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Article

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Contemporary Economics

Provided in Cooperation with:

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Suggested Citation: Ehigiamusoe, Kizito Uyi; Lean, Hooi Hooi (2018) : Tripartite analysis of financial development, trade openness and economic growth: Evidence from Ghana, Nigeria and South Africa, Contemporary Economics, ISSN 2300-8814, University of Finance and Management in Warsaw, Faculty of Management and Finance, Warsaw, Vol. 12, Iss. 2, pp. 189-206, <https://doi.org/10.5709/ce.1897-9254.271>

This Version is available at:

<https://hdl.handle.net/10419/195519>

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Primary submission: 21.07.2016 | Final acceptance: 05.05.2017

Tripartite Analysis of Financial Development, Trade Openness and Economic Growth: Evidence from Ghana, Nigeria and South Africa

Kizito Uyi Ehigiamusoe¹, Hooi Hooi Lean¹

ABSTRACT

This study examines the tripartite relationship between financial development, trade openness and economic growth in Ghana, Nigeria and South Africa for the 1980-2014 period. The study reveals a long-run causal relationship between financial development, trade openness and economic growth, thereby supporting finance- and trade-led growth hypotheses for Ghana, Nigeria and South Africa. Moreover, long-run causality from financial development and economic growth to trade openness is found for Ghana. In the short-run, there is evidence of causality from growth to financial development for Ghana, from trade openness to financial development for Nigeria and from growth and financial development to trade openness for South Africa. The findings of this study are robust to alternative proxies of financial development and various diagnostic tests. The study shows that financial development and trade openness can be deployed to accelerate growth, while growth and financial development can be used to promote trade openness. Additionally, trade openness spurs financial development. Therefore, a tripartite relationship exists between the three variables. Hence, interdependence between financial development, trade openness and economic growth is found and consequent policy recommendations are made.

KEY WORDS: Financial development, Trade openness, Economic growth

JEL Classification: G15, F10, O11

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1. Introduction

One of the greatest economic challenges currently confronting most developing countries concerns how to make economic growth more inclusive. Many developing countries in Africa, Asia and Latin America are

growing faster than most high-income economies in Europe, Asia and North America, but unemployment, income inequality and poverty rates have remained obstinately high in these regions despite their impressive growth (Central Intelligence Agency [CIA], 2014). Though some level of growth and strong average growth are necessary for poverty reduction, these are not sufficient conditions for economic development, as most people do not benefit equally from such growth. Ali and Son (2007) noted that economic growth can

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worsen the living conditions of the poor and of marginalized groups, thereby exacerbating inequality, unemployment and poverty rates. Therefore, growth is inclusive when it facilitates equal access to opportunities without social exclusion linked to institutional, market and policy factors (Ali & Zhuang, 2007). Inclusive growth and development boost the social opportunity function (social welfare function), which is dependent on how the average population is granted equity and access to resources such as employment, basic infrastructure, education and healthcare.

According to Todaro and Smith (2009), economic development involves the efficient allocation of existing productive resources and sustained growth over time as well as economic, political, social and institutional mechanisms (both public and private) needed to bring about rapid and large-scale improvements in people's quality of life. It measures the overall well-being of individuals in terms of how many real goods and services are available to them for investment and consumption. It seeks to trickle down economic growth to the general population in terms of job and economic opportunities; the broader distribution of social and economic benefits; and reductions in discrimination, poverty, unemployment and inequality. A commonly used index of development uses the levels and growth rates of real per capita income by considering a country's capacity to enhance output faster than the rate of population growth (Beck & Levine, 2004; Jhingan, 2010; Todaro & Smith, 2009). Consequently, many low-income countries are grappling with development policy options aimed at accelerating economic growth with a view to achieving inclusive growth and development. In achieving this, there has been a renewed emphasis on sectors of the economy that create job opportunities and that reduce inequality and poverty rates such as the agricultural, industrial, financial and external sectors.

