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RESEARCH PAPER

Foreign Direct Investment, Financial Development and Growth Convergence in ECOWAS

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Abstract
This study examines the tendency of low-income economies in ECOWAS to converge with their high-income neighbors. It extends the frontier of knowledge by ascertaining how quickly financial development (FD) and foreign direct investment (FDI) would stimulate growth, causing low-income ECOWAS member states to catch up. Also, the required threshold for FD and FDI required to facilitate convergence were computed. To achieve the above, fifteen ECOWAS member states were examined within the period 1990 to 2017 using panel data obtained from the World Development Indicators (WDI) 2018 database. The Fully Modified Ordinary Least Square (FMOLS) technique of analysis was utilized and the study found an absence of conditional convergence among ECOWAS member countries. More so, the FD-FDI threshold level required to aid conditional convergence is 22.8% and 3.77% respectively. Therefore to ensure convergence, the study recommends that low-income member states must thrive to attract FDI and seamless credit to the private sector.
Keywords: Conditional Convergence, Financial Development, Foreign Direct Investment, Fully Modified OLS (FMOLS), Growth Rate.
JEL Classification: F15, F21, F36.

Introduction

Convergence among countries with substantial miscellany as in the case of Africa presents an opportunity for least developed countries to catch up. In line with the above, it has been argued in the literature that poorer countries on the continent, regions, and sub-regions could attain levels of growth and development that may reduce these gaps (Barro and Sala-I-Martins, 1997). For instance, economies have recognized the fact that they cannot attain economic union prestige unless there is sustainable macroeconomic convergence (Wolassa, 2011). This is comprised of actions aimed at stimulating strategies through which members of a regional economic community can cooperate, ensure foreign direct investment (FDI) flows, facilitate intra-regional trade, secure macroeconomic and financial development, endorse high employment levels and stable economic growth.

Owing from the above, this study aims to focus on the Economic Community of West Africa States (ECOWAS) because of the seemingly level of disparities in economic prosperity among economies in this region. The study, therefore, seeks to ascertain whether the member countries in this community can converge (convergence club) or not. It also computes a threshold for FDI and financial development to foster growth convergence if the first is non-

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existent. Surprisingly, most policy-makers are unaware of the practice that regional integration and cooperation can only be efficiently and effectively managed among economies that have the tendency to converge.

However, Bartosz and Henryk (2014) opine that the key objective in the European region and conditions for cohesion actually targets stable and exponential growth potentials within the regional economies. This is because regional integration and economic cooperation in Europe have experienced high levels of default where countries slump into economic recession (Greece, Portugal etc). To curb this mishap, the economic union issues frequent bailouts to these weaker economies to reduce the disparities within the union and as such install long-term measures that will improve the quality of life in the entire region (Dumitru and Ileana, 2014). For instance, countries within the convergence range are those economies whose GDP per capita is less than 75% of the European Union (EU) average. Substantially, those economies unable to crawl into the above range falls outside the convergence club. Therefore, economies who are not able to meet the above condition would receive significant aid supports and FDI in order to complete their convergence process (Bartosz and Henryk, 2014).

In general, most economies in ECOWAS are faced with resource gap syndrome, since capital to fund broad development projects falls short of the required quantity and quality. This challenge has worsened governments' ability to dispense its main functions of improving social well-being and providing security for its citizenry. Thus, it becomes imperative for the government to create alternatives for supplementing this gap as it may trigger off distortions and instability in government policies. Over the past decades, scholars have produced abundant evidence on the growth-enhancing effect of FDI and financial system development (see Beck et al. 2005). Therefore, it is mainly through resource allocation and productivity growth that robust financial system development can assist economies to grow exponentially.

