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Linkages between Foreign Direct Investment and Financial Development: Evidence from West African Countries

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Abstract

This study investigates the relationship between foreign direct investment (FDI) and financial development for ten member countries of the Economic Community of West African States (ECOWAS) during the period from 1970 to 2017. Domestic credit to private sector and money supply as share of GDP are used as measures for financial development. As estimation method, the study employs the Common Correlated Effect Mean Group (CCEMG) estimator that deals with both slope heterogeneity and cross-sectional dependency across countries. The empirical findings indicate bidirectional causality between money supply and foreign direct investment in the short run, while there is no evidence of causality between domestic credit to private sector and foreign direct investment. Furthermore, there is bidirectional causality between financial development and economic growth in the short run. In the long run, economic growth was found to cause both foreign direct investment and money supply.

JEL classification numbers: C33, E51, F21, O55.
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1. Introduction

There has been extensive research work examining the relationship between foreign direct investment and economic growth and between financial development and economic growth. Most of the studies revealed the significance and positive impact of financial development and foreign direct investment on economic growth (e.g., Ang, 2008; Sghaier and Abida, 2013; Almfraji and Almsafir, 2014; Gui-Diby, 2014; Saqib, 2015). Some of empirical studies examined how financial development intervenes in the FDI-growth nexus (Hermes and Lensink, 2000; Alfaro *et al*. 2004; Choong and Lim, 2009; Lee and Chang, 2009; Azman-Saini *et al*., 2010; Chee, 2010; Choong, 2012; Korgaonkar, 2012; Adeniyi *et al*., 2015). Most of these studies demonstrated the importance of financial development in enhancing the positive influence of FDI on economic growth. Thus, the effect of FDI in fostering economic growth is much higher in a well-functioning financial system. The financial system in sub-Saharan African countries is relatively less developed compared to other regions of the world. Until the implementation of the reforms in the mid-80s, commercial banks dominated the banking system and were largely owned by governments. In the mid-80s, however, most governments in the region embarked on massive financial reforms and the financial sector starts to diversify. The number of commercial banks has increased, and government ownership of the bank has decreased significantly in most sub-Saharan African countries. In addition, non-bank financial institutions are playing an increasingly role in saving mobilization. Today, African countries are working towards integrating with the world economy with the aim to make financial system a key policy instrument for generating high inclusive economic growth.

Although the role of FDI and financial development on economic growth has been studied extensively, few attention have been devoted to the direct relationship between financial development and foreign direct investment. Therefore, this paper investigates this issue for a sample of West African countries. As far as we know, empirical works on the causal relationship between financial development and foreign direct investment are hardly available for African countries. The present study fills the gap and enriches the empirical literature by examining the case of the member countries of the Economic Community of West African States (ECOWAS). Contrary to most existing panel data studies, this study uses the common correlated effect mean group estimator that accommodates with both cross-sectional dependence and heterogeneity, two issues that are largely ignored.

The remainder of the paper is organized as follows. Section 2 outlines the econometric methodology employed for the empirical analysis. Section 3 reports the empirical findings of the study. Section 4 concludes the study and provides some policy recommendations.

2. Literature Review

Although the role of financial development in enhancing the growth effects of FDI has been recognized and empirically investigated, the question still arises with respect to the direct relationship between FDI and financial development. In general, there are two views regarding the relationship between FDI and financial development. Inward FDI may contribute to the financial development in host countries. The rational of this view is that FDI inflows impact positively on the economic activities of a host country leading to an increase in the funds available in the economy. Consequently, this contributes to the development of financial intermediation through financial markets or banking sector development (Desai *et al*., 2006). FDI can also enhance the participation of foreign firms in capital markets, since foreign investors might want to finance part of their investment with external capital. On the other hand, a relatively well-functioning financial market is an incentive for foreign investors to make further investment as they perceive such a market as a sign of an economy in good health and market-friendly environment (Sahin and Ege, 2015). Furthermore, a well-developed stock market increases the liquidity of listed companies and may reduce the cost of capital, thus rendering the economy attractive to foreign investment.