The foregoing emphasizes the importance of economic growth for the achievement of economic development and inclusiveness. Neither economic development nor inclusive growth can be attained without economic growth. Hence, the achievement of sustained and long-term economic growth remains a fundamental macroeconomic objective of most developing countries. However, the theoretical literature contends that financial development

can accelerate economic growth and development through its influence on technological innovation, capital accumulation, resource allocation and productivity growth. Through savings mobilization and the allocation of capital to productive investments, the financial sector promotes growth (Beck, Levine, & Loayza, 2000; Chortareas, Magkonis, Moschos, & Panagiotidis, 2015; Muhammad, Islam, & Marashdeh, 2016). The theory of finance and growth focuses on how finance impacts growth and development via resource allocation decisions by delivering on specific functions such as the mobilization of savings, the provision of extant information, the delivery of corporate governance, the allocation of capital and monitoring investments, the facilitation of trade, and the diversification and management of risks (Levine, 2002).

Similarly, theoretical and empirical evidence lays credence to the fundamental role that trade openness plays in economic growth and development (Baltagi, Demetriades, & Law, 2009; Sbia, Shahbaz, & Hamdi, 2014). The classical theory of international trade developed by Adam Smith, David Ricardo and J.S Mill stresses that trade openness broadens markets and enhances investment, productivity, the division of labor and specialization, vents for surplus, and the efficient use of resources and welfare (Jhingan, 2010). Additionally, the endogenous growth model opines that by granting access to global markets through international trade, an open economy is more likely to grow faster and more efficiently than a closed economy. This is the case because international markets allow producers to purchase inputs and sell outputs at competitive prices and grant consumers access to a variety of goods and services.

Furthermore, theoretical evidence supports a link between financial development and trade openness. For instance, Rajan and Zingales' (2003) hypothesis states that for financial development to occur, trade and financial openness are fundamental. Svaleryd and Vlachos (2002) also opined that positive interdependence exists between financial development and liberal trade policies, and this had been corroborated by Shahbaz, Hye, Tiwari, and Leitão, (2013). Baltagi et al. (2009) also posited that trade and financial openness can significantly impact financial development. In essence, there is a link between the finance-growth nexus, the trade-growth nexus and the finance-trade nexus.

For Sub-Saharan Africa however, the tripartite relationship between financial development, trade openness and economic growth remains unclear. This may be related to low levels of financial development and dominant trade deficits (or a chronic balance of payments deficits) observed alongside impressive levels of economic growth found in much of this region. Gries, Kraft, and Meierrieks, (2009) and Menyah, Nazlioglu, and Wolde-Rufael (2014) attempted to examine the causal relationship between these variables by applying a panel Granger causality approach to certain African countries, but their findings are quite conflicting even though most results support an absence of causal relationships between the variables for nearly all of the countries surveyed. Therefore, this study contributes to the existing literature by investigating relationships between financial development, trade openness and economic growth. Specifically, the objectives of this study are: (i) to examine the long-run relationship between financial development, trade openness and economic growth for Ghana, Nigeria and South Africa (hereafter GNS) and (ii) to investigate the direction of the causal relations between financial development, trade openness and economic growth in GNS.

In this regard, the contributions of this study to the existing literature are two-fold. First, unlike previous studies that mainly focus on the trade-growth or finance-growth nexus and that merely use trade openness as a control variable, this study examines the long-run relationship between financial development, trade openness and economic growth under a tripartite framework. In turn, the cointegration relationship between these three variables is identified. Second, the direction of the causal relationship between financial development and trade openness for developing countries remains unclear. Empirical evidence on whether more trade openness is beneficial for the development of the financial sector or whether more financial development is necessary to facilitate trade openness remains scant. This study represents an attempt to address this gap. Interestingly, the study finds that financial development and trade openness spur economic growth and thereby support finance- and trade-led growth hypotheses for Ghana, Nigeria and South Africa. There is also evidence of long-run causality from financial development and economic growth to trade

openness for Ghana. For the short-run, the study finds evidence in support of the openness-finance and finance-openness hypotheses for Nigeria and South Africa, respectively. These results reveal a tripartite relationship between financial development, trade openness and economic growth.