No doubt that varieties of proposition exist on the significance of FDI and financial development to cause dispersing economies to convergence (Raheem and Adeniyi, 2015). Therefore, standard views exist to provide support for the existence of a close correlation between vibrant financial system, investment and economic prosperity (Aregbesola, 2014). For instance, financial development can act as a strong attraction for the inflow of FDI into the regional economy; and in turn, they both promote growth by stimulating an outward shift in the production possibility frontier through technology transfer and spillover effects (Adeniyi et al., 2015). These are alternative means of solving "resource gap syndrome" and the above transmission pathway can be seen in the work of Awolusi et al. (2017). It is thus the thrust of this study to examine how financial development and foreign direct investment can affect the extent of convergence of economies in ECOWAS region. The relevant question that seeks for an answer in this study include: Does financial development and foreign direct investment significantly affect the rate at which economies in ECOWAS region convergence? Also, the study will establish the threshold level of financial development and foreign direct investment that is simultaneously needed to cause convergence. The study covers a period of 27 years between 1990 to 2016 of the 15 ECOWAS member states.

The remaining sections of this paper are divided into four; the second section examines the existing literature surrounding the argument; this is followed by the Theoretical Framework and Model Specification, then section four focuses on data analysis and discussion and the final section conclude and provides policy recommendation for the study.

Literature Review

Conceptual Literature

ECOWAS is an integration of fifteen countries created on the 28th day of May 1975 to speed up economic cooperation and regional integration. Unsurprisingly, the West African region is divided into the Anglophone, Francophone and Lusophone countries. This is further subdivided into West Africa Economic and Monetary Union (WAEMU) and West African Monetary Zone (WAMZ). The long term goal of the region is to dissolve into a single currency (Onakaja et al., 2013). Though the West African region experienced financial crisis recently, this region has consistently sustained its growth potentials from an average of 4.86% between 2000 and 2007 to about 5.11% between 2008 and 2013. Comparing WAEMU and WAMZ, it could be seen that member countries in WAEMU recorded an average growth rate of 3.89% between 1999 and 2014, while WAMZ member countries recorded an average of 6.58% within the same time period. On the other hand, between the periods 1999 to 2014, the entire ECOWAS region grew at an average rate of 4.96%. Interestingly, countries like Sierra Leone, Nigeria, Ghana, Burkina Faso, and Cape Verde topped the chart at 8.21%, 7.97%, 6.65%, 5.84%, and 5.63% respectively. Surprisingly, Niger, Benin, Senegal, and The Gambia struggled to maintain an average growth rate of 4.84%, 4.41%, 4.19%, 3.86%, and 3.7% respectively between 1999 and 2014; while Guinea, Togo, Guinea Bissau, and Cote d'Ivoire crawled behind with an average growth rates of 2.78%, 2.64%, 2.14%, and 1.46% respectively within the period of study (Jalloh, 2014).

Drawing from the above, it is pertinent to establish the nature of convergence in ECOWAS region. This could be absolute, conditional or sigma convergence. Here, economies would have converged conditionally if the value of beta is significantly different from zero. Therefore, it is more likely for economies with uniform population growth and technology to convergence faster "ceteris paribus" (Barro and Sala-I-Martin, 1997) as African economies exhibited conditional convergence between 1959 and 1985 (Murphy and Ukpolo, 1999). The above notwithstanding, absolute convergence occurs when economies converge at the same level of long-term income. And as such, the convergence hypothesis would imply that the least developed countries grow faster than developed ones thereby stimulating catch-up phenomenon by the poorest countries. More importantly, the growth rate of GDP per capita of the poorest countries tends to grow faster than that of the rich countries.

Similarly, in sigma convergence, the focal point is the reduction in dispersion in the rate of growth of the GDP per capita of both the rich and poor countries. Therefore, sigma convergence is measured by an indicator of dispersion (variance of the log of GDP per capita). Thus, sigma convergence is observed to show whether there is a stable and continuous declining trend in the dispersion of the log of income within the group.

Theoretical Discourse

The Augmented Neoclassical growth model as developed by Solow (1956) focus on convergence hypothesis which is core to the neoclassical growth theory. This theory posits that the growth rate of income in poorer economies will exceed that of the richer economies. For example, given that all economies have the same rate of growth, then countries with the higher initial level of income will grow faster and as such economies might never converge. Adopting a more realistic approach to the above theoretical foundation, economies with different steady states based on differences in technology and behavioural patterns would experience augmented neoclassical theory which predicts conditional convergence (Mankiw et al., 1992). Building on the above thesis, other controlled variables such as financial development and FDI enters the model as control variables which further stimulate the rate of growth and hence, fast track convergence. Furthermore, the theory posits that a single technology can be simultaneously adopted by all the countries in a region. Fortunately, they eventually attain the same steady-state rate of growth through spillover effects. In fact, in the

last ten years, a cosmic amount of research has been directed towards investigating this convergence hypothesis (Wahiba, 2015; Barro and Sala-I-Martin, 1997; Mankiw et al.,1992).

