Financial Development, Trade Openness and Economic Growth: The Evidence from West African Countries Revisited

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Abstract

This study investigates the relationship among financial development, trade openness and economic growth for a panel of 11 West African countries over the period from 1985 to 2018. Contrary to most existing studies, the analysis makes use of the Common Correlated Mean Group method and the Seemingly Unrelated Regression Estimator (SURE) to cope with both heterogeneity and cross-sectional dependency across countries. The study provides various pieces of evidence through whole-panel and country-level analyses. The results from the panel analysis show that financial development and trade openness have, on average, positive effects on economic growth both in the short and long run. The Granger causality tests show that real GDP, financial development and trade openness are mutually causal, implying that their simultaneous development should be promoted. In the short run, however, there is unidirectional causality flowing from trade openness to financial development. The results also show that investment is an important channel through which financial development and trade feed economic growth. The country-level results reveal, however, considerable heterogeneity across countries. The long-run growth effect of financial development is positive in 8 countries while that of trade openness is positive in 6 countries. The results have important policy implications for the financial sector and trade development of West African countries.

Keywords: financial development; trade openness; economic growth; West African countries

JEL Classification: C33, E44, F43, O55

1. Introduction

The growth effects of financial development and trade have been subjects of intense debate in macroeconomics. The debate has received increased attention in both theoretical and empirical literature and remains inconclusive. The theoretical view about the finance-growth nexus suggests a number of mechanisms through which financial development promotes economic growth. The development of financial sector allows risk diversification and risk management, facilitates exchange by reducing transaction costs, and improves resource allocation through the production of information about investment opportunities (Goldsmith, 1969; Shaw, 1973; Bencivenga and Smith, 1991; King and Levine, 1993a; Bencivenga, et al., 1995; De Gregorio and Guidotti, 1995). With respect to trade openness, the theoretical literature on international trade advocates that trade contributes positively to economic growth through efficient allocation of resources, dissemination of knowledge and technology, and greater economies of scale (Grossman and Helpman, 1991; Markusen et al., 1995). It
is in view of these expected gains from trade and financial development that many developing countries have adopted liberalization policies with the aim of opening up and integrating them into the world market in order to boost their economic development. Recent financial crises, however, have shown us that increase in the interdependence of economies across the world makes financial crises more costly because countries are more exposed and vulnerable to external shocks. Breitenlechner et al. (2015) showed that financial development has positive effect on economic growth in non-crisis times, but larger financial sectors worsen growth during banking crises. The 2008 global financial crisis which was mainly driven by subprime mortgage lending, brought the finance-trade-growth nexus into question. This crisis indicates the failure of financial markets to allocate the large inflow of funds into profitable ventures (Carré and L’oeillet, 2018).

On the empirical front, an overwhelming body of literature has examined the linkages between financial development and economic growth, and between trade openness and economic growth. Though the evidence from this literature is mixed and even conflicting, the general belief remains that financial development and market openness are essential for economic development. On the one hand, most of the studies revealing the significance of financial development and trade openness for economic growth have been conducted in a bivariate framework. On the other hand, few studies have investigated the causal links among financial development, trade openness and economic growth, simultaneously in a multivariate framework. As financial development and trade are important drivers of economic growth, understanding the causal connections between these three phenomena is important for designing relevant strategies in developing countries. A sizeable empirical research has been devoted, in recent years, to examine the effects of financial development and trade openness on economic growth. These studies show mixed and controversial results depending on countries, data, variables measurement, and econometric techniques used.

A serious shortcoming in previous studies is that they employed estimation methods that assume parameter homogeneity and cross-sectional independence across countries with the hope that the results from panel analysis could be applied to all countries. In addition, the problem of endogeneity has not been satisfactorily addressed. Therefore, the results from existing studies based on panel data may be questionable if models exhibit cross country dependency and heterogeneity. With the increasing globalization of the world, countries become more and more interdependent. In addition, findings reported by Demetriades and Hussein (1996), Aghetsiafa (2004), Ghirmay (2004), Enisan and Olufisayo (2008), Akinlo and Egbutunde (2010), Were (2015), Khoabai et al. (2017), and Guei and Le Roux (2019) show that the role of financial development and trade openness in the economic growth process is country specific. Therefore, more research is needed in this field of economics.

This study contributes to the empirical literature by employing recent developments in non-stationary heterogeneous panel techniques to appraise the effect of financial development and trade openness on economic growth in selected 11 West African countries. More precisely, the study provides more reliable results than previous studies by running the Common Correlated Effects Mean Group (CCEMG) estimator developed by Pesaran (2006). This estimator has been shown to be robust to the problems associated with cross-country dependence and heterogeneity, and omitted variables. It also takes care of the problem of endogeneity considered by Das and Paul (2011) as one possible reason for disappointing results in the empirical literature. Our aim in this study is to contribute to the ongoing debate on the growth effects of trade openness and financial development. To the best of our knowledge the methodology and estimation strategy employed in this study have not yet been used before for providing evidence for the joint effect of financial development and trade openness on economic growth in the African context.

The remainder of the study is organized as follows. Section 2 reviews the theoretical and empirical literature linking financial development, trade openness and economic growth. Section 3 outlines the empirical model and the estimation strategy of the study. The data description is provided in Sector 4. Section 5 presents and discusses the empirical results. Finally, Section 6 concludes the study and provides some key policy recommendations.
2. Literature Review

The relationships between financial development and economic growth, and between trade openness and economic growth are subjects of intensive debate that has received substantial attention both in empirical and theoretical economic literature. Yet these issues are far from being resolved. A comprehensive survey of the literature on these topics is provided by Ang (2008), Acaravci et al. (2009), Huang and Chang (2014), Saqib (2015), and Keho (2017). It is argued that the development of the financial sector fosters economic growth in two ways. One is quantitative and runs through the accumulation of physical capital. A well-developed financial sector stretches the range of financial services available in the economy and increases the accessibility of financial services to the public. An increasing use of financial services might stimulate savings, thereby increasing the availability of resources for investment (Goldsmith, 1969; Shaw, 1973). The other is qualitative and operates through productivity enhancement. By analyzing information and channeling savings to the most productive uses, financial intermediaries help the efficient allocation of resources and reduce asymmetries in information and costs of investing in productivity enhancement (Greenwood and Jovanovic, 1990). Also, financial development enhances productivity through the adoption of new technologies (Schumpeter, 1911; Pagano, 1993; Bencivenga and Smith, 1991; De Gregorio and Guidotti, 1995; Levine, 1997). These arguments suggest that in a financially underdeveloped economy, the allocation of resources will not be optimized in the sense that they will not go to most productive uses. Conversely, the development of the financial sector may follow economic growth. As the real economy grows, the demand for credits and new financial products and services increases which enhances the development of the financial sector (Robinson, 1952; Patrick, 1966; Goldsmith, 1969).

As regards the trade-growth nexus, the theory of comparative advantage contends that international trade encourages specialization in sectors which have economies of scale that contribute to improve the efficiency and productivity in long-run (Krueger, 1978; Bhagwati, 1978). New endogenous growth models advocate that openness to trade enhances economic growth by improving productivity through the diffusion of knowledge and advanced technologies (Rivera-Batiz and Romer, 1991; Grossman and Helpman, 1991; Ben-David and Loewy, 2000). A more open economy has a greater ability to use advanced technologies, and this capability leads it to grow more rapidly than a less open economy. It is therefore expected that outward-oriented economies will record higher economic growth rates than inward-oriented economies. From this perspective, developing countries have much to gain by trading with advanced countries. An opposite view claims, however, that increase in trade openness may be detrimental to economic growth by increasing inflation, vulnerability to terms of trade and financial crisis (Cooke, 2010; Jafari et al., 2012; Fosu, 2013). A reverse causation flowing from economic growth to trade is also possible through an increase in the exportable capacity of the economy and imports of goods and services.