The scope of this study is limited to GNS for the following reasons. First, these countries are likely the largest economies of Sub-Sahara Africa and any force that affect their economies will definitely have adverse effects on the continent. Second, these countries have embarked on financial sector reforms over the past decades and consequently have the most developed financial systems in Africa. Third, they have the largest volumes of imports and exports and are more open than other countries of the continent. Finally, our findings on GNS will prove useful to other developing countries in Africa, Asia and Latin America that are vigorously pursuing financial and trade sectors reforms.

The remainder of this paper is divided into five sections. Section 2 presents stylized facts on financial development, trade openness and economic growth for GNS. Section 3 examines empirical issues. The methodology employed in the study is presented in section 4, and section 5 presents the study's empirical results and findings. The final section concludes the paper with policy recommendations.

2. Stylized Facts on Financial Development, Trade Openness and Economic Growth for GNS

Over the past three decades several Sub-Sahara African countries have embarked on reforms in the financial and external sectors with a view to accelerating economic growth and development. Although such reforms have enhanced sector development, levels of development achieved have remained low compared to levels achieved in the financial and external sectors of advanced economies. Moreover, the financial systems of most Sub-Sahara African countries are dominated by the banking sector with stock markets remaining relatively underdeveloped. The failure of government interventions into financial systems in West African countries (e.g., Ghana, Nigeria, etc.) in the 1980s prompted most of these countries to embark on structural reforms involving interest rate liberaliza-

tion, credit control elimination, the restructuring and privatization of commercial banks, the adoption of indirect instruments of monetary policy and the development of financial systems (Mehran et al., 1998; Ncube, 2007).

For instance, banking sector reforms applied in Ghana in the 2000s consolidated the financial sector and repositioned it for efficiency and effectiveness. The regulator of commercial banks (Bank of Ghana) recapitalized commercial banks to prevent bank insolvency and to restore the confidence of customers of the system. In a bid to adhere to the new capitalization scheme, many banks injected new capital and retained earnings, thereby substantially increasing shareholders' funds. Financial development indicators for Ghana show that credit to the private sector as a ratio of GDP increased from 2.19% in 1980 to 13.97% in 2000 and to 20.44% in 2015. Broad money supply as a ratio of GDP also increased from 18.55% to 28.16% and to 33.95% in the same period. Furthermore, liquid liabilities as a ratio of GDP improved from 16.54% to 23.22% and to 29.15% during this period (Federal Reserve Bank of St. Louis, 2016; The World Bank, 2016). These figures reveal the occurrence of steady improvements in financial development indicators during this period.

In Nigeria, banking consolidation (reforms) occurring in 1991, 2005 and 2009 repositioned the banking sector for efficiency and boosted customer confidence. Prior to this consolidation, the system was characterized by incessant bank failures and insolvency, which resulted in a loss of customer deposits and confidence. The financial system was characterized by suspicion and uncertainty because many bank executives were running financial institutions as private businesses without recourse to customers' deposits and interests. Transparency, accountability and the adequate disclosure of banks' financial positions were lacking. Thus, the bank regulator (Central Bank of Nigeria) embarked on bank consolidation, which increased the share capital of commercial banks and which led to the emergence of stronger and larger banks through mergers and acquisitions. Improvements in technological and financial innovations rendered the financial sector more efficient in the performance of its functions (see Todaro & Smith, 2009). These financial reforms and policies have resulted in greater supply and demand for financial services. However, no remarkable

improvements in financial development indicators were made during the 1980-2015 period. For instance, credit to the private sector as a ratio of GDP marginally increased from 12.22% in 1980 to 12.35% in 2000 and to 14.21% in 2015. Broad money supply as a ratio of GDP decreased from 28.62% in 1980 to 21.96% in 2000 and to 19.54% in 2015. Liquid liabilities relative to GDP experienced a similar trend, as they decreased from 23.96% in 1980 to 19.05% in 2000 before slightly increasing to 19.75% in 2015 (Federal Reserve Bank of St. Louis; The World Bank, 2016).