Review of Empirical Literature

Although there is a dearth of literature which has focused directly on FDI, financial development and growth convergence, this study attempts to draw deductions on the above relationship through the modification of the neoclassical theory. For instance, Alan and Carlyn (2015) testing for economic convergence among OECD economies, discovered their growth paths were related to the target economy. Utilizing the Fourier-type tests, they revealed that growth in a large number of Latin American countries is similar to results found in the US. Despite the above, some of these economies converged at a lower level of income.

Furthermore, in the research conducted by Cesar and Ha (2015), they examined the relationship between domestic output growth and capital inflows using panel data set from 38 SSA countries. Embracing the two-step technique, this study observes that output growth in this region does not attract the inflows of capital. Instead, their results support that aid and foreign direct investment inflows rather stimulate enhanced growth. Here, one percent rise in real aid inflows upshot output growth per capita by 0.022 percentage point holding other variables constant.

Also, Dumitru and Ileana (2014) concentrated on investigating the relationship between net capital flows, current account imbalances and income convergence between 1995 and 2007 in the European Union economies. They concluded that there is an occurrence of income convergence in the EU; and as such computed the level of thresholds to enforce convergence. On the contrary, Haupt et al. (2017) utilized the Classical theory; but they ignored explanations for the sources of differences and nonlinearity. However, most recently, scholars are supporting nonlinearity of models and proffering solution and identifying group-specific convergence paths. They proposed a model with time-varying, heterogeneous and nonlinearity in the growth phase. In addition, Von Hagen and Zhang (2014) using an overlapping-generations model, found that disparities in financial development can describe current stylized facts in international capital flows. Though FDI and net capital flow were competitive, the latter triggers a positive multipliers effect to the US.

Furthermore, Monfort et al. (2013) investigated the issue of per capita income convergence among economies in the EU. Here, the study focused on testing the existence of convergence club; because of the series of default experienced in the EU. On the other hand, Ewijk and Arnorld (2015) using panel data, they adopted the new-Keynesian theory and concluded that the benefits of economic cooperation and integration include macroeconomic stability to mention a few. More so, since foreign capital is transformed into domestic physical capital, Chatterjee and Naknoi (2009) posited that capital Inflows increase output using the neoclassical theory. Alternatively, Sum (2012), adopted the dynamic panel technique on 69 countries from 1976 to 2008. They tried to compute the level of thresholds for financial development and quality of institution which would ensure a steady growth rate. Interestingly, Wahiba (2015) using GMM on series between 1999 and 2013 focuses on ascertaining whether or not there is a conditional convergence hypothesis among WAEMU countries. The study discovered that the above variables contribute to economic growth in the region. Contrary to the above, Sbia and Alrousan (2016) concentrated on the United Arab Emirate between 1974Q1 – 2012Q4. They concluded that there is long-run cointegration between financial debt and development using panel cointegration analysis.

In the same vein, Adeniyi et al. (2015) investigating the relationship between FDI, credit to private sector and growth in sub-Saharan Africa reported that FDI and financial system development have a positive impact on economic growth. Lastly, Sghaeir and Albida (2013)

utilized the GMM panel data analysis, and they discovered that there is a positive relationship between FDI and economic growth. In the same vein, their investigation supports the evidence that the financial system is a pertinent precondition for FDI to impact economic growth positively in four North African countries between 1980 and 2011.