On the empirical ground, a number of studies has investigated the nexus between FDI and financial development, yielding to mixed evidence. For instance, Zakaria (2007) researched the causal relationship between FDI and financial development for 37 developing countries. He found that there is no causal link between foreign direct investments and the development of the domestic banking sector. In contrast, a bidirectional causal relationship was found between foreign direct investments and the development of the domestic stock markets. Adam and Tweneboah (2009) examined the case of Ghana and found that FDI significantly influences the development of the stock market. Al Nasser and Gomez (2009) examined the relationship between FDI and the development of the stock market and banking system using a pooled data of 15 Latin American countries. They found that FDI is positively correlated with trading volume, a variable reflecting the development of the stock market. Furthermore, FDI is significantly and positively correlated with the level of private credit offered by the banking sector. Beck *et al.* (2009) found bidirectional positive relationship between FDI and financial development in Africa. Mahmoud (2010) examined the effect of financial development on inward FDI in 62 countries from 1996-2007. The findings confirm that domestic financial development act as a catalyst in attracting FDI to low income, non-OECD and lower middle income economies. Mohamed and Sidiropoulos (2010) analyzed the main determinants of foreign direct investment in MENA countries. The study revealed that the size of the host economy, the government size, natural resources, financial development, the investment profile and corruption are among the key determinants of FDI inflows in MENA countries. Financial development exhibits a positive effect on FDI. Abzari *et al*. (2011) investigated the link between foreign direct investment and financial development for D8 group countries. The results revealed that inflows

of foreign direct investment causes financial development. Dutta and Roy (2011) using domestic credit to banking as well as private sector for a panel of 97 countries underlined the fact that financial development influences FDI inflow into an economy. Fakhreddin *et al.* (2011) studied the factors affecting FDI in Malaysia from 1974-2009. They determined that trade openness, domestic credit to private sector and GDP positively and significantly influenced foreign direct investment into Malaysia. Nwosa *et al.* (2011) investigated the linkage among the financial development, foreign direct investment and economic growth in Nigeria over the time period 1970 to 2009. They found that financial development and foreign direct investment Granger cause economic growth and economic growth also influences foreign direct inflow and financial development. Further, there is no evidence of causality between financial development and foreign direct investment. Adeniyi *et al*. (2012) investigated the link between foreign direct investment and economic growth with financial development as a control variable, in five selected African countries (Cote d'Ivoire, Gambia, Ghana, Nigeria and Sierra Leone). Adopting a country-by-country time-series approach they found that the overall size of the financial sector matters for the benefits of FDI to impact growth in Ghana, Gambia, and Sierra Leone. Korgaonkar (2012) examined the effect of financial development on FDI inflows in 78 countries from 1980 to 2009. The findings showed that FDI is not directed into countries that are financially weak and is dependent on both the stock market and banking sector development. Further, the development of the financial system of the recipient country is an important precondition for FDI to have a positive impact on economic growth. Agbloyor *et al.* (2013) found that higher FDI flows can lead to the development of the domestic banking system in Africa. Kaur *et al*. (2013) examined the case of BRIC countries and found that FDI is positively influenced by the size of banking sector and stock market capitalization. However, higher domestic credit by banking sector reduces FDI inflows. The results of Sahin and Ege (2015) revealed unidirectional causality running from FDI inflows to financial development in Bulgaria and Greece, and bidirectional causality in Turkey. Soumaré and Tchana Tchana (2015) examined the case for a panel of 29 emerging countries and reported bidirectional causality between FDI and stock market development. Fauzel (2016) found evidence of bidirectional causal relationship between FDI and financial development for small Island economies. Gebrehiwot *et al*. (2016) also found bidirectional causality between different indicators of financial development and FDI inflows for eight Sub-Saharan African countries. Otchere *et al*. (2016) also obtained bidirectional positive causal relationship between FDI and financial development in Africa. Nasir *et al.* (2017) found that economic growth causes both foreign direct investment and financial development in Saudi Arabia. However no significant causality can be observed between foreign direct investment and financial development. Ayouni and Bardi (2018) investigated the financial development and FDI nexus in Tunisa using a nonlinear approach. They found that there is a threshold level of financial development beyond which financial development negatively affect the entry of FDI in Tunisia. Financial development positively affect the entry of FDI when it is

below the threshold. Bayar and Gavriletea (2018) found a one-way causality from the development of financial sectors to FDI inflows in Central and eastern European Union countries. Investigating the case of India, Mishra and Mishra (2019) confirmed the view that the financial sector development, particularly the development of banking as well as capital markets, contributes to larger FDI inflows. Njangang *et al.* (2019) assessed the effects of FDI on financial development in a panel of 49 African countries. They found that there is a positive and significant long run relationship the two variables. However, in the short run, the effect of FDI on financial development is negative.