These theoretical considerations have stimulated a growing empirical literature devoted to ascertain the role of financial development and trade openness in supporting economic growth. Unsurprisingly, the evidence from this literature remains mixed and inconclusive. The literature is rich in studies that highlight the positive effect of financial development on economic growth (e.g., King and Levine, 1993b; Gregorio and Guidotti, 1995; Odedokun, 1996; Beck et al. 2000; Levine et al., 2000; Odhiambo, 2007; Ahmad and Malik, 2009; Hassan et al., 2011; Afawubo and Fromentin, 2013; Uddin et al., 2013; Puryan, 2017). Conversely, many other studies reported that financial development undermines economic growth (e.g., Narayan and Narayan, 2013; Herwartz and Walle, 2014; Samargandi et al., 2015; Iheanacho, 2016; Seven and Yetkiner, 2016).

In terms of causality, a number of studies found evidence of financial development causing growth (Levine and Zervos, 1998; Agbetsiaga, 2004; Christopoulos and Tsionas, 2004; Ghirmay, 2004) while others support the reverse causality that economic growth leads to financial sector development (Al-Yousif, 2002; Chakraborty, 2008; Odhiambo, 2008; Hassan et al., 2011; Godfrey, 2013). In contrast to these studies, there is empirical evidence in support of bi-directional causality between financial development and economic growth (e.g., Demetriades and Hussein, 1996; Ahmed
and Ansari, 1998; Akinboade, 1998; Kul and Khan, 1999; Luintel and Khan, 1999; Craigwell and Downes, 2001; Shan and Morris, 2002; Odhiambo, 2005; Apergis et al., 2007; Acaravci et al., 2009; Wolde-Rufael, 2009; Akinlo and Egbetunde, 2010; Fowowe, 2011; Jun, 2012; Godfrey, 2013; Pradhan et al., 2014; Adekeye et al., 2015; Lebe, 2016). Still others do not find evidence of any causal relationship between financial development and economic growth (e.g., Ram, 1999; Majid, 2008; Arestis et al., 2001; Eng and Habibullah, 2011; Nain and Kamaiah, 2014; Akbas, 2015; Hasan and Barua, 2015).

Among the reasons of these mixed results are country-characteristics, data, variables measurement, and econometric techniques employed in the empirical analysis. For example, Esso (2009) examines the relationship between financial development and economic growth in ECOWAS countries, using data from 1960 to 2005. He employs the autoregressive distributed lag analysis and the Ganger causality test proposed by Toda and Yamamoto (1995). He finds a positive long-run relationship between financial development proxies by the ratio of M2 to GDP and economic growth in four countries, namely, Cote d'Ivoire, Guinea, Niger and Togo, and a negative one in Cape Verde and Sierra Leone. The results of the causality test show that finance causes economic growth only in Cote d'Ivoire and Guinea. The author concluded that the relationship between financial development and economic growth cannot be generalized across countries because these results are country specific. In another work, Esso (2010a) re-examines the relationship between financial development and economic growth in the ECOWAS countries over the period 1960 - 2005. He employs the autoregressive distributed lag analysis and the Ganger causality test proposed by Toda and Yamamoto (1995). Financial development is measured by the credit to private sector as a percentage of GDP. He finds that there is a positive long - run relationship between financial development and economic growth in five countries, namely, Cape Verde, Cote d'Ivoire, Ghana, Guinea and Liberia. In addition, financial development leads economic growth in Ghana, Liberia and Mali; growth causes financial development in Cote d'Ivoire, and a bidirectional causality exists in Cape Verde and Sierra Leone. Esso (2010b) revisits the evidence from ECOWAS over the period 1960-2005, using cointegration tests that account for structural change. The study shows that financial development leads economic growth in Ghana and Mali, while growth causes finance in Burkina Faso, Cote d'Ivoire and Sierra Leone, and finance and growth cause each other in Cape Verde and Liberia. Aka (2010) also examines the link between financial development and economic growth for the eight member countries of the West Africa Economic and Monetary Union (WAEMU) over the period 1961-2005. He builds a synthetic financial development indicator using the principal component analysis. He finds unidirectional causality running from finance to economic growth in 3 countries, and bidirectional causality in 5 countries. Even though the studies by Esso (2009, 2010a,b) and Aka (2010) considered the ECOWAS or WAEMU region, they analyze each country individually, instead of collectively as a panel, which would have improved the efficiency of the parameter estimates and reveal cross sectional dependencies if any. Ncanywa and Mabusela (2019) employ panel autoregressive and distributive lag model to depict the relationship between financial development and economic growth in five selected sub-Saharan African countries (Botswana, Ghana, Kenya, Nigeria, South Africa) for the period 1980–2014. In the long run, bank credit to the private sector and liquid liabilities have a positive influence on economic growth.

With respect to the relationship between trade openness and economic growth, the empirical evidence is also quite varied and inconclusive. There is accumulated evidence supporting the positive influence of trade openness on economic growth (e.g., Frankel and Romer, 1999; Deme, 2002; Yanikkaya, 2003; Wang et al., 2004; Das and Paul, 2011; Shahbaz, 2012; Hye et al., 2016; Kim et al., 2016; Zārra-Nezhad et al., 2016). On the other hand, a number of studies reported a negative impact of trade openness on economic growth (e.g., Vlastou, 2010; Hye and Lau, 2015), while others fail to find significant relationship between trade openness and economic growth (Vamvakidis, 2002; Tekin, 2012; Fenira, 2015; Ulaşan, 2015). Dufrenot et al. (2010) apply the quantile regression approach to explore the trade-growth nexus for 75 developing countries. Their results indicate that the effect of openness on economic growth is higher in low-growth countries relative to high-growth countries. The low-growth
economies include countries from all the continents, but a majority is in Africa (Benin, Cote d’Ivoire, Madagascar, and Zambia) and Latin America. For a sample of 34 African countries, Vlastou (2010) finds that openness to trade has a negative impact on economic growth. He also reports a causal relationship running from openness to growth. Kim et al. (2011) use instrumental variable threshold regressions to examine whether the trade-income relationship varies with the level of economic development. Their results show that trade openness stimulates economic development in high-income countries. In low-income countries, however, the effect is negative. Asfaw (2014) investigates the impact of trade liberalization on economic growth in 47 Sub-Saharan African countries. He shows that openness to trade stimulates both economic growth and investment. Brueckner and Lederman (2015) employ the instrumental variable approach to a panel of 41 Sub-Saharan African countries. They find that trade openness increases economic growth both in the short and long run. Were (2015) finds that trade exerts a positive and significant effect on economic growth rate in developed and developing countries, but its effect is not significant for least developed countries which largely include African countries. Keho (2017) examines the impact of trade openness on economic growth for Cote d’Ivoire over the period 1965–2014 in a multivariate framework including capital stock, labor and trade openness. Using the Autoregressive Distributed Lag bounds test to cointegration and the Toda and Yamamoto (1995) Granger causality tests, he shows that trade openness has positive effects on economic growth both in the short and long run. In addition, the results from the Granger causality tests reveal unidirectional causality from capital, labor, and trade openness to economic growth. Furthermore, a positive and strong complementary relationship exists between trade openness and capital formation in promoting economic growth in Cote d’Ivoire. Khobai et al. (2017) study the relationship between trade openness and economic growth in Ghana and Nigeria for the period from 1980 to 2016. The results from the application of the ARDL bounds test show that trade openness has a positive and significant impact on economic growth in Ghana while in Nigeria trade openness has a negative but insignificant effect on economic growth. In the short-run trade has a positive and significant impact on economic growth in both countries. Alam and Sumon (2020) examine the causal relationship between economic growth and trade openness for 15 Asian countries over the period 1990-2017. They apply panel cointegration and causality approaches and find that trade openness has a positive impact on economic growth. Furthermore, the Granger causality analysis reveals a bidirectional causality between economic growth and trade openness.