South Africa has experienced more financial development than Ghana and Nigeria. In terms of regulations and capitalization levels, South Africa's banking sector is ranked one of the best in Africa. Thus, reforms and policies introduced by the regulatory authority (South African Reserve Bank) have continued to ensure further improvements to promote system stability and soundness. Local banks have closed, customer confidence has been enhanced and consumer credit has increased. Consequently, financial development indicators for this country have substantially improved. For instance, credit to the private sector as a ratio of GDP increased from 55.6% in 1980 to 130.3% in 2000 and to 149.18% in 2015. Broad money supply as a ratio of GDP also increased from 53.67% to 57.31% and to 74.13% during this period. Additionally, liquid liabilities as a ratio of GDP respectively reached 48.19%, 52.70% and 40.74% during this period (Federal Reserve Bank of St. Louis, 2016; The World Bank, 2016).

Unlike those of the financial sector, reforms made in the external sector have not substantially altered the composition and direction of international trade in many African countries. The composition of international trade shows that exports mainly involve primary goods (agricultural and mineral products) while imports mainly involve manufactured goods. As noted by Gries et al. (2009), countries specializing in the production and export of primary products are less likely to obtain learning spill overs, dynamic externalities and industrial linkages that promote productivity and sustainable economic growth. Specifically, Ghana's main exports are gold, cocoa (beans, paste and butter), crude petroleum, etc. whereas its main imports include refined petroleum, rice, military technologies, industrial equipment, etc. Substantial

improvements in trade openness have been achieved in Ghana over the years. Statistically, The World Bank (2016) shows that trade openness as a ratio of GDP reached 17.62%, 116.05% and 99.25% in 1980, 2000 and 2015, respectively.

Moreover, Nigeria's main exports include crude petroleum, cocoa, oil palm, rubber, leather, etc. while its main imports include industrial supplies, machinery appliances, vehicles, refined petroleum products, rice, processed food, etc. According to The World Bank (2016), trade openness in Nigeria reached 48.57%, 71.38% and 21.45% in 1980, 2000 and 2015, respectively. For South Africa, international trade increased remarkably after the end of Apartheid and with the subsequent lifting of sanctions and boycotts imposed during the Apartheid period. Thus, South Africa's main exports include gold, coal, diamonds, metals, agricultural products (fruits, corn and sugar), etc. while its main imports include machinery and transportation equipment, manufactured goods, chemicals, petroleum, etc. Thus, The World Bank (2016) notes that trade openness levels in South Africa respectively reached 62.72%, 46.86% and 62.85% in 1980, 2000 and 2015.

However, Ghana, Nigeria and South Africa have recently experienced impressive levels of GDP growth despite income level variations. For instance, Ghana's real GDP per capita reached USD411, USD264 and USD1369 in 1980, 2000 and 2015, respectively. Corresponding GDP growth rates reached 0.47%, 3.70% and 3.91%, respectively. Additionally, Nigeria's real GDP per capita respectively reached USD871, USD377 and USD2640 in 1980, 2000 and 2015, respectively. Corresponding GDP growth rates respectively reached 4.20%, 5.31% and 2.65%. Finally, South Africa's real GDP per capita increased from USD2920 in 1980 to USD3099 in 2000 and to USD5723 in 2015. Corresponding GDP growth rates for the period respectively reached 6.62%, 4.20% and 1.26% (The World Bank, 2016). From these figures it is unclear whether financial development or/and trade openness are preconditions for economic growth for these countries. Moreover, there is no evidence to suggest that trade openness enhances economic growth by influencing financial sector development or that financial development enhances growth through its effects on trade openness in these countries.