3. Model, Data and Methodology

3.1 Model and Data

This study explores the relationship between foreign direct investment and financial development in the context of West African countries. To that end, we specify the empirical model as follows:

$$FDI_{it} = \beta_{0i} + \beta_{1i} FD_{it} + \beta_{2i} Y_{it} + e_{it} \quad (1)$$

where $i=1,...,N$, denotes the country, $t=1,...,T$ refers to the time period, FDI is foreign direct investment inflows, FD is financial development indicator and Y is a measure of economic development included into the model as a control variable.

The study uses annual time series data for ten member countries of the Economic Community of West African States (ECOWAS), over the period from 1970 to 2017. The countries under study are: Benin, Burkina Faso, Cote d'Ivoire, Ghana, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo. The coverage of countries and time period has been determined by the availability of data for at least T=30 observations. We use two measures of financial sector development which are domestic credit to private sector as a percentage of GDP, and broad money supply (M2) as ratio of GDP. These indicators have been widely used in the empirical literature on financial development and economic growth in developing countries (e.g., Uddin *et al*., 2013; Menyah *et al*., 2014; Adeniyi *et al*., 2015; Coulibaly, 2015; Njangang *et al.*, 2019). Foreign direct investment inflows as ratio of GDP was taken as proxy for FDI, and the logarithm of real GDP per capita in constant US dollar was used as control variable to measure economic development. Data on financial development and real GDP per capita were extracted from the World Development Indicators database of the World Bank. Data on foreign direct investment inflows were retrieved from the electronic databank of the United Nations Conference on Trade and Development (UNCTAD).

The descriptive statistics and correlation matrix of variables are presented in Table 1. As this Table shows, there is a wide disparity among ECOWAS countries. For instance, the average of domestic credit to private sector was 15.027% of GDP in

the overall panel during the study period, and the size of domestic credit to private sector was the highest in Cote d'Ivoire with a 42.263% in 1983 and the lowest in Ghana with a 1.542% in 1983. FDI as share of GDP averaged about 1.733% in the overall panel and ranged between -14.531% and 32.302%. The correlation matrix indicates a positive and significant relationship between money supply and foreign direct investment. On the contrary, there is not a significant correlation between domestic credit to private sector and foreign direct investment. Further, financial development and economic growth are positively related to one another.

Table 1: Descriptive Statistics and Correlation Matrix

	CRED	M2	FDI	GDP
Panel A: Summary Statistics				
Mean	15.027	21.768	1.733	6.586
Median	13.829	20.663	0.980	6.455
Std. Dev.	8.911	8.484	3.070	0.572
Minimum	1.542	5.341	-14.531	5.599
Maximum	42.263	57.002	32.302	7.848
Panel B: Correlation Matrix				
CRED	1.000			
M2	0.644*	1.000		
FDI	0.001	0.155*	1.000	
GDP	0.287*	0.203*	-0.001	1.000

Notes: CRED: domestic credit to private sector as share of GDP, M2: broad money supply as share of GDP, FDI: foreign direct investment inflows as share of GDP, GDP: log of real GDP per capita. * and ** indicate significance at the 5% and 10% levels, respectively.

3.2 Econometric Methodology

In order to investigate the relationship between foreign direct investment and financial development, we use the panel data framework as it increases the power of the tests. However, in examining causal linkages within panel framework, a number of econometric issues have to be addressed. The first issue is to test for cross-sectional dependence across panel members. The last few decades have witnessed an increasing globalization of the world, which implies a strong interdependence between countries. Cross-sectional dependency has become a crucial econometric issue in determining appropriate panel data estimation methods. It has been shown that ignoring cross-sectional dependence by relying on standard panel estimation methods such as fixed effect, random effect or GMM methods is likely to produce inconsistent and biased estimates (Pesaran, 2006; Kapetanios *et al*., 2011). We test for cross-sectional dependency among countries using the Lagrange Multiplier (LM) statistic test proposed by Breusch and Pagan (1980) and its adjusted versions provided by Pesaran (2004). The Lagrange Multiplier (LM) statistic is specified as follows:

$$LM = T\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{\rho}_{ij}^{2} \tag{2}$$

where ρ_{ij} is the sample correlation coefficient among the residuals obtained from individual OLS estimations of Eq.(1). Under the null hypothesis of no cross-sectional dependence, that is H_0: $cov(\mu_{it}, \mu_{jt})=0$ for all *t* and $i \neq j$, the LM statistic is asymptotically distributed as Chi-square with N(N-1)/2 degrees of freedom. The LM statistic is valid for panels in which N is relatively small and *T* is sufficiently large. Pesaran (2004) proposed the scaled version of the LM statistic, which is defined for balanced panels as follows:

$$LM_S = \sqrt{\frac{1}{N(N-1)}}\left(\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\left(T\hat{\rho}_{ij}^{2}-1\right)\right) \tag{3}$$

This statistic is asymptotically distributed as standard normal when $T\rightarrow\infty$ first and then $N\rightarrow\infty$. To address the size distortion of LM and LM_S, Pesaran (2004) also proposed a more general cross-sectional dependency tests that is valid for panel where T and N are sufficiently large in any order. This statistic is defined as follows:

$$CD_P = \sqrt{\frac{2T}{N(N-1)}}\left(\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{\rho}_{ij}\right) \tag{4}$$

Under the null hypothesis of no cross-sectional dependence, CD_P is asymptotically distributed as standard normal.

The second issue examines whether the data can be pooled across countries and whether panel estimates account for country heterogeneity. To test for heterogeneity in the nexus between foreign direct investment and financial development a number of tests can be employed. The standard F-test is widely used to test the null hypothesis of slope homogeneity H_0: $\beta_i=\beta$ for all *i* against the alternative of heterogeneity H_1: $\beta_i \neq \beta_j$. In this study, we make use of the delta tilde and adjusted delta tilde tests by Pesaran and Yamagata (2008). Even though the selected countries on this study belong to the same geographic area, they are not identical in terms of economic structure, financial development and economic development. In such a context, the assumption that slope coefficients are homogeneous is unlikely to hold and thus applying standard panel data estimation methods will generate inconsistent estimates. Swamy (1970) proposed a slope homogeneity test that allows for group-wise heteroscedasticity. This test is based on the following statistic:

$$\tilde{S} = \sum_{i=1}^{N}\left(\hat{\beta}_i - \hat{\beta}_{WFE}\right)\frac{x_i^{'}M_\tau x_i}{\tilde{\sigma}_i^{2}}\left(\hat{\beta}_i - \hat{\beta}_{WFE}\right) \tag{5}$$

Where $\hat{\beta}_i$ is the pooled OLS estimator, $\hat{\beta}_{WFE}$ is the weighted fixed effect pooled estimator, M_τ is an identity matrix, and $\tilde{\sigma}_i^2$ is the estimator of σ^2_i. Under the null hypothesis of slope homogeneity, this statistic is asymptotically distributed as Chi-square with k(N-1) degrees of freedom when N is fixed and T→∞.

Pesaran and Yamagata (2008) argued that the Swamy (1970) test is applicable for panel data where N is relatively small compared to T. To overcome this limitation they proposed a standardized version of Swamy's test for testing slope homogeneity in large panels. The statistic is defined as follows:

$$\tilde{\Delta} = \sqrt{N}\left(\frac{N^{-1}\tilde{S} - k}{\sqrt{2k}}\right) \tag{6}$$

The small sample properties of the delta test can be improved by using the adjusted version defined as:

$$\tilde{\Delta}_{adj} = \sqrt{N}\left(\frac{N^{-1}\tilde{S} - E(\tilde{z}_{it})}{\sqrt{\text{var}(\tilde{z}_{it})}}\right) \tag{7}$$

where $E(\tilde{z}_{it}) = k$, $\text{var}(\tilde{z}_{it}) = 2k(T-k-1)/(T+1)$.