Most of the above studies have been conducted in a bivariate framework or do not consider the joint effect of trade openness and financial development on economic growth. Recently, an extensive empirical literature has attempted to investigate the relationship between financial development, trade openness and economic growth, simultaneously thereby creating multivariate analytical frameworks. Using various time spans, different econometric methodologies and different measures for trade, financial development and economic growth, this literature produced mixed and even conflicting results. For instance, Udegbunam (2002) examines the relationship between trade openness, economic growth and financial development in Nigeria for the period from 1970 to 1997. The study reveals that a combination of financial development and trade openness had a strong positive and significant effect on economic growth in Nigeria. Beck and Levine (2004) analyze the impact of stock market and bank development on economic growth in a panel of 40 countries over the period 1976-1998. Using the Generalized Method of Moments (GMM) estimators, the results show that both variables positively influence economic growth. The effect of trade openness is insignificant in most of the models. Gries et al. (2009) investigate financial development, economic development and trade openness interrelationships in the Sub-Saharan African (SSA) countries and record that financial development and trade openness have negligibly influenced economic growth. They also provide evidence that economic growth causes trade openness in Ethiopia, Gabon, Kenya, Mauritius, Senegal, Sierra Leone, and Togo, whereas a feedback causal relationship exists for Cameroon, Cote d’Ivoire, Nigeria and Rwanda. On the contrary, no causal relationship between trade and growth was found for Burundi, Ghana, Madagascar, South Africa, and Gambia. Furthermore, they find bi-directional causality
between financial development and trade openness. Ogbonna (2010) examines the case of Botswana and finds that trade openness and economic growth were responsible for sustainable financial development. Gries et al. (2011) investigate the causal link between finance, growth and trade openness for 13 Latin American and Caribbean countries. Their empirical results do not reveal any direct or indirect link between the three variables. Kim (2011) shows that openness to trade exerts positive effects on economic growth and real income in developed countries but negative effects in developing countries. Furthermore, the growth effect of trade openness also depends on the level of financial development and inflation. Openness to trade has negative effect on growth in countries with low financial development, but has insignificant impact in countries with high financial development. In addition, trade openness is conducive to economic growth in low-inflation countries but has insignificant impact on economic growth in high-inflation countries. Kim et al. (2012) provide evidence that trade promotes economic growth in high-income, low-inflation, and non-agricultural countries but has a negative impact in countries with the opposite attributes. Adu et al. (2013) investigate the effects of financial development on economic growth in Ghana over the period 1961-2010. They use the ARDL bounds approach to cointegration and find that credit to private sector and domestic credit are conducive to growth, whereas money supply is growth-retarding. They also report some evidence of trade openness impeding growth. Adusei (2013) also examines the case of Ghana using annual data for the period from 1971 to 2010. He finds that whereas domestic credit as well as broad money supply hamper economic growth both in the short and long run, credit to private sector has a positive but statistically insignificant relationship with economic growth. The author concludes that financial development undermines economic growth in Ghana. The effect of trade openness on growth is positive but statistically insignificant. Investigating the case a panel of 46 countries, Huang and Chang (2014) find that the effect of trade on growth depends on the extent of stock market development. Trade enhances economic growth only when the country reaches a threshold level of stock market development. Menyah et al. (2014) study the causal nexus among financial development, trade openness, and economic growth for 21 Sub-Saharan African countries. The empirical results suggest that financial development and trade openness do not Granger-cause economic growth in Sub-Saharan Africa. Further, trade openness was found to cause economic growth in Benin, Sierra Leone, and South Africa. Abubakar et al. (2015) examine the relationship among financial development, human capital accumulation and growth in the ECOWAS region over the period from 1980 to 2011. They employ panel cointegration approaches as well as the Fully Modified OLS (FMOLS) and Dynamic OLS estimators. The results reveal that bank private credit and domestic private credit contribute significantly to economic growth in the ECOWAS, both directly and through their influence on human capital accumulation. The results also show that openness to trade has positive effect on growth while FDI has either negative or insignificant influence on growth. Kaushal and Pathak (2015) investigate the causal relationship among financial development, economic growth and trade openness in India over the period 1991-2013. Their findings suggest that economic growth and financial development have a positive effect on trade openness. Ngongang (2015) tests the link between financial development and economic growth in the context of 21 Sub-Saharan African countries during the period 2000-2014. Financial development is measured by stock market capitalization and bank credit to private sector as ratios to GDP. Using the dynamic panel method of GMM, stock market capitalization appears to be positively but insignificantly correlated to the growth rate of real GDP per capita. On the contrary, bank credit to private sector negatively and significantly impacts on economic growth. Furthermore, trade openness has a positive but insignificant impact on economic growth. Polat et al. (2015) report that financial development stimulates economic growth in South Africa, while trade openness impedes growth. They also find bidirectional causality between financial development and trade openness both in the short and long run. Iheanacho (2016) applies the ARDL approach to Nigeria over the period 1981–2011 and finds that the relationship between financial intermediary development and economic growth in Nigeria is insignificantly negative in the long-run and significantly negative in the short-run. The effect of trade openness is found to be insignificant in the long run and negative and significant in the short run. For the Author, her findings confirm what has been observed generally in
oil-dependent economies where economic activities are driven by oil price determined in the international oil market and not by domestic economic activities; creating economic conditions that adversely affect the ability of financial intermediaries to allocate resources efficiently. Lawal et al. (2016) apply the ARDL methodology to Nigeria and find a negative long-run impact of trade openness on economic growth but a positive effect in the short run. Further, a two-way causality was found between the two variables. Sehrawat and Giri (2016) investigate the finance-growth nexus for South-Asian Association for Regional Cooperation (SAARC) countries over the period 1994-2013. Using FMOLS and DOLS methods, they find that financial development and trade openness contribute to economic growth in SAARC region. Diallo and Mendy (2017) examine the growth effect of financial development in the West African Monetary Zone (WAMZ). They apply the Group Mean method and Dynamic OLS (DOLS) technique to annual data covering the period 1990-2015. The results indicate that financial development has a positive long run impact on economic growth when measured by liquid liabilities whilst domestic credit to private sector exerts no impact on economic growth in the long run. The results further show a significant and negative effect for trade openness suggesting that trade undermines economic growth in WAMZ. At country level, the results reveal that financial development contributes to economic growth in four countries (The Gambia, Ghana, Nigeria and Sierra Leone), while it undermines economic growth in Liberia and has not significant effect in Guinea. Ofori-Abibrese et al. (2017) apply the ARDL approach and Granger causality test to examine the finance and growth relationship in Ghana over the period 1970-2013. They report that domestic credit to private sector has a positive and significant impact on economic growth while trade openness impedes economic growth. Bist (2018) investigates the issue for a panel of 16 selected low-income countries for the period from 1995 to 2014. The author finds that trade openness and financial development proxied by credit to private sector, have long-run positive and significant impact on economic growth. The estimates of individual countries showed that 9 countries out of 16 have a significant positive relationship between financial development and economic growth. The short run causality analysis shows that economic growth causes financial development and there is no causal link between economic growth and trade openness. Ogbebor and Ohiomu (2018) investigate the impact of FDI, and trade openness on economic growth in the ECOWAS area by including financial development and other control variables. They apply fixed and random effects models along with the system generalized method of moments to data covering the period 2000-2016. The results show that FDI, trade openness and domestic credit to private sector exert significant and positive influence on per capita income in ECOWAS. Rani and Kumar (2018) examine the case of BRICS countries using panel data from 1993 to 2015. They find that trade openness and money supply have positive effects on economic growth while foreign direct investment inflows have a negative impact. The results from Granger causality confirm bidirectional causality between FDI and economic growth, and between domestic credit and growth. Furthermore, money supply is caused by economic growth. Guru and Yadav (2019) investigate the relationship between financial development and economic growth for a panel of five major emerging countries of BRICS (Brazil, Russia, India, China and South Africa) during the period from 1993 to 2014. The results from System Generalized Method of Moment estimation show that financial development and exports are positively and significantly determining the economic growth of the selected countries. Guei and Le Roux (2019) examine the impact of trade on GDP per capita in 15 ECOWAS member countries over the period 1990–2016. Using the PMG estimation method in a multivariate framework, the results show that trade openness and GDP per capita have a negative relationship in the long run. The impact of trade openness on economic growth is negative and significant in eight countries (Cape Verde, Cote d’Ivoire, Gambia, Guinea-Bissau, Mali, Niger, Nigeria, Senegal). Finally, Ogbebor et al. (2020) investigate the case of Nigeria for the period 1986-2016, using vector error correction model and causality tests. They find that stock market development, foreign direct investment and trade openness promote economic growth. Furthermore, the Granger causality results confirm the existence of bidirectional causality between economic growth and FDI, trade openness, stock market development and banking sector development.
All in all, the literature reviewed above clearly shows that the relationship between financial development, trade openness and economic growth is subject to diverse and conflicting findings. This suggests that not all countries take equal advantage from financial development and trade openness. Notwithstanding this, the conventional wisdom remains that openness to international trade and development of the financial sector are beneficial to economic development, especially for developing countries. It is mainly in view of this belief, that international organizations routinely recommend trade and financial liberalization policies to developing countries in the hope of opening up and integrating them into the global market. These recommendations are fueled by findings from empirical studies showing that more outward-oriented and financially-developed economies record higher economic growth rates.