Theoretical Framework cum Model Specification

The framework for this study is built on the Augmented Neoclassical growth model (Mankiw et al., 1992). In their exposition, the model follows a dynamic panel data estimation pattern. The applied model though modified, closely follows a broad strand of related literature (Osada and Saito, 2010; Sum, 2012). This is represented below as:

$$\Delta Y_{it} = \alpha_1 Y_{0it} + \alpha_2 \Delta POP_{it} + \alpha_3 INV_{it} + \alpha_4 HC_{it} + \alpha_5 Z_{it} + \alpha_6 THRESHOLD_{it} + \varepsilon_{it} \quad (1)$$

Growth rates (ΔY_{it}) is the log difference of real GDP per capita, Y_{0it} denotes the log of real GDP per capita and accounts for the convergence effect. ΔPOP_{it} stands for population growth rate, INV_{it} denotes the gross fixed capital formation, HC_{it} represents average years of schooling (proxy is human capital), Z_{it} signifies the control variables which include: FDI and financial development (proxy is the credit to the private sector), THRESHOLD_{it} stand for threshold measures. More importantly, threshold measures the amount of FDI and financial development which will augment the weak financial system and cause growth convergence in ECOWAS countries, thereby encouraging beta-convergence. Thus, credit to the private sector is used to proxy financial development. To check for a potentially optimal level of the threshold, squared value of the threshold identity is introduced into equation (2) below, along with the variables for the dynamic panel regression. The resultant equation is represented in equation (3.2) below:

$$\Delta Y_{it} = \alpha_1 Y_{0it} + \alpha_2 \Delta POP_{it} + \alpha_3 INV_{it} + \alpha_4 HC_{it} + \alpha_5 FDI_{it} + \alpha_6 FD_{it} + \alpha_7 FDI_{it}^2 + \alpha_8 FD_{it}^2 + \varepsilon_{it} \quad (2)$$

The turning points of equation (2) will be obtained by partially differentiating the equation with respect to FDI and FD respectively and setting it to zero. With this, the threshold level of FDI and credit to the private sector as a percentage of GDP needed to stimulate growth is the value of FDI and FD at their respective critical points. Hence, we have that for FDI:

$$\frac{\partial \Delta Y_{it}}{\partial FDI_{it}} = \alpha_5 + 2\alpha_7 FDI_{it} \quad (3)$$

Setting equation (3) to zero, we have:

$$\alpha_5 + 2\alpha_7 FDI_{it} = 0 \quad (4)$$

Hence, the required amount of FDI as a percentage of GDP needed across ECOWAS on a long run basis is given as:

$$FDI_{it}^{**} = \frac{-\alpha_5}{2\alpha_7} \quad (5)$$

For Financial Development, we have:

$$\frac{\partial \Delta Y_{it}}{\partial FD_{it}} = \alpha_6 + 2\alpha_8 FD_{it} \tag{6}$$

Setting equation (6) to zero, we have:

$$\alpha_6 + 2\alpha_8 FD_{it} = 0 \tag{7}$$

Hence, the required extent of Financial Development as a percentage of GDP needed across ECOWAS on a long run basis is given as:

$$FD_{it}^{**} = \frac{-\alpha_6}{2\alpha_8} \tag{8}$$

The estimation technique is the Fully Modified Ordinary Least Square (FMOLS) as developed by Hansen and Philips (1990). The FMOLS estimates directly cointegrating relationships by amending the traditional Ordinary Least Square with corrections that take into cognizance of the endogeneity problem as well as the serial correlation that may arise from estimating the traditional OLS. The FMOLS is relevant as a researcher can use the fully modified corrections to examine how relevant the effects are while applying them empirically. This really assisted in making the technique less of a "black box" for researchers (Philips, 1995). There are empirical evidence that suggest that the Fully Modified OLS estimator performs very much better with respect to other techniques of estimating cointegrating relations (Cappuccio and lubian, 1992; Hansen and Phillips, 1990; Hargreaves, 1994; Phillips and Loretan, 1991). Thus, the panel data utilized for this study is sourced from the World Bank World Development Indicators (WDI) database 2018.

Data Analysis and Discussion

This section analyses the data gathered from the fifteen ECOWAS countries in a bid to achieve the objectives of these studies earlier stated in this section. We begin by examining the trend analysis of ECOWAS member countries' output per capita for the period 1990 till 2017. This is presented in figure 1.