The third step investigates the existence of long run relationships among the variables. To this regard, the second-generation panel cointegration test developed by Westerlund (2007) was used. This test allows for large degree of heterogeneity both in the long-run relationship and in the short run dynamics. To apply this test, Eq.(1) is transformed into the following error-correction model:

$$\begin{aligned}\Delta FDI_{it} = {} & \alpha_{1i} + \sum_{j=1}^{p}\varphi_{1ij}\Delta FDI_{it-j} + \sum_{j=0}^{p}\varphi_{2ij}\Delta FD_{it-j} + \sum_{j=0}^{p}\varphi_{3ij}\Delta Y_{it-j} + \\ & \theta_i\left[FDI_{it-1} - \beta_{1i}FD_{it-1} - \beta_{2i}Y_{it-1}\right] + \mu_{it}\end{aligned} \tag{8}$$

where θ_i measures the speed of error-correction towards the long run relationship. Westerlund (2007) suggested four error-correction based tests. The G_α and G_τ test statistics test: H_0: $\theta_i = 0$ for all *i* versus H_1: $\theta_i < 1$ for at least one *i*. These statistics start from a weighted average of the individually estimate of θ_i's and the *t*-ratio respectively. If H_0 is rejected, it means that cointegration exists for at least one of the cross-sectional units. While, P_α and P_τ test statistics pooled the information over all the cross-sectional units to test H_0: $\theta_i = 0$ for all *i* versus H_1: $\theta_i < 1$ for all *i*. The rejection of H_0 suggests the evidence of cointegration for the panel as a whole.

According to Westerlund (2007), P_α and P_τ test statistics have the highest power and are the most robust to cross-sectional correlation.
If the model contains cointegration relationship between the variables, we proceed with long and short run coefficients estimation. In the presence of cointegration, the OLS estimator yields biased and inconsistent results. For this reason, several estimators for cointegrated panel data have been developed in the econometric literature. The most commonly used estimators are the Fully Modified OLS (FMOLS) and the Dynamic OLS estimators. However, both estimators do not consider the importance of cross-sectional dependency. To deal with both cross-section dependence and heterogeneity, we use the Common Correlated Effects Mean Group (CCEMG) estimator designed by Pesaran (2006). This estimator solves the issue of cross-section dependence by augmenting the regression equation with the cross-sectional averages of the dependent variable as well as the observed regressors:

$$FDI_{it} = \beta_{0i} + \beta_{1i} FD_{it} + \beta_{2i} Y_{it} + d_{1i}\overline{FDI}_t + d_{2i}\overline{FD}_t + d_{3i}\overline{Y}_t + e_{it} \tag{9}$$

This equation is estimated by OLS for each cross-section. The consistent mean group estimator is derived as the simple average of the group-specific estimates. The CCEMG estimator was found to be robust to omitted variables bias and endogeneity of regressors (Pesaran, 2006; Kapetanios *et al*., 2011). In addition, it performs well even when the cross-section dimension is small, when variables are nonstationary, cointegrated or not. To test whether there is a long-run relationship among variables, the residuals obtained from the CCEMG estimator is tested for unit root. In presence of cointegration among the variables, the short run dynamics is estimated through a panel error correction model given by:

$$\begin{aligned}\Delta FDI_{it} = {} & \gamma_{0i} + \gamma_{1i}\Delta FD_{it} + \gamma_{2i}\Delta Y_{it} + \lambda_i ECT_{it-1} + d_{1i}\overline{\Delta FDI}_t + d_{2i}\overline{\Delta FD}_t + \\ & d_{3i}\overline{\Delta Y}_t + d_{4i}\overline{\Delta ECT_{t-1}} + \nu_{it}\end{aligned} \tag{10}$$

where Δ is the first difference operator and ECT_{it-1} is the lagged residuals of the long run relation Eq.(1).