The major factors responsible for controversial results in the empirical literature include, inter alia, the time periods, the data measurement and the methodologies used. At the methodological level, most of previous studies did not address the problem of endogeneity which is a serious problem in time series studies. When this issue is addressed, the choice of instrumental variables is questionable. For instance, in their study on 74 developing countries, Beck et al. (2000) control for the endogeneity of financial development by using the legal origin of the law (Anglo-saxon, French, Germanic and Scandinavian). With regard to studies that have employed Generalized Method of Moments, endogeneity is controlled for by using lagged levels or differences of the explanatory variables as instrumental variables. The use of those internal instruments may not be efficient under certain conditions. Furthermore, previous studies did not adequately dealt with the issues of cross-section dependency and heterogeneity; they relied on the assumptions of independence and homogeneity concerning the countries studied. Differences in economic structure, financial sector reform and trade policies as well as in their implementation may explain why the relationship among financial development, trade openness and economic growth is country-specific (Badun, 2009). Consequently, the results from these studies may be questionable if data exhibit cross-country dependency and heterogeneity.

The mixed evidence in the empirical literature implies a literature gap that calls for further examination of the connections between financial development, trade openness and economic growth where few studies have been conducted. Specifically, not many studies have been attempted to depict the causal relationship among financial development, trade openness and economic growth in the context of West African countries. Therefore, this paper contributes to the ongoing debate on the growth effects of trade openness and financial development by using relevant estimation methods that accounts for some shortcomings in previous studies.

3. Model Specification and Methodology
This section presents the empirical model and outlines the econometric methodology of the study.

3.1. Model Specification
To examine the long run relationship between financial development, trade openness and economic growth, the following econometric model is specified:

\[ Y_{it} = \beta_0 + \beta_1 F_{i} + \beta_2 T_{O_{it}} + \beta_3 X_{it} + \mu_{it} \]  

where \( Y_{it} \) stands for economic growth defined as the logarithm of real gross domestic product per capita, \( F_{i} \) is financial development indicator, \( T_{O_{it}} \) represents trade openness, \( X_{it} \) denotes a set of control variables, and \( \mu_{it} \) is an error term assumed to be a white-noise process. The coefficient \( \beta_0 \) is the country-specific fixed effect, while \( \beta_{1i} \) and \( \beta_{2i} \) are the country parameters related to financial development and trade openness, respectively. The model assumes heterogeneity amongst the
countries, allowing individual intercepts and slope coefficients to vary across countries. The set of control variables considered in this study includes gross fixed capital formation and population as proxy for labor force. In terms of *a priori* expectations, financial development and trade openness are predicted to be positively correlated with real GDP per capita. Gross fixed capital formation contributes to capital accumulation and is expected to be positively correlated with GDP per capita.

### 3.2. Econometric Methodology

The estimation procedure used in this study draws on recent developments in heterogeneous panel regressions. The methodology of the study follows five steps. First, the question of whether a cross-country dependency exists was tested. It has been shown that if the variables as well as the error term of Eq.(1) suffer from cross-sectional dependence, the estimates will be biased and inconsistent (Driscoll and Kraay, 1998; Pesaran, 2006; Sarafidis and Wansbeek, 2012). To test for cross-sectional independence (*i.e.*, \( \text{cov}(\mu_i, \mu_j) = 0 \)), we employ the tests suggested by Breusch and Pagan (1980) and Pesaran (2004). The second step examines the heterogeneity between countries, which arises as a result of different country intercepts and varying regression coefficients of the relationship among the variables. More especially, we test the null hypothesis \( H_0: \beta_{ki} = \beta_k \) for all \( i \) and \( k=0,1,2,3 \), against the alternative of heterogeneity \( H_1: \beta_{ki} \neq \beta_k \). To achieve this end, we use the delta tilde and adjusted delta tilde homogeneity tests developed by Pesaran and Yamagata (2008) along with the test proposed by Swamy (1970). In a third step, to avoid the problem of spurious regression related to non-stationary variables, we determine the integration order of the variables. This is achieved through the use of the Cross-sectionally Augmented Dickey-Fuller (CADF) unit root test proposed by Pesaran (2007), which takes into account cross-sectional dependency and heterogeneity. Fourth, we estimate Eq.(1) using the Common Correlated Effects Mean Group (CCEMG) estimator designed by Pesaran (2006). This estimator deals with the issue of cross-section dependence by augmenting the regression equation with the cross-sectional averages of the dependent variable as well as the regressors, as follows:

\[
Y_{it} = \beta_{0i} + \beta_{1i}FD_{it} + \beta_{2i}TO_{it} + \beta_{3i}X_{it} + d_{1i} \bar{Y}_i + d_{2i} \bar{FD}_i + d_{3i} \bar{TO}_i + d_{4i} \bar{X}_i + e_{it} \tag{2}
\]

where \( X = (\ln K, \ln POP) \). 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 cross-country dependence, heterogeneity, omitted variables, endogeneity of regressors and structural breaks (Pesaran, 2006; Kapetanios *et al*., 2011; Pesaran and Tosetti, 2011).

To test whether there is a long-run relationship between the variables, we perform the residual-based panel cointegration test. We apply the Cross-sectionally Augmented Dickey-Fuller (CADF) unit root test to the residuals obtained from the CCEMG estimation of Eq.(1). In presence of cointegration among the variables, we estimate the short run relationship through a panel error correction model given by:

\[
\Delta Y_{it} = \gamma_{0i} + \gamma_{1i}\Delta FD_{it} + \gamma_{2i}\Delta TO_{it} + \gamma_{3i}\Delta X_{it} + \lambda_i ECT_{it-1} + \mu_{it} \tag{3}
\]

where \( \Delta \) denotes the first difference operator and \( ECT_{it-1} \) is the lagged error correction term which is derived from the long-run relationship among the variables. Eq.(3) is estimated using the CCEMG estimator.

Finally, after estimating the long and short run dynamics of the variables, the study carries out panel Granger causality tests to establish the direction of causality among the variables. The Granger causality tests are based on the following panel vector error correction model:
\[
\Delta Y_t = \alpha_1 + \sum_{j=1}^{p} \beta_{1j} \Delta Y_{t-j} + \sum_{j=1}^{p} \gamma_{1j} \Delta FD_{t-j} + \sum_{j=1}^{p} \phi_{1j} \Delta TO_{t-j} + \sum_{j=1}^{p} \theta_{1j} \Delta X_{t-j} + \lambda_1 ECT_{t-1} + e_{1t} \tag{4}
\]

\[
\Delta FD_t = \alpha_2 + \sum_{j=1}^{p} \beta_{2j} \Delta Y_{t-j} + \sum_{j=1}^{p} \gamma_{2j} \Delta FD_{t-j} + \sum_{j=1}^{p} \phi_{2j} \Delta TO_{t-j} + \sum_{j=1}^{p} \theta_{2j} \Delta X_{t-j} + \lambda_2 ECT_{t-1} + e_{2t} \tag{5}
\]

\[
\Delta TO_t = \alpha_3 + \sum_{j=1}^{p} \beta_{3j} \Delta Y_{t-j} + \sum_{j=1}^{p} \gamma_{3j} \Delta FD_{t-j} + \sum_{j=1}^{p} \phi_{3j} \Delta TO_{t-j} + \sum_{j=1}^{p} \theta_{3j} \Delta X_{t-j} + \lambda_3 ECT_{t-1} + e_{3t} \tag{6}
\]

The optimal lag \( p \) is determined by Akaike Information Criterion (AIC). The Granger causality approach explains that a variable \( Z_1 \) causes another variable \( Z_2 \) when the past values of \( Z_1 \) help to predict current changes in \( Z_2 \). In addition to providing indication on the direction of causality, the error correction model also allows us to identify both long and short run Granger causality. The long run causality is identified by testing the significance of the coefficients on the error correction term (ECT). The short run causality is determined by testing the significance of the coefficients of the lagged difference terms by mean of Wald tests. For instance, in terms of short run causality, financial development (FD) does not cause economic growth (Y) if the null hypothesis \( \gamma_{1j} = 0 \) (for all \( j \)) is not rejected. Similarly, economic growth (Y) does not cause financial development (FD) if the null hypothesis \( \beta_{2j} = 0 \) (for all \( j \)) is not rejected. With regard to long run causality, financial development does not cause economic growth (Y) if the null hypothesis \( \lambda_1 = 0 \) is not rejected. The above system of equations is estimated using the CCEMG estimator and SURE.