3. Literature Review

The findings of empirical literature on the finance-growth nexus, trade-growth nexus and finance-trade nexus are mixed, conflicting and inconclusive. However, it has been argued that countries with developed financial systems tend to grow faster and to exhibit stronger economic performance than countries with poorly developed financial systems (Baltagi et al., 2009; Fung, 2009). Additionally, Ndulu, Chakraborti, Lijane, Ramachandran, and Wolgin (2007) asserted that inadequate financial development and poor international trade are partly responsible for the poor economic performance of most developing countries in Africa. Thus, through capital accumulation and productivity growth, financial development accelerates economic growth, and this has been documented by some empirical studies (Beck et al., 2000; Christopoulos & Tsionas, 2004; Shan & Jianhong, 2006). Muhammad et al. (2016) found a positive and significant impact of finance on economic growth, though Arcand, Berkes, and Panizza (2015) opined that when credit to the private sector exceeds 100% of GDP, the positive effect of finance on growth vanishes. However, some empirical studies (Ang & McKibbin, 2007; Blanco, 2009; Esso, 2010; Gozgor, 2015) report that the direction of the causal relationship runs from economic growth to financial development. These studies show that as the economy grows, more financial products, services and instruments are demanded, promoting financial system development. Furthermore, Apergis, Fillippidis, and Economidou, (2007), Adusei (2013) and Chortareas et al. (2015) found a bidirectional causal relationship between financial development and growth. Furthermore, evidence of the absence of a causal relationship between financial development and economic growth is documented in Atindehou, Gueyie, and Amenounve (2005); Kar, Nazlioglu, and Ağır, (2010) and Menyah et al. (2014). Thus, Rapp and Udoieva (2016) found that while stock markets accelerate economic growth and mitigate economic risks, private sector credit does not have any significant impact on growth. This is corroborated by Kalaitzoglou and Durgheu (2016) who also found an insignificant relationship between financial development and economic growth. Badeeb and Lean (2017) found that financial development does not play any significant role in enhancing real sector activities of a resource-based

economy. This literature reveals an absence of consensus among scholars on the direction of the causal relationship between financial development and economic growth.

On the finance-trade nexus, Baltagi et al. (2009) noted that trade and financial openness have significant impacts on financial development. Thus, in enabling international trade and capital accounts, a relatively closed economy can benefit significantly. Their study corroborates Rajan and Zingales' hypothesis that for financial development to occur, trade and financial openness are fundamental. Rajan and Zingales (2003) contended that industrial opposition to financial development can be weakened by trade openness and capital flows. This hypothesis however refutes the views of McKinnon (1993), which posit that financial liberalization should be preceded by trade liberalization and that capital account opening should be the last stage of the liberalization process. Law and Demetriades (2006) concluded that middle-income countries that are simultaneously opened in terms of capital flows and trade can enhance financial development while the link is weaker for low income countries. Kim, Lin, and Suen (2010a) found a positive long-run relationship and a negative short-run link between trade openness and financial development for relatively low- and high-income countries. Through a similar study Kim, Lin, and Suen (2010b) found long-run complementarity and short-run substitutability between trade openness and financial development for non-OECD countries while the effect of financial development on trade was found to be negligible for OECD countries. They found non-linearity in the long-run relationship, as trade responses decline with financial development. Moreover, Choratareas et al. (2015) reported that the long-run relationship between finance and output only holds after accounting for economic openness. Trade openness appears to be more essential for developing countries while financial openness appears to be more fundamental for advanced countries.

Huang and Temple (2005) concluded that trade openness promotes financial development. Wolde-Rufael (2009) found a strong unidirectional causal relation from financial development to import and export growth (trade) but weak causality from trade to financial development for Kenya. Chinn and Ito (2006) also

found that trade openness is a *sine qua non* for capital account liberalization while banking sector development is a prerequisite of equity market development. Furthermore, positive interdependence between financial development and liberal trade policies was unearthed by Svaleryd and Vlachos (2002). Beck (2002) also found that financial development significantly affects exports and the trade balance of manufactured goods. This confirms the theoretical postulation that countries with better developed financial sectors enjoy a comparative advantage in manufacturing industries. Levine (2001) contended that stock market liquidity can be enhanced through liberal restrictions on international portfolio flows and banking sector efficiency can be enhanced through the stronger presence and participation of foreign banks. Shahbaz et al. (2013) found a short-run unidirectional causal relation from financial development to trade openness for Indonesia while Farhani and Ozturk (2015) found short-run Granger causality from financial development to trade openness for Tunisia. Conversely, Gries et al. (2009) found little to no evidence in support of any causal relation between financial development and trade openness for 16 Sub-Sahara African countries, and similar results (absence of causality) were found by Menyah et al. (2014) for 21 Sub-Sahara African countries.