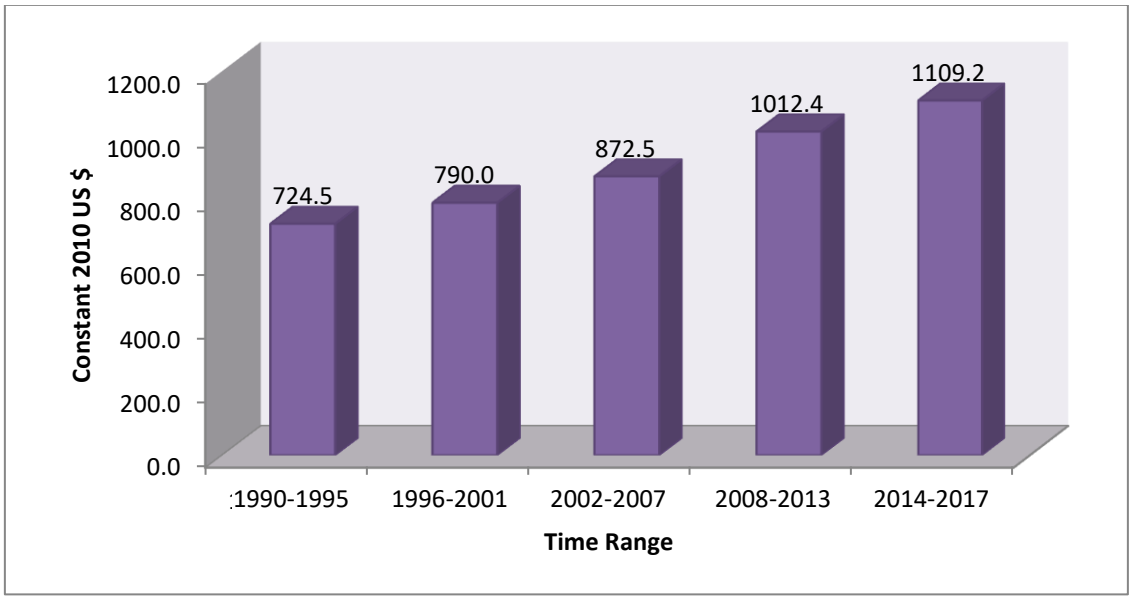

Figure 1: GDP Per Capita on Average of ECOWAS Member States
Source: Authors' Sketch using Data from WDI, 2018.

Figure 1 reveals that the output per capita endured a gradual increase over the period of study as it increased from 724.5 US Dollars between 1990 and 1995 to 790 US Dollars between 1996 and 2001, representing 9% increase. This continued between 2002 and 2007 as it managed to climb to 872.5 US Dollars representing 10.4% increment. The output per capita reached the 1000 US Dollars hallmark between 2008 and 2013 and endured a gradual increase between 2014 and 2017, representing 9.6% increment. The greatest growth occurred between 2002 and 2007 to 2008 and 2013, shows a 16% increase.

Descriptive Statistics

A summary statistic of the variables employed is presented in Table 1.

Table 1: Descriptive Statistic Summary of the Variables Employed

Statistic	FD (%)	FDI (%)	HC (%)	INV (%)	POP (%)	Y
Mean	14.58887	3.872085	80.69710	15.92836	2.686977	2.868154
Median	12.47595	1.798279	83.02812	5.879475	2.673837	2.792267
Maximum	65.74181	103.3374	132.4683	2357.678	7.849706	3.552839
Minimum	0.402581	-2.138160	26.15871	-294.1620	-1.838800	2.437514
Std. Dev.	11.39115	9.285289	25.56360	145.0367	0.960380	0.250202
Skewness	2.077427	7.554456	-0.183558	15.15528	-0.024054	0.748404
Kurtosis	8.679199	68.99964	2.421321	245.4574	11.09205	2.911062
Jarque-Bera	833.5213	77931.93	6.848978	694062.5	1145.964	38.40924
Probability	0.000000	0.000000	0.032566	0.000000	0.000000	0.000000
Sum	5893.905	1579.811	28243.99	4444.013	1128.530	1175.943