4. Data Description

The study uses annual data for 11 West African countries, covering the period from 1985 to 2018. The countries covered are: Benin, Burkina Faso, Cote d’Ivoire, Gambia, Ghana, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo. The selection of countries and time periods is limited by data availability.

The ultimate findings from an empirical study are sensitive to the choice of measurement for variables. Several indicators of financial depth and trade openness have been used in the empirical literature. These measures are considered as ratios of GDP. Thus, financial development is commonly measured by credit to the private sector as a percentage of GDP or broad money as a share of GDP (De Gregorio and Guidotti, 1995; Demetriades and Hussein, 1996; Beck et al., 2000; Levine et al., 2000; Quartey and Prah, 2008; Uddin et al., 2013; Adeniyi et al., 2015). Trade openness is commonly measured by the ratio of the sum of exports and imports over GDP (Yanikkaya, 2003; Kim, 2011; Adu et al., 2013; Menyah et al., 2014; Bist, 2018). It is obvious that using such ratios may lead to unexpected empirical results. Indeed, if GDP and an indicator X are positively correlated, and that GDP grows faster than X, then GDP and X/GDP will be negatively correlated. A negative coefficient on log of X/GDP does not necessarily imply that X impedes growth but that the elasticity of GDP with respect to X is lower than one. Many studies have reached different conclusions depending on the indicators used to proxy for financial development and trade openness (e.g., Quartey and Prah, 2008; Ndako, 2010; Adu et al., 2013).

In this study, the variables are measured as follows. Following the literature (e.g., King and Levine, 1993a; De Gregorio and Guidotti, 1995; Acaravci et al., 2009; Akinlo and Egbejunde, 2010; Odhiambo, 2010), we use real per capita GDP as a measure for economic growth (Y). With respect to financial development, we argue that focusing only on credit extended to the private sector is insufficient to capture the essence of the financial sector which is that of intermediation, especially in African countries where governments are compelled to borrow from the financial markets to provide the needed infrastructure for economic growth and social development. Hence, in this study we use total domestic credit provided by the financial sector (FD) instead of credit to the private sector.
because we want to capture the full degree of financial intermediation in African economies. This indicator is also preferred to broad money measure which reflects the use of currency rather than the real level of financial intermediation. In most African countries, the large portion of broad money is currency held outside the banking system. Total domestic credit by the financial sector accurately mirrors the role of financial intermediation in transmitting funds to the whole economy.

With regards to trade openness, it is measured by the sum of real exports per capita and real imports per capita (TO). We also include into the analysis per capita gross fixed capital formation (K) and total population as control variables. The data are in 2010 constant US dollar and were gathered from the World Development Indicators of the World Bank. All data enter the model in logarithm form.

Table 1: Descriptive Statistics and Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>FD</th>
<th>TO</th>
<th>K</th>
<th>POP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel A: Summary Statistics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>6.603</td>
<td>4.894</td>
<td>6.000</td>
<td>4.818</td>
<td>16.176</td>
</tr>
<tr>
<td>Minimum</td>
<td>5.609</td>
<td>4.151</td>
<td>4.442</td>
<td>6.690</td>
<td>13.535</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.531</td>
<td>0.965</td>
<td>0.667</td>
<td>0.829</td>
<td>1.091</td>
</tr>
<tr>
<td>Panel B: Correlation Matrix</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FD</td>
<td>0.653*</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TO</td>
<td>0.846*</td>
<td>0.614*</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>0.787*</td>
<td>0.452*</td>
<td>0.661*</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>POP</td>
<td>0.511*</td>
<td>0.357*</td>
<td>0.243*</td>
<td>0.607*</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Note: Y: log of real GDP per capita, FD: log of per capita domestic credit provided by financial sector, TO: trade openness as the log of the sum of real per capita exports and real per capita imports, K: log of per capita gross fixed capital formation, POP: log of total population. * denotes significance at the 5% level

Table 1 outlays the summary statistics for the variables. This Table reveals a disparity among the countries. The log of real per capita GDP averages 6.603 and varies from 5.609 to 7.849. The financial development indicator also varies from -4.151 to 6.619. The maximum and minimum values of the variables suggest that there is a wide gap among the countries in terms of per capita income, capital accumulation, trade openness, financial development and population in the sub-region. The features of the data clearly show that the use of heterogeneous panel data analysis procedure for the estimation of the empirical model is appropriate. A look at the correlation matrix shows that real per capita GDP correlates positively with all explanatory variables. Furthermore, all correlation coefficients are lower than 0.8, implying that there is no problem of multicollinearity among the explanatory variables.

5. Empirical Results and Discussion
Our empirical analysis begins with tests of cross-sectional dependence and homogeneity. The results of these tests are portrayed in Table 2. The results strongly indicate that the null hypothesis of no cross-sectional dependence is rejected at the 5 percent level of significance. The cross-sectional dependence tests thereby support evidence of high integration among the selected countries, implying that any shock that occurs in one country can quickly be transmitted to other countries. The results also support cross-country heterogeneity, implying that the relationship among real GDP per capita, financial development, and trade openness differs across countries.
Table 2: Results for Cross-Sectional Dependence and Homogeneity Tests

<table>
<thead>
<tr>
<th>Tests</th>
<th>Statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-sectional dependence test</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breusch-Pagan LM</td>
<td>369.081</td>
<td>0.000*</td>
</tr>
<tr>
<td>Pesaran CD</td>
<td>12.174</td>
<td>0.000*</td>
</tr>
<tr>
<td>Pesaran scaled LM</td>
<td>29.946</td>
<td>0.000*</td>
</tr>
<tr>
<td>Homogeneity test</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delta</td>
<td>297.074</td>
<td>0.000*</td>
</tr>
<tr>
<td>Delta adjusted</td>
<td>316.063</td>
<td>0.000*</td>
</tr>
<tr>
<td>Swamy test</td>
<td>7406.80</td>
<td>0.000*</td>
</tr>
</tbody>
</table>

Note: * indicates significance at the 5% level

Given these results, the study uses panel unit root tests to depict the order of integration of the variables. We first apply the well-known IPS test developed by Im et al. (2003), which is less restrictive and more powerful compared to other first generation panel unit root tests. The IPS test allows heterogeneity in the autoregressive coefficients, but assumes cross-section independence across countries. 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 reported in Table 3. The IPS test indicates that the null hypothesis of unit root cannot be rejected for real GDP and financial development while trade openness, capital and population are stationary. On the contrary, the CADF test shows that all variables have unit root in level. However, when applied to the first differences, the null hypothesis of unit root is rejected for all variables. Thus, we can regard all 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

<table>
<thead>
<tr>
<th>Variables</th>
<th>Level IPS test</th>
<th>CADF test</th>
<th>First difference IPS test</th>
<th>CADF test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>1.052 [0.853]</td>
<td>2.669 [0.996]</td>
<td>-9.612 [0.000]</td>
<td>-3.518 [0.000]</td>
</tr>
<tr>
<td>FD</td>
<td>-0.093 [0.462]</td>
<td>3.033 [0.999]</td>
<td>-15.918 [0.000]</td>
<td>-2.566 [0.005]</td>
</tr>
<tr>
<td>TO</td>
<td>-3.201 [0.000]</td>
<td>0.375 [0.646]</td>
<td>-17.002 [0.000]</td>
<td>-4.506 [0.000]</td>
</tr>
<tr>
<td>K</td>
<td>-1.677 [0.046]</td>
<td>0.002 [0.501]</td>
<td>-17.069 [0.000]</td>
<td>-2.903 [0.002]</td>
</tr>
<tr>
<td>POP</td>
<td>-2.230 [0.012]</td>
<td>1.867 [0.969]</td>
<td>-5.241 [0.000]</td>
<td>-6.935 [0.000]</td>
</tr>
</tbody>
</table>

Notes: Y: log of real GDP per capita, FD is the log of per capita domestic credit provided by financial sector, TO is trade openness as the log of the sum of real per capita exports and real per capita imports, K is the log of per capita gross fixed capital formation, POP is the log of total population. The IPS test provides W-t-bar statistic, whereas the CADF test provides z-t-bar statistic of Pesaran (2007) test. p-values are given in brackets. Optimal lag length was determined using AIC with a maximum of 5. * denotes rejection of the null hypothesis of unit root at the 5% significant level.

