import concentration index is negative and significant. These suggest that these variables significantly affect output growth.

Table 5: Summary Statistics for test of pooled Regression

Code	Mean	Std. Dev.	Freq.	Test Statistics	
101≡GAM	-0.5652	0.2291	23	W0=6.2143 df(5, 123)	Pr>F=0.0000
102≡GHA	0.2943	0.3196	23		
103≡GUI	0.1293	0.1754	23		
104≡LIB	-0.6561	0.2587	23	W50=5.7974 df(5, 123)	Pr>F=0.0000
105≡NIG	0.1481	0.4015	23		
106≡SRL	0.0592	0.2788	23		
Total	2.060e-16	0.3935	138	W10=6.0569 df(5, 123)	Pr>F=0.0000

Source: Estimated from STATA 13.0

There are three statistics (W0, W50 and W10) reported on table 5. W0 is Levene's robust test statistics, W50 is Brown & Forsythe (1974) Statistics replacing the Levene' test statistic (trimmed mean) and W10 is the alternative statistics replacing the 10% trimmed mean. A review of the three statistics suggests that the model as currently specified is inadequate, as it does not account for unobserved factors or country specific factors that might affect economic growth. The hypothesis of equality of variance is soundly rejected in all the robvar statistics. It is clear

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that there is need for an estimator that can take into account the heterogeneous properties of the six counties in the WAMZ in the model.

Table 6: Test Random Effects and Fixed Effects Estimators

Variable	**Coefficient**	**Prob.**
101-GAM	3.2962***	0.0000
102-GHA	4.4048***	0.0000
103-GUI	4.1645***	0.0000
104-LIB	3.1592***	0.0000
105-NIG	5.0433**	0.0000
106-SRL	3.6706***	0.0000
FSE_{it}	0.0492***	0.0000
ECI_{it}	-0.1091**	0.0250
ICI_{it}	0.0472**	0.0130
GCI_{it}	0.0006	0.7030
Model Diagnostic		
R^2	0.9983	**F-statistic** 7364.09 (0.0000)
Adj_R^2	0.9981	**Durbin-Watson** 2.00092
Test Statistics		
F(6, 128) =	535.23	$\boldsymbol{Prob} > F = 0.0000$

Source: Estimated from STATA 13.0

The result presented on table 6 was estimated with the Least Square Dummy Variable (LSDV) estimator using the "*ibn command"* in STATA, in addition, we conduct a Baltiga (2001) test on the intercept term to check for the existence of heterogeneity on the coefficients. The null hypothesis of the test is that the intercept coefficients (parameters) for all the six countries are equal or the same (that is, the countries estimated intercept parameters are homogenous). The results are presented in Table 6. From Table 6, we reject the null hypothesis of equality of coefficients on the country specific intercept terms, which implies that the intercept coefficients are unequal or heterogeneous. It implies that the six countries possess uneven socio-economic characteristics and as such they should be estimated with the fixed effect estimator, the Least Square Dummy Variable (LSDV) estimator (that is, the data from the six countries should not be pooled into a single equation and estimated with a common intercept parameter). The difference between the Baltiga (2001) test and the Hausman test statistic is that, the Hausman test is used to contrast the complete set of common estimates. That is, to carry out a test of joint hypothesis comparing all coefficients except the intercept whereas the Baltiga test is used to test for homogeneity of the intercept.

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The Models Result

Table 7: Summary of Fixed, Random Effect and the Dynamic Models

	FE –Model (A)		RE-Model (B)		Dynamic Model (C)	
Variable	**Coeff.**	**Prob.**	**Coeff.**	**Prob.**	**Coeff.**	**Prob.**
PCR_{it-1}					1.1506***	0.0000
FSE_{it}	0.049***	0.000	0.051***	0.000	0.0017***	0.0000
ECI_{it}	-0.109	0.475	-0.057	0.714	-0.1227***	0.0096
ICI_{it}	0.472	0.833	-0.080	0.716	-0.0830	0.4155
GCI_{it}	0.001	0.703	0.001	0.820	-0.0018**	0.0465
C	3.956***	0.000	17.95***	0.000		
Models Diagnostic Checks						
R^2	0.5390		0.6510			
F-Statistics	27.31***		107.85***			
$H-Test$	12.67 [0.0130]					
Hansen J-Test					1.3111 [0.2522]	
observations	138		138		126	
Countries	6		6		6	