Source: Authors' Computation using Data from WDI, 2018

Table 1 revealed that the level of financial development (FD) as measured by credit that goes to the private sector as a percentage of GDP on average leveled at 14.6%. While the peak was 65.7%, the lowest credit ratio given was 0.40%. This shows the extent of disparity that is attributable to the level of financial development. The foreign direct investment inflow as a percentage of GDP rallied at an average of 3.87% for the whole period among ECOWAS member states while as much as 103.34% inflows came into the region at a certain period and as low as (2.14%) inflows were recorded. The level of primary school enrolment ratio as a measure of human capital was relatively low as it also rallied at an average of 80.69% and has its peak at 132.5% while its minimum was 26.16%. The level of domestic investment growth rate maintained an average of 15.9% throughout the sample period while it had the highest of 2357.68%; a massive investment outburst for the period and there was still worse investment growth of (294.16%). Population growth rate within the period maintained a growth trajectory of 2.67% throughout the period and the highest of 7.85% was recorded while there was a massive death toll that shrinks population growth rate to (1.84%). The normality of the variables is individually examined using the Jarque-Bera statistics. The Jarque-Bera statistics test the null hypothesis of normal distribution for a variable against the alternative of non-normally distribution. The probability value is used to make the decision. From table 1, it can be seen that the variables under study are all not normally distributed as their probability value is all less than 5% level of significance.

Correlation Test

It is important to examine the degree of relationship amongst the explanatory variables; this is to verify the extent of collinearity and however ensure that the variables are not correlated.

Table 2: Correlation Test Result

	FD	FDI	HC	INV	POP	Y
FD	1.00					
FDI	0.00	1.00				
HC	0.27	0.19	1.00			
INV	-0.09	0.05	-0.06	1.00		
POP	-0.33	0.02	-0.20	0.03	1.00	
Y	0.44	-0.07	0.27	-0.12	-0.46	1.00

Source: Authors' Computation using Data from WDI, 2018.

Table 2 reveals that there is no high degree of correlation between the independent variables as the highest is 0.46 thus implying that there is no perfect multicollinearity that is associated with the formulated model.

Unit Root Test

This study employs two different technique of establishing the stationarity condition of the variables. The study employed the Levin, Lin & Chu t* unit root test technique which examines the stationarity status by assuming that it follows a common unit root process. The other unit root technique employed is the Im, Pesaran and Shin W-stat test which also examines the unit root condition of the variable assuming it follows an individual unit root process. Table 3 summarizes the findings of the unit root test. Table 3 reveals that only human capital and gross domestic output per capita are stationary at first difference while others are stationary at levels.

Table 3: Unit Root Test Result

	Levin, Lin & Chu t* (2002)				Im, Pesaran and Shin W-stat (2003)				
	Level		1st Difference		Level		1st Difference		Conclusion
	Statistic	P-Value	Statistic	P-Value	Statistic	P-Value	Statistic	P-Value	
FD	-2.65780**	0.0039	-	-	-3.34746**	0.0004	-	-	I(0)
FDI	-2.65780**	0.0039	-	-	-3.34746**	0.0004	-	-	I(0)
HC	0.43835	0.6694	-1.67660*	0.0468	2.99976	0.9986	-3.20137**	0.0007	I(1)
INV	-8.68645**	0.0000	-	-	-6.94275**	0.0000	-	-	I(0)
POP	-12.8522**	0.0000	-	-	-15.9878**	0.0000	-	-	I(0)
Y	0.47132	0.6813	-4.30844**	0.0000	3.35708	0.9996	-6.47952**	0.0000	I(1)

Note: ** Signifies significant at 1% and* significance significant at 5%
Source: Authors' Computation using Data from WDI, 2018.

Co-integration Test

Following the order of integration of the variables employed as reported in table 3, the next step is to conduct a co-integration test. To do this, the study employs the Pedroni Residual Cointegration test technique using the Panel PP-statistic to verify the long run co-movement

possibility of the model. The co-integration test was also extended by conducting the joint Wald test of the long run coefficients and the results are presented in table 4.