After checking the variables for unit root, we estimate the long run relationship among the variables. For comparison purposes, we first run the Mean Group (MG) estimator proposed by Pesaran and Smith (1995), the Fully Modified OLS (FMOLS) developed by Pedroni (2000) and the Dynamic OLS estimator suggested by Kao and Chiang (2000). Results are reported in Table 4. As expected, financial development and trade openness are significantly positively related to economic growth in two out of the three regressions. With regard to control variables, we can see that the effect of gross fixed capital formation on real per capita GDP is positive and significant only in the mean group regression. On the contrary, population has a positive and significant effect on real per capita GDP in all the three alternative regressions. The magnitude of coefficients varies across regression methods. The long run growth effects of financial development are 0.067, 0.014 and 0.084 for FMOLS, DOLS, and MG regressions, respectively. Those of trade openness are 0.307, 0.261 and 0.041 for FMOLS, DOLS and MG, and regressions, respectively. From these results, we can conclude that financial development and trade openness are growth enhancing in the selected countries. Among the control variables, the labor force proved to be a robust determinant of long-run economic growth.
Table 4: Long Run Estimates from FMOLS, DOLS and MG

<table>
<thead>
<tr>
<th>Variables</th>
<th>FMOLS</th>
<th>DOLS</th>
<th>MG</th>
</tr>
</thead>
<tbody>
<tr>
<td>FD</td>
<td>0.067* (4.823)</td>
<td>0.014 (0.663)</td>
<td>0.084* (4.930)</td>
</tr>
<tr>
<td>TO</td>
<td>0.307* (8.706)</td>
<td>0.261* (6.300)</td>
<td>0.041 (1.000)</td>
</tr>
<tr>
<td>K</td>
<td>0.009 (0.401)</td>
<td>0.039 (1.361)</td>
<td>0.093* (4.770)</td>
</tr>
<tr>
<td>POP</td>
<td>0.110* (2.527)</td>
<td>0.089* (1.865)</td>
<td>0.281* (2.02)</td>
</tr>
<tr>
<td>IPS</td>
<td>-1.874* [0.030]</td>
<td>-9.483* [0.000]</td>
<td>-5.063* [0.000]</td>
</tr>
<tr>
<td>CADF</td>
<td>1.844 [0.967]</td>
<td>-0.846 [0.199]</td>
<td>-2.380 [0.009]</td>
</tr>
<tr>
<td>CD test</td>
<td>5.098* [0.000]</td>
<td>3.873* [0.000]</td>
<td>4.126* [0.000]</td>
</tr>
</tbody>
</table>

Note: Y: log of real GDP per capita, FD is the log of per capita domestic credit provided by financial sector, TO is trade openness as the log of the sum of real per capita exports and real per capita imports, K is the log of per capita gross fixed capital formation, POP is the log of total population. Figures in parentheses are *t*-statistics. Unit root tests are conducted under the model with intercept and p-values are given in brackets. Optimal lag length was determined using AIC with a maximum of 5. * indicates significance at the 5% (10%) level.

The three estimators allow for coefficient heterogeneity but do not deal with cross-sectional dependence. As can be seen from the bottom rows of Table 4, they exhibit cross-section dependence in the residuals. In addition, the CADF test results suggest rejection of the null hypothesis of unit root in the residuals only in the MG regression. The residuals from both FMOLS and DOLS regressions have unit root, rejecting the existence of a long run relationship among the variables. As mentioned above, the existence of cross-sectional dependence may lead to misleading results. Therefore, estimator that can accommodate both slope heterogeneity and cross-section dependence is required so as to provide more reliable estimates.

We employ the CCEMG method to estimate both the long and short run relationships among the variables. The results for the whole panel are reported in Table 5. For each model we test the residuals for unit root using heterogeneous panel unit root tests. The point estimate on the error correction term (ECT) is negative and statistically significant. This provides evidence in support of the existence of a long-run relationship between the variables. Furthermore, the IPS and CADF test results suggest rejection of the null hypothesis of unit root in the residuals. Therefore, we can conclude that there is a long run relationship among financial development, trade openness and economic growth in selected countries over the period from 1985 to 2018.

Table 5: CCEMG Long and Short Run Estimates

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FD</td>
<td>0.037**</td>
<td>1.750</td>
<td>0.081</td>
<td>0.032**</td>
<td>1.67</td>
<td>0.094</td>
</tr>
<tr>
<td>TO</td>
<td>0.052*</td>
<td>2.390</td>
<td>0.017</td>
<td>0.044**</td>
<td>1.72</td>
<td>0.085</td>
</tr>
<tr>
<td>K</td>
<td>0.057*</td>
<td>2.740</td>
<td>0.006</td>
<td>0.039</td>
<td>2.93</td>
<td>0.003</td>
</tr>
<tr>
<td>POP</td>
<td>-1.011</td>
<td>-0.580</td>
<td>0.561</td>
<td>0.325</td>
<td>0.53</td>
<td>0.599</td>
</tr>
<tr>
<td>ECT</td>
<td>-0.696*</td>
<td></td>
<td>0.363</td>
<td>-11.519</td>
<td>-13.86</td>
<td>0.000</td>
</tr>
<tr>
<td>Obs.</td>
<td>374</td>
<td></td>
<td></td>
<td>363</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPS</td>
<td>-9.568 [0.000]</td>
<td></td>
<td>-11.519 [0.000]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CADF</td>
<td>-5.404* [0.000]</td>
<td></td>
<td>-4.267* [0.000]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The dependent variable is the log of real GDP per capita. FD is the log of per capita domestic credit provided by financial sector, TO is trade openness as the log of the sum of real per capita exports and real per capita imports, K is the log of per capita gross fixed capital formation, POP is the log of total population, ECT denotes the error correction term. IPS unit root test provides W-t-bar statistic, whereas the CADF test provides z-t-bar statistic. Optimal lag length was determined using AIC with a maximum of 5. IPS and CADF tests are conducted in the case of an intercept only. The p-values are indicated in brackets. The asterisks * and ** indicate significance at the 5% and 10% levels, respectively.

Looking at the long run estimates, we note that financial development exerts a significant positive effect on real per capita GDP. Other things remain the same, a one percent increase in per capita domestic credit causes the real per capita GDP to increase by 0.037 percent in the long run. Similarly, trade openness has a positive impact on economic growth. The results show that keeping
other things constant, a one percent rise in trade openness increases real per capita GDP by 0.052 percent. Thus, financial intermediation and trade are playing a significant role in enhancing economic growth in ECOWAS countries. These results suggest that ECOWAS countries can accelerate their economic growth by improving their financial systems and opening up their economies. Another important determinant of economic growth is gross fixed capital formation. The results indicate that gross fixed capital formation is positively related to real per capita GDP. If all other things remain the same, one percentage increase in gross fixed capital formation is associated with 0.057 percent increase in real per capita GDP.

With regard to the short run estimates, domestic credit and trade openness exert positive impact on economic growth. The results also show that gross fixed capital formation impacts positively on economic growth. Conversely, population shows a positive but non-significant effect on economic growth. The results confirm that financial intermediation, trade openness and capital formation are major factors influencing economic growth of West African countries both in the long and short run.