On the trade-growth nexus, Blackburn and Hung (1998) reported a bidirectional causal relationship between financial development and economic growth and found that the development of intermediation efforts can be accelerated through financial and trade liberalization with the latter having a positive impact on economic growth. Klein and Olivei (2008) found that economic growth can be accelerated through capital account liberalization and by deepening a country's financial sector. This view had previously been canvassed by Bekaert, Harvey, and Lundblad (2001) who found a strong relationship between capital account liberalization and economic growth. While Khan, Qayyum, and Ghani (2006) found that trade and financial liberalization play a fundamental role in enhancing long-run growth, Naceur and Ghazouani (2007) found a negative relationship between trade openness and economic growth. Sbiba et al. (2014) found a long-run unidirectional causal relation from trade openness to economic growth and a short-run bidirectional causal relationship between the two variables. However, Far-

hani and Ozturk (2015) found no causal relationship between trade openness and economic growth.

Nevertheless, relationships between financial development, trade openness and economic growth for Sub-Sahara Africa remain unclear due to limited research conducted on the subject and due to the conflicting and inconclusiveness results of empirical studies. Two notable previous studies (Gries et al., 2009; Menyah et al., 2014) found no causal relation from financial development or trade openness to economic growth for most of the countries examined. However, given reforms made to the financial and trade sectors of Sub-Saharan African countries over the past three decades, development brought about through these reforms should be positively related to economic growth. Hence, the present study measures the tripartite relationship between financial development, trade openness and economic growth for Ghana, Nigeria and South Africa.

4. Methodology

We conduct an Autoregressive Distributed Lagged (ARDL)-bounds test (developed by Pesaran and Shin (1999) and later extended by Pesaran, Shin, and Smith, 2001) to investigate the long-run relationship between financial development, trade openness and economic growth for Ghana, Nigeria and South Africa. The ARDL bound test can be applied irrespective of whether the model variables are endogenous, integrated at order one or zero, and even when the sample size considered is small. However, the ARDL-bound test approach requires that all variables of the model be integrated in the order of zero [I(0)] and one [I(1)]. Hence, we conduct Augmented Dickey Fuller and Phillip Perron unit root tests to determine the order of integration for the studied variables before conducting our cointegration test. When a long-run cointegration relationship was found between the variables, we examined long-run effects and short-run dynamics via the Error Correction Model (ECM). Data on economic growth, financial development and trade openness used in this study for 1980-2014 were sourced from the World Bank's World Development Indicators.

4.1 Model Specification

The ARDL model used to examine the cointegration relationship between financial development, trade

openness and economic growth (following Beck et al., 2000; Beck & Levine, 2004) is written as follows:

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^p \alpha_i \Delta Y_{t-i} + \sum_{j=0}^q \alpha_2 \Delta FDE_{t-j} + \sum_{k=0}^r \alpha_3 \Delta TOP_{t-k} + \alpha_4 Y_{t-1} + \alpha_5 FDE_{t-1} + \alpha_6 TOP_{t-1} + \mu_t \quad (1)$$

where: Y = economic growth (proxied by real GDP per capita growth rates; FDE = financial development (proxied by credit to the private sector as a ratio of GDP); TOP = trade openness as a ratio of GDP; and μ_t = the disturbance term. All of the variables are given as natural logarithms.