Table 4: Pedroni Residual Cointegration Test

Method	Statistic	Prob.	Weighted Statistic	Prob.
Panel PP-Statistic	-4.699098	0.0000	-5.806635	0.0000
Wald Test: Null Hypothesis: C(1)=C(2)=C(3)=C(4)=C(5)=C(6)=0	**F-statistics**	**Chi-square**	**d.f**	**Prob(F-stat & Chi-square)**
	9.839433	59.03660	(6, 126)	0.0000

Source: Authors' Computation using Data from WDI, 2018.

Using the Panel PP-statistic as developed by Pedroni, table 4 reveals that the probability of both the statistic and the weighted statistic is less than 5% implying that they are significant. The null hypothesis of no co-integration can thus be rejected while the alternative of cointegration existing is accepted. Following the Wald test also as reported in table 4; the result shows that the F-statistic and chi-square statistic are significant as their probability are less than 5%. This implies that the null hypothesis of no joint significance of the long run coefficients is rejected. Thus, the result concludes that co-integration exist in variable relation.

Regression Result: Convergence Test

Having established cointegration in table 4, the next step is to estimate the model and test for the existence of convergence. To do this, the Fully Modified OLS (FMOLS) is employed and the result is presented below.

Table 5. Fully Modified OLS Convergence Test Result
Dependent Variable: ΔY

Variable	Coefficient	t-Statistic	Prob.	95% Confidence Interval	
				Lower Bound	Upper Bound
Y_0	0.290899**	4.66	0.0000	0.167410	0.414388
POP	-0.022254*	-2.37	0.0192	-0.040818	-0.003690
INV	0.000403**	4.34	0.0000	0.000219	0.000587
HC	-0.000616	-1.68	0.0947	-0.001339	0.000108
FDI	0.001926**	3.24	0.0016	0.000748	0.003105
FD	-0.000438	-0.82	0.4124	-0.001494	0.000617
R-squared	0.758927				
Adjusted R-squared	0.719797				
S.E. of regression	0.013782				
Jarque-Berra	14.24936				
Jarque Berra Prob	0.000805				

Note: ** Signifies significant at 1% and* significance significant at 5%
Source: Authors' Computation using Data from WDI, 2018.

The result obtained from table 5 reveals that the coefficient of the GDP per capita is positive and statistically significant. Hence, the implication of this is that there is no conditional convergence among low income and high-income member countries within ECOWAS. Invariably, we say that there is a conditional divergence in the ECOWAS region. Also, the result shows that the coefficient of population growth rate is negative implying that there is a negative impact of population growth on output growth rate. The implication of this is that the population growth rate does not spur conditional convergence among ECOWAS

member states. However, the investment coefficient of 0.000403 is positive and statistically significant implying that investment spurs conditional growth convergence among ECOWAS regions. More so, the level of human capital does not, however, spur conditional convergence as this is negative but statistically insignificant. Concentrating on foreign direct investment, the result shows that the extent to which foreign direct investment inflow as a percentage of GDP aids conditional convergence as the coefficient is positive and statistically significant. Contrary to the above, the financial development does not spur conditional convergence. This showcase the level of underdevelopment of the financial sector among ECOWAS countries and as such explains the banking crisis that has rocked the region between 1990 and 2017 coupled with the global economic meltdown and the aftermath effect of 2008. Also, on the statistical significance of the model, the Adjusted R-squared shows that about 72% of the variations in growth rate are well explained by the independent variables all put together.

Regression Result: Threshold Measurement

To examine the level of Foreign Direct Investment threshold needed for convergence, the study employed the Fully Modified OLS (see table 6).

Table 6. Fully Modified OLS Threshold Test Result
Dependent Variable: ΔY

Variable	Coefficient	t-Statistic	Prob.	95% Confidence Interval	
				Lower Bound	Upper Bound
Y_0	0.231904**	5.42	0.0000	0.147147	0.316662
POP	-0.009788	-1.59	0.1136	-0.021951	0.002375
INV	0.000631**	11.54	0.0000	0.000522	0.000739
HC	-0.00068**	-3.42	0.0009	-0.001073	-0.000286
FDI	0.000695	1.01	0.3154	-0.000671	0.002060
FD	0.001966*	2.51	0.0137	0.000411	0.003520
FDI^2	-0.000128**	-2.97	0.0037	-0.000214	-4.26E-05
FD^2	-0.000043**	-3.66	0.0004	-0.000007	-0.000003
R-squared	0.878710				
Adjusted R-squared	0.832865				
S.E. of regression	0.015630				
Jarque-Berra	11.80106				
Jarque Berra Prob	0.002738				
Wald F-statistic	31.60464**				

Note: ** Signifies significant at 1% and* significance significant at 5%
Source: Authors' Computation using Data from WDI, 2018.