Overall, the results of this study show that financial development has significant enhancing impact on economic growth both in the long and short run. This finding is consistent with those of a number of studies (e.g., King and Levine, 1993a; Beck et al., 2000; Beck and Levine, 2004; Christopoulos and Tsionas, 2004), but contradicts with others (Demetriades and James, 2011; Ngongang, 2015). Similarly, international trade plays a significant role in the economic growth of West African countries, validating the trade-led growth hypothesis both in the short and long run. This finding accords with those of Asfaw (2014), Zarras-Nejad et al. (2014), and Brueckner and Lederman (2015), but contradicts with Vlastou (2010), Beck and Levine (2004), Ngongang (2015), Polat et al. (2015), Ulaşan (2015), and Were (2015) who reported a negative or insignificant impact of trade openness on economic growth. The findings of this study are also in accordance with those of Abubakar et al. (2015), Bist (2018) and Ogbebor and Ohiomu (2018) who reported that domestic credit to private sector and trade openness have positive and significant effect on economic growth. However, they are not consistent with those of Gries et al. (2009) who found that financial development and trade openness have negligible influence on economic growth in Sub-Saharan Africa.

Once the long-run panel coefficients are estimated for the whole panel, we further estimate the long-run relationship for each individual country. This is important to understand the impact of financial development and trade openness on real per capita GDP across the sample countries. Table 6 displays the country-level results for the long run relationship between the variables. The long-run coefficients are estimated using the CCEMG estimator. For comparison purposes, we also report the results from estimation using the Seemingly Unrelated Regression Estimator (SURE). Our empirical analysis will combine the results from these two estimation methods. As expected, the results show considerable heterogeneity in the relationship between financial development, trade openness and economic growth. It is worth emphasizing that out of the 11 countries, financial development exerts a positive and significant impact on economic growth in eight countries (Benin, Burkina Faso, Cote d’Ivoire, Ghana, Niger, Nigeria, Senegal and Togo). This means that development in the financial sectors will positively affect economic growth. Thus, these countries have much to gain by developing their financial sectors. Likewise, for 3 countries (Gambia, Mali, Sierra Leone), there is no significant impact of financial development on real per capita GDP.

The absence of significant effect of financial development on economic growth in Gambia, Mali and Sierra Leone could be attributed to the relatively less developed financial sectors in these countries. Weak financial institutions provide rooms for misallocation of resources which leads to poor economic growth. As a policy recommendation, policies must be put in place to support development of growth-enhancing financial sector. For financial development to have a positive effect on economic growth in these three countries, it is necessary that the expansion of the financial system be accompanied by an increase in the domestic credit towards productive uses. Our finding for Sierra Leone is not in line with Kargbo and Adamu (2009) who reported that financial development has a positive and significant effect on economic growth.
The results also reveal a significant positive long run effect of trade openness on real per capita GDP for six countries (Benin, Cote d’Ivoire, Mali, Senegal, Sierra Leone and Togo). Thus, the strategy of opening up these countries is a better development policy with the aim of accelerating economic growth. Likewise, the effect of trade openness on real per capita GDP is insignificant for 4 countries (Burkina Faso, Gambia, Niger and Nigeria). However, in the case of Ghana, trade openness has a negative impact on real per capita GDP. The results for Cote d’Ivoire confirm those of Keho (2017) who found that trade openness has a positive effect on economic growth both in the long and short run. Our findings for Burkina Faso, Nigeria, Senegal, Sierra Leone and Togo support those of Sakyi et al. (2014) while the results for Benin, Cote d’Ivoire, Gambia, Ghana, Mali and Niger contradict with it. The results of this study also contradict Osabuohien (2007) who found that trade openness impacts positively economic growth in Ghana and Nigeria. On the other hand, our results are not in line with Iheanacho (2016) who finds that financial development has insignificant long run effect on economic growth and negative effect in the short run in Nigeria. In the case of Ghana, a justification of the negative long run relationship between trade and growth is that trade liberalization might have exposed domestic industrial sector to foreign competition thereby adversely impacting on long run real GDP. Our results further show that gross capital formation has a positive impact on economic growth in the majority of the countries.

Table 6: Individual Country Results of Long-Run Estimates

<table>
<thead>
<tr>
<th>Country</th>
<th>CCEMG</th>
<th>SURE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FD</td>
<td>TO</td>
</tr>
<tr>
<td>Benin</td>
<td>-0.011</td>
<td>0.027</td>
</tr>
<tr>
<td></td>
<td>[-0.77]</td>
<td>[1.06]</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>0.053</td>
<td>-0.030</td>
</tr>
<tr>
<td></td>
<td>[1.54]</td>
<td>[-0.50]</td>
</tr>
<tr>
<td>Cote d’Ivoire</td>
<td>0.182</td>
<td>0.167</td>
</tr>
<tr>
<td></td>
<td>[3.80]</td>
<td>[2.00]</td>
</tr>
<tr>
<td>Gambia</td>
<td>-0.002</td>
<td>0.034</td>
</tr>
<tr>
<td></td>
<td>[-0.28]</td>
<td>[0.74]</td>
</tr>
<tr>
<td>Ghana</td>
<td>0.094</td>
<td>-0.012</td>
</tr>
<tr>
<td></td>
<td>[1.79]</td>
<td>[-0.24]</td>
</tr>
<tr>
<td>Mali</td>
<td>0.098</td>
<td>0.121</td>
</tr>
<tr>
<td></td>
<td>[2.97]</td>
<td>[1.60]</td>
</tr>
<tr>
<td>Niger</td>
<td>0.009</td>
<td>-0.035</td>
</tr>
<tr>
<td></td>
<td>[0.29]</td>
<td>[-0.53]</td>
</tr>
<tr>
<td>Nigeria</td>
<td>0.069</td>
<td>-0.011</td>
</tr>
<tr>
<td></td>
<td>[4.16]</td>
<td>[-0.31]</td>
</tr>
<tr>
<td>Senegal</td>
<td>0.061</td>
<td>0.083</td>
</tr>
<tr>
<td></td>
<td>[1.35]</td>
<td>[1.15]</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>0.020</td>
<td>0.143</td>
</tr>
<tr>
<td></td>
<td>[0.72]</td>
<td>[3.80]</td>
</tr>
<tr>
<td>Togo</td>
<td>0.020</td>
<td>0.084</td>
</tr>
<tr>
<td></td>
<td>[0.38]</td>
<td>[1.41]</td>
</tr>
</tbody>
</table>

Table 7 reports the country-level results of short run dynamics. As can be seen, financial development enhances economic growth in 6 countries (Burkina Faso, Cote d’Ivoire, Mali, Nigeria, Senegal, and Sierra Leone). Trade openness growth is associated with an increase in economic growth in five countries (Benin, Cote d’Ivoire, Mali, Sierra Leone, and Togo). The point estimate on the lagged error correction terms is negative and statistically significant in all countries. This provides additional evidence in support of the existence of a long run relationship between financial development, trade openness and economic growth.
Table 7: Individual Country Results of Short-Run Estimates

<table>
<thead>
<tr>
<th>Country</th>
<th>CCEMG</th>
<th>SURE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ΔFD</td>
<td>ΔTO</td>
</tr>
<tr>
<td>Benin</td>
<td>0.006</td>
<td>0.068*</td>
</tr>
<tr>
<td></td>
<td>[0.550]</td>
<td>[2.590]</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>0.038</td>
<td>-0.023</td>
</tr>
<tr>
<td></td>
<td>[1.840]</td>
<td>[-0.580]</td>
</tr>
<tr>
<td>Cote d’Ivoire</td>
<td>0.195</td>
<td>0.156</td>
</tr>
<tr>
<td></td>
<td>[5.920]</td>
<td>[3.200]</td>
</tr>
<tr>
<td>Gambia</td>
<td>-0.011</td>
<td>0.009</td>
</tr>
<tr>
<td></td>
<td>[-1.480]</td>
<td>[0.240]</td>
</tr>
<tr>
<td>Ghana</td>
<td>-0.025</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>[-0.790]</td>
<td>[0.190]</td>
</tr>
<tr>
<td>Mali</td>
<td>0.090*</td>
<td>0.135*</td>
</tr>
<tr>
<td></td>
<td>[2.780]</td>
<td>[2.780]</td>
</tr>
<tr>
<td>Niger</td>
<td>-0.003</td>
<td>-0.099</td>
</tr>
<tr>
<td></td>
<td>[-0.130]</td>
<td>[-1.710]</td>
</tr>
<tr>
<td>Nigeria</td>
<td>0.028*</td>
<td>-0.021</td>
</tr>
<tr>
<td></td>
<td>[1.900]</td>
<td>[-1.160]</td>
</tr>
<tr>
<td>Senegal</td>
<td>0.053</td>
<td>0.012</td>
</tr>
<tr>
<td></td>
<td>[1.150]</td>
<td>[0.280]</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>0.031*</td>
<td>0.180</td>
</tr>
<tr>
<td></td>
<td>[1.780]</td>
<td>[5.460]</td>
</tr>
<tr>
<td>Togo</td>
<td>-0.048</td>
<td>0.067</td>
</tr>
<tr>
<td></td>
<td>[-0.920]</td>
<td>[1.530]</td>
</tr>
</tbody>
</table>

Notes: CCEMG and SURE denote the Common Correlated Effects Mean Group estimator and the Seemingly Unrelated Regression Estimator, respectively. The dependent variable is the growth rate of real GDP per capita, FD is the log of per capita domestic credit provided by financial sector, TO is trade openness as the log of the sum of real per capita exports and real per capita imports, K is the log of per capita gross fixed capital formation, POP is the log of total population, ECT denotes lagged error correction term. Figures in brackets are t-statistics. The asterisks * and ** indicate significance at the 5% and 10% levels, respectively.