Source: Estimated from STATA 13.0 and E-view 9.0

Table 7 reports the summary statistics of the static (Fixed and Random) and the dynamic panel models for regional economic integration and economic growths in six countries of West Africa Monetary Zone from 2001 to 2017. XXXX*** and XXXX** denotes the coefficients estimated is statistically significant at either 0.01 or 0.05 level respectively. However, the benchmark level of significance allowed for this study is 0.05 or less, (i.e., XXXX≤0.05). The table has three columns. The first column (A) reports the statistics from the fixed effects estimator; column (B) reports the statistics from the random effect estimator and column three (C) reports the statistics from the dynamic model estimator. The statistics reported at the bottom (Diagnostic checks) are the R-Square (R^2) for models in column (A) and (B), the R-square is not reported for the dynamic estimations of panel frameworks; the programmes used in the estimator do not report the R-square (Arellano & Bond, 1991; Davidson & Mackinnon, 2004; and Bun & Windmeijer, 2009). H-test is the report of the spirited Hausman Statistics (the statistic is used to select the model coefficients that perfumed efficiently (except the coefficients of the intercepts in a static panel framework). The Hansen J-Test is the test for overuse/the efficiency of the use of instruments in the dynamic model.

Decision Rule: At a given level of degree of freedom $(df(5,23))$ the null hypothesis (Ho) is rejected if the probability values computed for$X^2_{0.05}$ is less than or equal to 0.05 level (i.e., P-value ≤ 0.05).

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The H-test statistics reported in table 7 allowed for the rejection of the null hypothesis. That is, the estimated coefficients from the "fixed effect" estimator are consistent and efficient than the estimates from the "random effect" estimator. The conclusion reached here is in line with the results reported in the Baltiga (2001) coefficients in tables 6. The analysis supported the arguments that the estimated coefficients for the variables (FSE, ECI, ICI and GCI) and intercept from the fixed effect estimator is consistent and more efficient than the estimates from the Maximum Likelihood estimator. Thus, the explanation of the effects of regional economic integration on economic growth in this study is anchored on the static model reported on column (A) in table 7. We observe from table 7 (A) that while the R-square for the static model is 0.5390, implying that 53.90% of the index of financial market development (financial system development or efficiency), index of export concentration, index of import concentration and quality of the institutions in the six countries of WAMZ region accounted for the changes in economic growth of the monetary zones in the model, the remaining 46.10% are explained by factors outside this model, but are accounted for by the error term. The statistics shows that the model is strong in explaining regional economic integration and economic growth among the WAMZ countries. The extracted fisher ratio (F-Statistics) equally supported the substantiality of the overall model at the given level of significance.

The results from cointegration test in table 3 necessitated the estimation of the dynamic model. The cointegrating relationship revealed that there is no possibility of long-term relationship between regional integration indexes (financial and trade integration indexes) and economic growths among the countries in the WAMZ region selected for this study for the period of 2001 to 2017. Hence, there is need to concentrate on the dynamic or short-term effect of the integration indexes on economic growth. The dynamic model is reported in column (C) on table 7. The model is dynamic because we included previous information about the variables (Catch-up effects) in the model either as extremely exogenous or as instruments, (the instruments used are the past information about the variables employed). The Hansen J-Test statistics supported the efficiency or the use of the instrument.

V. Results and Findings

The results of the one period lag of economic growth (Catch-Up effects) in the dynamic model show a 1% significant cluster effects of lagged dependent variable (see column C on table 7) reflecting the strength of the effect. This means that output growth of the region internally stimulated itself to further output growth (no exogenous factors). The results could also imply that it perpetuates itself relatively and attracts further growth since investors locate their new investment next to other. See Moses & Godbertha (2012) and Krugell (2005).

The study found that index of financial integration is positively related to output growth in both the static and dynamic models. The parameter is highly significant which implies that financial integration has a strong implication on regional economic growth of the WAMZ economies. However, the nature of elasticity is perfectly inelastic (one per cent improvement in the index of integration of the financial system of the six countries will lead to minor improvement in economic growth of the region). The result is in line with the observation on the contribution of financial sector efficiency to output levels of the six countries. The summary statistics on table 5 shows a staggering 7percentage financial sector contribution to output growth of the region. The