The core purpose of the result presented in table 6 is to determine the threshold level of FDI and Financial Development as a percentage of GDP that is needed to spur growth and aid convergence. Following equation (5) specified in the previous section, $FDI_{it}^{**} = \frac{-\alpha_5}{2\alpha_7}$, we input the values of $\alpha_5 and \alpha_7$ as 0.000695 and -0.000128 respectively into equation (5) and thus we arrived at $FDI_{it}^{**} = \frac{-0.000695}{2(-0.000128)}$, hence the threshold level is 3.77%. For financial development, we follow equation (8) specified in the previous section, $FD_{it}^{**} = \frac{-\alpha_6}{2\alpha_8}$, input the

values of $\alpha_6 and \alpha_8$ as 0.001966 and -0.000043 respectively into equation (8); thus the resultant equation is $FD_{it}^{**} = \frac{-0.001966}{2(-0.000043)}$, hence the threshold level is 22.86%.

The implication of this is that the Foreign Direct investment as a percentage of GDP threshold level needed to aid conditional convergence and spur growth across all ECOWAS member states is 3.77%. Building on the above, the low-income countries must strive to maintain this level of investment inflows to fast-track convergence with other high-income countries. The result further implies that the required credit to private sector as a percentage of GDP which measures financial development that is needed to actualize convergence is 22.86%. Thus, the low-income member states must strive to maintain credit lending ratio of 22.86% of GDP in order to catch up with the growing economies. This finding proffers support to the previous result obtained in table 5. Here, population growth rate and level of human capital development do not aid conditional convergence, rather it is the investment that aids conditional convergence. More so, on the statistical significance of the model, the Adjusted R-squared shows that about 83% of the variations in growth rate are well explained by the independent variables all put together. Despite the above, Jarque-Bera test statistics reveals that the model is not normally distributed. Lastly, the Wald test statistic shows that all the coefficients are jointly significant and relevant in the model.

Conclusion and Policy Implication

This study has examined financial development, foreign direct investment and growth convergence among ECOWAS member states. It supports the absence of conditional growth convergence among ECOWAS member states. Also, the extent of population growth rate and human capital development does not accelerate or spur conditional growth convergence among ECOWAS member states. However, the level of domestic investment and foreign direct investment spurs conditional growth convergence in the region. The study, therefore, concludes that the pace of financial development within the region does not spur convergence within the region. Given that foreign direct investment spurs convergence, the study posits that the required level of foreign direct investment threshold to stipulate growth convergence is 3.77%. A further conclusion drawn is that credit to the private sector threshold level required by low-income ECOWAS member countries to catch up with their high-income neighbours is 22.86%. The policy implication for this study is that the government of member states must thrive to ensure that foreign direct investment threshold of 3.77% is maintained. In addition, credit lending base of the low-income countries must be improved tremendously for growth convergence to occur. The above notwithstanding, low-income countries within the region must as a matter of urgency formulate fiscal and monetary policies that would spur investment. This is because domestic investment is a pre-requisite for growth convergence. More so, policies to control population growth rate must be maintained among the poor income countries within the region in order to stimulate catch up with high-income countries. More importantly, improving the level of human capital development within the region could shorten the period for convergence to occur; if not growth convergence will not be achieved. Hence, there must be massive investment in the determinants of human capital development (Health, education, and income) for low-income countries to catch up.

Lastly, since the pace of financial development does not stimulate growth convergence, policies that will aid financial inclusion and increased formal financial activities by member states' monetary authority as a matter of emergency should be formulated so as to drive growth within the region.

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