Based on these results, the next step is to test for the existence and the direction of causal relationships among the variables. The outcomes of Granger causality test are depicted in Table 8. It is evident from the results that both financial development and trade openness cause real per capita GDP in the long run. On the other hand, economic growth and trade also cause financial development. Furthermore, economic growth and financial development cause trade openness. Thus, in the long run, financial development, trade openness and economic growth are mutually causal. This finding suggests that financial development and trade openness are both a cause and a consequence of economic growth. The bidirectional causal relationship between financial development and economic growth is consistent with the view of Robinson (1952) that financial development promotes economic growth and this, in turn, generates higher demand for financial services and resources which induces further financial development. This result is consistent with the findings of Fowowe (2011) for 17 Sub-Saharan African countries. We conclude that policies aimed at improving financial sectors will have a significant effect on economic growth and vice versa. The bidirectional causal relationship between trade openness and economic growth is also consistent with Sakyi et al. (2014). Our findings contradict those of Menyah et al. (2014) who found limited support for trade and finance causing economic growth in a panel of 21 Sub-Saharan African countries. As mentioned in the literature review, previous studies based on panel data may be plagued with the problems of cross-sectional dependence and heterogeneity.
Table 8: Results of the Granger Causality Tests

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Direction of Granger Causality</th>
<th>Short Run</th>
<th>Long Run</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Y</td>
<td>FD</td>
<td>TO</td>
</tr>
<tr>
<td>Y</td>
<td>-</td>
<td>6.860 [0.143]</td>
<td>9.580 [0.048]</td>
</tr>
<tr>
<td>FD</td>
<td>3.670 [0.452]</td>
<td>-</td>
<td>9.710 [0.045]</td>
</tr>
<tr>
<td>TO</td>
<td>6.430 [0.169]</td>
<td>4.490 [0.344]</td>
<td>-</td>
</tr>
<tr>
<td>K</td>
<td>2.430 [0.656]</td>
<td>10.640 [0.030]</td>
<td>13.600 [0.008]</td>
</tr>
</tbody>
</table>

Note: Y: log of real GDP per capita, FD: per capita domestic credit provided by financial sector, TO: trade openness as the sum of real per capita exports and real per capita imports, K: per capita gross fixed capital formation, ECT: error correction term. The lag order was set to 4 based on AIC. χ<sup>2</sup> statistics for Wald tests are reported here and the p-values are indicated in brackets. Significance at 5% and 10% levels are denoted with * and **, respectively.

A look at the short run causality shows strong evidence of unidirectional causality running from trade openness and gross fixed capital formation to economic growth and financial development. On the other hand, both financial development and trade openness cause gross fixed capital formation. Thus, we can say that in the short run, financial development causes economic growth indirectly through capital formation while trade openness causes economic growth directly and indirectly through capital accumulation. Therefore, investment is an important channel through which financial development and trade openness feed economic growth. Financial development as proxy by domestic credit increases supply of funds to productive sectors which influences overall economic growth through increased investment in the economy. These findings are not consistent with those of Bist (2018) who found that economic growth causes financial development and that there is no causal link between economic growth and trade openness.

6. Conclusion
The relationship between financial development, trade openness and economic growth has received a great deal of attention among economists over the last three decades. Despite voluminous research on this topic, the empirical evidence is inconclusive. This is particularly true for studies that have examined the experience of African countries. These studies end up with mixed results due to several reasons including the use of various estimation techniques and proxies of financial development and trade openness measures. With regards to estimation technique, most existing studies have used standard panel estimation methods assuming cross-country independence and slope homogeneity. This study empirically contributes to the ongoing debate on the relationship between financial development, trade openness and economic growth for a panel of 11 selected West African countries which are working towards achieving a convergence macroeconomic framework. As proxy for financial development, the study used per capita domestic credit provided by financial sector which measures how much intermediation is performed by the financial system, including credit to the public and private sectors. The study also used per capita foreign trade as proxy for trade openness, and real per capita GDP as measure of economic growth. Further, per capita gross fixed capital formation and population were included as control variables. The study utilizes panel unit root, cointegration and Granger causality tests and data covering the period from 1985 to 2018. The first tests showed that there exists a cross-sectionalal dependence across the countries. Therefore, contrary to previous studies, we applied the Common Correlated Effects Mean Group (CCEMG) estimator and the Seemingly Unrelated Regression Estimator (SURE) that cope with both cross-sectional dependency and heterogeneity. The empirical results of the study showed that financial development and trade openness have, on average, positive effect on real per capita GDP both in the long and short run. The results also confirmed the positive and significant role of capital formation in economic growth.

The country-level results revealed, however, considerable heterogeneity across countries. The long-run effect of financial development was positive in the majority of the countries. The estimates
revealed that out of 11 countries, 8 countries (Benin, Burkina Faso, Cote d’Ivoire, Ghana, Niger, Nigeria, Senegal and Togo) have a positive and significant impact of domestic credit on real per capita GDP. Conversely for 3 countries (Gambia, Mali, Sierra Leone), there is no significant impact of financial development on real per capita GDP. Further, the results showed that trade openness is positively related to economic growth in 6 countries (Benin, Cote d’Ivoire, Mali, Senegal, Sierra Leone and Togo). Likewise, for 4 countries (Burkina Faso, Gambia, Niger, Nigeria) there is no significant impact of trade openness on economic growth. However, trade openness has a negative impact upon real per capita GDP in Ghana. Granger causality tests are conducted in order to find the direction of causality between the variables. The results indicate that real GDP, financial development and trade openness are complementary to each other in the long run. Trade and financial openness affect economic growth positively and it in turn paves the way for financial development. In the short run, there is unidirectional causality running from trade openness to economic growth and financial development. The results also suggest that investment is an important conduit through which both financial development and trade openness affect economic growth.

In the view of these findings it is recommended that countries in the sub-region should adopt policies aimed at enhancing the development of the financial sector to accelerate their economic growth. One of the reasons that have been slowing African growth is the small financial systems that allocate capital inefficiently. One particular policy recommendation is to improve the accessibility to affordable credits and financial services by a broader set of people and economic sectors. Access to financial services may be improved by promoting the use of modern information and communication technologies via electronic money and mobile banking, and sustaining the growth of microfinance institutions particularly in rural areas. This would increase liquidity in the economy and also access to funding by small and medium-scale enterprises. Additionally, policies should improve financial markets so as to make the efficient and effective allocation of resources among the productive sectors which in turn will enhance long run economic growth. The findings of this study also imply that a portion of the economic growth of West African countries is external. Therefore, further efforts should be made to allow more trade openness of the countries in order to achieve high and sustainable economic growth. They should reduce trade barriers and simplify procedures and controls. However, the heavily dependence on international trade may be detrimental to fiscal sustainability and economic growth under the Prebisch–Singer law of decline in the terms of trade. Most African countries export mainly primary products, which prices are unstable and determined on the international market. For outward-oriented strategy to have much larger impact on economic growth, West African countries should modify the composition of their exports by switching from exports of raw materials and semi-manufactured goods to high valued-added goods. Furthermore, trade policy should promote investments in capital intensive sectors and develop human capital that can absorb technologies coming from advanced countries. The results also show that gross capital formation has a positive impact on economic growth. This suggests that the public and private investment in the productive sector are essential for the economic growth.

References