Finally, we investigate the causal relationship between financial development and foreign direct investment using the panel Granger causality tests. The panel Granger causality within Vector Error Correction Model (VECM) framework is based on a two-step procedure. The VECM is specified as follows:

$$\Delta FDI_{it} = \alpha_1 + \sum_{j=1}^{p}\gamma_{1ij}\Delta FDI_{it-j} + \sum_{j=1}^{p}\varphi_{1ij}\Delta FD_{it-j} + \sum_{j=1}^{p}\delta_{1ij}\Delta Y_{it-j} + \lambda_{1i} ECT_{it-1} + e_{1it} \tag{11}$$

$$\Delta FD_{it} = \alpha_{2i} + \sum_{j=1}^{p} \gamma_{2ij} \Delta FDI_{it-j} + \sum_{j=1}^{p} \varphi_{2ij} \Delta FD_{it-j} + \sum_{j=1}^{p} \delta_{2ij} \Delta Y_{it-j} + \lambda_{2i} ECT_{it-1} + e_{2it} \quad (12)$$

where p is the optimal lag length and ect_{it-1} is the error correction term obtained from the long run relationship. The optimal lag p is determined by both the Akaike Information Criterion (AIC) and the Final Prediction Error (FPE). In small sample study ($n<60$) these criteria have been shown to be superior to other information criteria (Lutkepohl, 1991; Liew, 2004).

In addition to providing indication on the direction of causation, the VECM also enables the identification of both short and long run causality. We examine the short run causality by testing the significance of the coefficients of the lagged difference terms, while the long run causality is identified by testing the significance of the coefficients on the error correction terms. In terms of short run causality financial development (FD) does not Granger cause foreign direct investment (FDI) if the null hypothesis $\varphi_{1ij} = 0$ (for all i and j) is not rejected. Similarly, foreign direct investment (FDI) does not Granger cause financial development (FD) if the null hypothesis $\gamma_{2ij} = 0$ (for all i and j) is rejected. Short run causality is tested using Wald-statistic which has an asymptotic chi-square distribution. With regard to the long run causality, financial development does not Granger cause foreign direct investment if the null hypothesis $\lambda_{1i}=0$ (for all i) is not rejected. To implement the short and long run Granger causality tests, we estimate equations (11) and (12) by CCEMG estimator.

4. Empirical Findings and Discussion

Before proceeding with the estimation of the nexus between foreign direct investment and financial development, we test for cross-sectional dependency and slope homogeneity. The results reported in Table 2 indicate that the relationship among the variables is plagued by cross-sectional dependency. Therefore, we can conclude that there are strong connections among ECOWAS countries. Furthermore, the null hypothesis of slope homogeneity is rejected in favor of the alternative hypothesis that heterogeneity exists in the relationship between foreign direct investment, financial development and economic growth. This means that inconsistent estimates will be obtained if the constraints of cross-section independence and slope homogeneity are imposed.

Table 2: Results of Cross-Sectional Dependence and Homogeneity Tests

Test statistics	Model 1 FD=Domestic credit to private sector		Model 2 FD=M2/GDP	
	Statistics	p-value	Statistics	p-value
Cross-sectional dependency tests				
LM (Breusch and Pagan, 1980)	250.699*	0.000	182.139*	0.000
LM adjusted (Pesaran 2004)	21.682*	0.000	14.455*	0.000
CD (Pesaran, 2004)	10.922*	0.000	6.195*	0.000
Homogeneity tests				
Delta tilde	64.193*	0.000	72.320*	0.000
Delta tilde adjusted	70.104*	0.000	84.743*	0.000
Note: * indicates rejection of the null hypothesis at 5% significance level.				

The next step of our empirical analysis is to determine the order of integration of the series by means of unit root tests. We first apply the well-known IPS test developed by Im *et al*. (2003), which is less restrictive and more powerful compared to the other first generation panel unit root tests. The IPS test allows heterogeneity in the autoregressive coefficients. However, this test assumes cross-section independence across countries. Given the existence of cross-sectional dependency, we further employ the Cross-sectional Augmented Dickey-Fuller (CADF) test proposed by Pesaran (2007) which deals with both heterogeneity and cross-sectional dependency. The results of these tests are portrayed in Table 3. They indicate that the null hypothesis of unit root cannot be rejected for all variables. However, when applied to the first differences, the null hypothesis of unit root is rejected. Thus, we can regard the variables as being integrated of order one, which suggests that there might be a long-run relationship among them.