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result is in line with theories, which state that stronger financial integration will enhance positive regional economic integration and economic growth. The finding is also in line with results reported elsewhere in the empirical literature by the following: (Cuaresma et al 2008; Klein & Olivei, 2008; Masten et al., 2008; Kamau 2010; Sen et al, 2010; Gehringer 2013; Conti 2014; Gehringer 2015; Coulibaly, 2015; and Ibrahim et al., 2016) which points to a positive relationship between various financial integration indexes and regional economic growth. Empirical evidence from studies looking at integration in the European region show stronger implications of financial integration on economic growth of the region. Most of the magnitudes from the models on the European studies are elastic and fairly inelastic, demonstrating the soundness of financial systems of the individual economies in the region, (Cuaresma et al 2008; Conti 2014 and Kalaitzoglou & Durgheu (2016). However, Gehringer (2013) and Kalaitzoglou & Durgheu (2016) insisted that the positive effects of financial integration index on regional outputs of the EU are indirect. Masten et al. (2008) and Coulibaly (2015) studies argued a nonlinear effect of financial integration indexes on economic growth in Africa, unlike the studies in EU, they observed an inelastic coefficient as Africa's and traced it to the underdeveloped financial markets of majority of the African economies. The results obtained here only demonstrate the potentialities of financial integration on improving the output growth of the WAMZ economies, but it can only be achieved by a strong financial markets development in the individual countries. The studies have shown that the glorious story in the European economic integrations is the soundness of the individual countries financial market.

The index of trade integration was divided into export concentration index and import concentration index. Theoretically, it is expected that improvement in both indices of the regional economies will improve the economic output of the region because of the attendant reduction in trade barriers and improvement in market access. The direction and magnitude of export concentration is negative across the three model specifications, suggesting that increases in export concentration index decreases the economic growth of member countries. The result is counterintuitive, however, only the estimates from the dynamic model is significant, which suggests that the results for the export concentration is not stable. The magnitude and direction of import concentration index on economic growth from the model is not consistent across the three model specifications, and they are all insignificant. The fixed effects estimator suggests that improvements in the import concentration index will increase economic growth of member countries, while the random effects and dynamic specifications suggest otherwise.

While it is not possible to infer a clear impact of the effect of two indices on economic growth of member countries, the implications of both trade integration indexes was unobserved in the long-term (static model). The negative relationship could be due to the fact that the countries in the region are mono-product exporters of goods and services which has significant effect on the growth of the region, especially in the short-period. This study is of different opinion from other studies (Anyanwu, 2015; Mevel et al, 2016 and Baier et al. 2017). These scholars found a strong positive relationship between trade index and economic integration in West Africa, North Africa and in the East Africa economic regions. However, the trade proxies employed in these studies were computed differently from the present study. Some of the studies used the degree of openness as proxy of trade integration index, whereas others used the monetary values of imports

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and exports as the proxies of trade integration index. This may have implications on their models leading to the strong positive relationship observed in their study in the long-term.

The indicator used for global competitive index (GCI) is corruption perception in public institutions of the six countries. As previously explained in section three, countries should aim to have higher levels of GCI because the ideal state is close to the frontier which is the value of 100. The estimated coefficients for GCI is not consistent across the three model specifications, while it is positive, small and inconsistent in the two panel regression models, the coefficient in the dynamic model is significant and negative. Which points to the idea that the two general model specifications are measuring different things. It is possible that GCI coefficient in the dynamic model is measuring index of corruption in which case, we should expect a negative coefficient of GCI with respect to economic growth. Theoretically, we expect that as the rank of corruption index reduces economic growth of the region should increase. The result shows that a percentage decrease in the index of corruption increases economic output of the region with less than a percentage (0.0018). The elasticity of contribution of the index to the growth economic output is perfectly inelastic (that is so small to be noticed). Although the scenario in the static model is different in terms of sign and probability (the impact of global competitive index is statistically weak but positively impacted on the growth of economic output in West Africa Monetary Zone for the period of analysis). The results indicate that the institutions in the selected African countries for this study are less developed and less competitive causing growth rates of economic output to be slow in the region. It was equally observed, that the conditions of the institutions, especially public institutions in The Gambia, Ghana, Guinea, Liberia, Nigeria and Sierra Leone have contributed to the growth of their individual economies as well as the overall growth of the regional economy. The result in turn deviated from the findings of Schonfelder & Wagner (2015) which argued that institutional development accelerated economic growth among the regional economies of Europe; the reverse is the case in WAMZ economic region.

Vi. Concluding Remarks

The findings show that there are no long-run relationships between regional economic integration and economic growth in WAMZ countries; these imply that the underlying relationships between regional economic integration and economic growth in the WAMZ can only be treated in short-term policy frameworks. The paper also concludes that the countries of the WAMZ region tend to follow the demand-leading hypothesis since imports are more concentrated than exports and that the relationships among the six countries are heterogeneous, making it difficult for regional economic integration to facilitate economic growth in the region in the long-term. Based on these findings, the study recommends: an increase and strengthening of financial integration among WAMZ countries; the diversified of productive activities in WAMZ countries in order to improve trade and growth and not just the declaration of war against corruption but a complete eradication of the menace in order to attract more investment, promote trade and make economic integration beneficial to member countries of WAMZ.

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