Table 3: Results of Panel Unit Root Tests

Variables	Level		First difference	
	IPS test	CADF test	IPS test	CADF test
CRED	0.665 [0.747]	1.136 [0.872]	-15.045* [0.000]	-4.841* [0.000]
M2	1.920 [0.972]	-0.734 [0.232]	-6.893* [0.000]	-3.349* [0.000]
FDI	-2.764* [0.003]	-0.681 [0.248]	-26.108* [0.000]	-4.385* [0.000]
GDP	2.966 [0.998]	2.831 [0.998]	-17.642* [0.000]	-3.385* [0.000]
Notes: CRED: domestic credit to private sector as share of GDP, M2: broad money as share of GDP, FDI: foreign direct investment inflows as share of GDP, GDP: log of real GDP per capita. The IPS test provides W-t-bar statistic, whereas the CADF test provides z-t-bar statistic of Pesaran (2007) test. Tests are conducted for model with intercept and *p-values* are given in brackets. Optimal lag length was determined using AIC with a maximum of 5. * and ** denote rejection of the null hypothesis of unit root at the 5% and 10% significant levels, respectively				

After checking the stationarity of the variables, we test whether there is a long run relationship among the variables. To this end, we first employ Pedroni (2004) residual-based cointegration test. Pedroni (2004) proposed seven different statistics to test for the cointegration relationship in a heterogeneous panel. The seven test statistics are classified into within-dimension and between-dimension statistics. Within-dimension statistics are referred to as panel cointegration statistics, while between-dimension statistics are called group mean panel cointegration statistics. The results of Pedroni tests are reported in Table 4. The cointegration test results reveal that six of the seven statistics reject the null hypothesis of no cointegration at the 5% significance level. There is a cointegration relationship among the variables when foreign direct investment (FDI) is used as the dependent variable. The cointegration test of Pedroni allows for heterogeneity among cross-sectional units but it is limited by the assumption of cross-sectional independence. We apply the second-generation panel cointegration test developed by Westerlund (2007), which allows for both heterogeneity and cross-sectional dependence. The results display in Table 5 confirm the existence of a long run relationship among the variables under investigation.

Table 4: Results of Pedroni Panel Cointegration Tests

Statistics	**Model 1** FD=Domestic credit to private sector (%GDP)		**Model 2** FD=M2/GDP	
	Statistic	Prob.	Statistic	Prob.
Within dimension				
Panel v-Statistic	0.047	0.480	0.521	0.300
Panel rho-Statistic	-5.643*	0.000	-5.146*	0.000
Panel PP-Statistic	-5.466*	0.000	-4.975*	0.000
Panel ADF-Statistic	-5.624*	0.000	-5.110*	0.000
Between dimension				
Group rho-Statistic	-6.408	0.000	-5.973*	0.000
Group PP-Statistic	-7.638*	0.000	-6.969*	0.000
Group ADF-Statistic	-6.452*	0.000	-5.716*	0.000
Note: The asterisks * denotes significance at the 5% level.				

Table 5: Results of Westerlund Panel Cointegration Tests

Statistics	Without trend		With trend	
	Value	*p*-value	Value	*p*-value
Model 1: FD=Domestic credit to private sector (% GDP)				
G_t	-2.547*	0.039	-3.009*	0.035
G_a	-15.518*	0.001	-20.473*	0.002
P_t	-5.239	0.569	-8.117	0.164
P_a	-8.408**	0.075	-21.615*	0.000
Model 2: FD=M2/GDP				
G_t	-2.556*	0.037	-3.190*	0.006
G_a	-13.088*	0.023	-22.562*	0.000
P_t	-5.727	0.382	-9.648*	0.004
P_a	-10.266*	0.006	-25.111*	0.000
Note: The asterisks * and ** denote significance at the 5% and 10% levels, respectively				

The existence of cointegration relationship explains co-movement between the underlying variables. As argued in the methodology section, we rely on the CCEMG method to estimate both the long and short run relationships among the variables. The results are reported in Table 6. Looking at the long run estimates, we see that in the long run financial development does not exert any significant effect on foreign direct investment. On the contrary, economic growth increases foreign direct investment in the long run. Other things remain the same, a one percent increase in real GDP per capita leads to about 4.4 percentage point increase in foreign direct investment. Thus, economic growth is playing a significant role in attracting foreign direct investment in ECOWAS countries. With regard to the short run estimates, domestic credit to private sector and economic growth do not exert any significant impact on foreign direct investment. When broad money supply is used as proxy for financial development, only economic growth has a positive effect on foreign direct investment. We can therefore conclude that financial development has no significant effect on foreign direct investment both in the long and short run. The coefficient on the lagged error term is negatively signed and statistically significant. This provides additional evidence of the presence of an established long-run relationship among the variables. The results confirm that domestic economic growth is a major factor influencing foreign direct investment both in long and short run.

Table 6: CCEMG Long and Short Run Estimates.

Regressors	Dependent variable: FDI (% GDP)					
	Long run coefficient			Short run coefficient		
	Coef.	Std. Err.	z-stat.	Coef.	Std. Err.	z-stat.
Model 1: FD=Domestic credit to private sector (% GDP)						
FD	-0.011	0.061	-0.19	-0.096	0.140	-0.68
GDP	4.442*	1.556	2.85	1.652	1.655	1.00
ECM	-	-	-	-0.755*	0.054	-13.81
Model 2: FD=M2/GDP						
FD	0.029	0.031	0.92	0.051	0.048	1.06
GDP	3.970*	1.159	3.42	3.069*	1.502	2.04
ECM	-	-	-	-0.782*	0.073	-10.67

Note: CRED: domestic credit to private sector as share of GDP, M2: Broad money as share of GDP, FDI: Foreign direct investment inflows as share of GDP, GDP: log of real GDP per capita. The asterisk * indicates significance at the 5% level.

We proceed to detect the direction of causality between the variables. Table 7 portrays the results of short run and long run Granger causality tests. As can be seen from this Table, there is evidence of causality running from foreign direct investment to economic growth, and from financial development to economic growth. Moreover, economic growth causes financial development. So, it can be concluded that there is bidirectional causality between financial development and economic growth in the short run. Furthermore, the results indicate bidirectional causality between broad money supply and foreign direct investment. In the long run, economic growth causes both foreign direct investment and money supply.

Table 7: Results of the Granger Causality Tests

Dependent variable	Direction of Granger Causality			
	Short Run			Long Run
	FDI	FD	GDP	ECT_{t-1}
Model 1: FD=Domestic credit to private sector (% GDP)				
FDI	-	6.10 [0.296]	7.16 [0.209]	-1.523* [0.000]
FD	3.67 [0.597]	-	9.89** [0.078]	-0.208 [0.734]
GDP	24.56* [0.000]	9.95** [0.076]	-	0.004 [0.554]
Model 2: FD=M2/GDP				
FDI	-	27.50 [0.000]	3.97 [0.554]	-1.321* [0.000]
FD	14.24* [0.014]	-	63.52 [0.000]	1.170** [0.056]
GDP	6.99 [0.221]	15.50* [0.008]	-	0.004 [0.669]

Note: FD: financial development, FD: foreign direct investment as share of GDP, GDP: real GDP per capita, ECT: error correction term. The maximum lag selected by AIC is five. χ^2 statistics for Wald tests are reported here and the p-value are indicated in parentheses. Significance at 5% and 10% levels are denoted with * and ** respectively.

5. Conclusion

In many empirical studies, the relationship between foreign direct investment and financial development is widely analyzed in terms of their contribution to economic growth. There are quite a few pieces of empirical literature focusing specifically on the causal relationship between the two financial variables. The aim of this study was to shed light on the relationship between financial development and foreign direct investment for a panel of ten member countries of the Economic Community of West African States (ECOWAS). The empirical investigation uses annual data covering the period from 1970 to 2017. Contrary to previous panel studies which are typically based on standard panel estimators, we have made use of a more flexible and efficient panel estimation framework which controls for a number of issues usually affecting panel methods. Among these, parameter heterogeneity and cross-sectional dependency are of particular importance. Our empirical strategy deals with these issues relying on multifactor modelling approaches. More precisely, we have applied the Common Correlated Effects Mean Group estimator developed by Pesaran (2006). The results have shown bidirectional causality between money supply and foreign direct investment in the short run. There was no causal relationship between domestic credit to private sector and foreign direct investment. Further, bidirectional causality was found between financial development and economic growth in the short run. In the long run, economic growth was found to cause both foreign direct investment and money supply, an indicator of financial development.

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