Following Baltagi et al. (2009) and Chinn and Ito (2006) and Kim et al. (2010a) and Law and Deme- triades (2006), Equation 1 can also be written with financial development and trade openness as dependent variables as follows:

$$\Delta FDE_t = \beta_0 + \sum_{i=0}^p \beta_1 \Delta Y_{t-i} + \sum_{j=1}^q \beta_2 \Delta FDE_{t-j} + \sum_{k=0}^r \beta_3 \Delta TOP_{t-k} + \beta_4 Y_{t-1} + \beta_5 FDE_{t-1} + \beta_6 TOP_{t-1} + \mu_t \quad (2)$$

$$\Delta TOP_t = \delta_0 + \sum_{i=0}^p \delta_1 \Delta Y_{t-i} + \sum_{j=0}^q \delta_2 \Delta FDE_{t-j} + \sum_{k=1}^r \delta_3 \Delta TOP_{t-k} + \delta_4 Y_{t-1} + \delta_5 FDE_{t-1} + \delta_6 TOP_{t-1} + \mu_t \quad (3)$$

In Equation 1, if α_5 and α_6 are positive and statistically significant, financial development and trade openness impact economic growth. Similarly, if β_4 and β_6 in Equation 2 are positive and statistically significant, it suggests that economic growth and trade openness affect financial development. In the same vein, economic growth and financial development can be seen as having impact on trade openness if δ_4 and δ_5 in Equation 3 are positive and statistically significant.

Furthermore, the first section of Equation 1 ($\alpha_1, \alpha_2, \alpha_3$) examines the short-run dynamic relationship while the second section ($\alpha_4, \alpha_5, \alpha_6$) investigates long-run associations between the variables. The same goes for parameters of Equations 2 and 3. In selecting the number of lags denoted by p, q, r , we consider the Akaike information criterion (AIC). To test for the cointegration relationship between the variables via the ARDL approach, the null hypothesis of no cointegration is stated against the alternative

hypothesis of cointegration between the variables in the models as follows:

$$H_0: \alpha_4 = \alpha_5 = \alpha_6 = 0 \quad H_1: \alpha_4 = \alpha_5 = \alpha_6 \neq 0$$

$$H_0: \beta_4 = \beta_5 = \beta_6 = 0 \quad H_1: \beta_4 = \beta_5 = \beta_6 \neq 0$$

$$H_0: \delta_4 = \delta_5 = \delta_6 = 0 \quad H_1: \delta_4 = \delta_5 = \delta_6 \neq 0$$

Once a cointegration relationship is established between the variables, we examine the direction of long- and short-run causal relations between the variables using Error Correction Model (ECM) equations given as follows:

$$\Delta Y_t = \phi_0 + \sum_{i=1}^m \phi_1 \Delta Y_{t-i} + \sum_{j=0}^n \phi_2 \Delta FDE_{t-j} + \sum_{k=0}^o \phi_3 \Delta TOP_{t-k} + \varpi ECT_{t-1} + \mu_t \quad (4)$$

$$\Delta FDE_t = \delta_0 + \sum_{i=0}^m \delta_1 \Delta Y_{t-i} + \sum_{j=1}^n \delta_2 \Delta FDE_{t-j} + \sum_{k=0}^o \delta_3 \Delta TOP_{t-k} + \lambda ECT_{t-1} + \mu_t \quad (5)$$

$$\Delta TOP_t = \theta_0 + \sum_{i=0}^m \theta_1 \Delta Y_{t-i} + \sum_{j=0}^n \theta_2 \Delta FDE_{t-j} + \sum_{k=1}^o \theta_3 \Delta TOP_{t-k} + \sigma ECT_{t-1} + \mu_t \quad (6)$$

Thus, the null hypothesis of no long- or short-run causality is tested against the alternative hypothesis of causality using the ECM equations. In Equations 4-6, long-run causality is examined based on the statistical significance of the coefficient of the lagged error correction term (ECT_{t-1}) at the 5% level. In other words, the null hypothesis is rejected based on the joint statistical significance of the regressors and based on the significance of the coefficient of the lagged error correction term (ECT_{t-1}), which should also be negative. The long-run null hypotheses of Equations 4-6 are stated against the alternative hypotheses as follows:

$$H_0: \varpi_1 = 0; H_1: \varpi_1 \neq 0$$

$$H_0: \lambda_1 = 0; H_1: \lambda_1 \neq 0$$

$$H_0: \sigma_1 = 0; H_1: \sigma_1 \neq 0$$

Conversely, short-run causality is examined from the statistical significance of the F-statistic of each coefficient of the independent variables. The short-run null hypotheses for financial development is stated against the alternative hypotheses as follows:

$$H_0: \phi_2 = 0; H_1: \phi_2 \neq 0$$

$$H_0: \delta_2 = 0; H_1: \delta_2 \neq 0$$

$$H_0: \theta_2 = 0; H_1: \theta_2 \neq 0$$

The short-run null hypotheses for trade openness are stated against the alternative hypotheses as follows:

$$H_0: \phi_3 = 0; H_1: \phi_3 \neq 0$$

$$H_0: \delta_3 = 0; H_1: \delta_3 \neq 0$$

$$H_0: \theta_3 = 0; H_1: \theta_3 \neq 0$$

Similarly, the short-run null hypotheses for economic growth are stated against the alternative hypotheses as follows:

$$H_0: \phi_1 = 0; H_1: \phi_1 \neq 0$$

$$H_0: \delta_1 = 0; H_1: \delta_1 \neq 0$$

$$H_0: \theta_1 = 0; H_1: \theta_1 \neq 0$$

4.2 Justification of the Model Variables

Various monetary aggregates have been proposed and employed in the literature as proxies for measuring financial development. However, credit to the private sector as a ratio of GDP remains as a primary proxy because it defines credit to economic agents (producers and consumers) as against credit to the public sector (Beck et al., 2000; Beck & Levine, 2004; Levine & Zervos, 1998). To measure the robustness of the results, we use broad money supply as a ratio of GDP as an alternative proxy for financial development (Kar et al., 2010; Odhiambo, 2008; Wolde-Rufael, 2009). Financial development is expected to be positively related to economic growth and trade openness.

To measure trade openness, we use the addition of exports and imports as a ratio of GDP. Theory suggests

that because international trade allows for flows of foreign capital into and out of a country, a more open economy is likely to develop faster and more efficiently through its access to global markets (Herwartz & Walle, 2014; Shan & Jianhong, 2006; Yilmazkuday, 2011). Hence, trade openness is expected to be positively related to economic growth and financial development.

The GDP per capita growth rate is used to proxy economic growth because it takes into account a country's GDP and population. The rate at which a country's GDP and population grows has serious implications for unemployment, inequality and poverty rates (Beck et al., 2000; Beck & Levine, 2004).

Thus, financial development and trade openness are fundamental determinants of economic growth. In modeling the relationship between financial development and economic growth, most previous studies have used trade openness and income level as control variables (Beck et al., 2000; Levine et al., 2000; Herwartz & Walle, 2014). Moreover, in modeling the relationship between financial development and trade openness, previous studies have typically used income levels and one-period lagged financial development as control variables (Baltagi et al., 2009; Chinn & Ito, 2006). The present study follows previous empirical studies of the modeling framework. However, as we focus on the tripartite relationship between financial development, trade openness and economic growth using the Error Correction Model-based causality approach, the number of control variables considered is kept to a minimum to retain the interpretability of the relationships examined (Chinn & Ito, 2006; Gries et al., 2009; Menyah et al., 2014; Wolde-Rufael, 2009).

5. Empirical Results

Table 1 presents descriptive statistics on variables measured in this study. It shows broad variations in financial development, trade openness and economic growth across the samples for the three countries. While Ghana experienced an average growth rate of 1.79% during the period, Nigeria and South Africa experienced average growth rates of 1.06% and 0.41%, respectively. In addition, average credit to the private sector as a ratio of GDP reached 8.93% in Ghana compared to 15% in Nigeria and 110.2% in South Africa. Furthermore, trade openness averaged at 62.8% in Ghana but hovered at approximately 52% in Nigeria and South Africa.

This shows that Ghana experienced the highest average growth rate and levels of trade openness while South Africa experienced the highest average levels of financial development during the period.

The results of the unit root tests using the Augmented Dickey Fuller (ADF) and Philip-Perron (PP) to ascertain the order of integration of model variables are presented in Table 2. GDP per capita growth is integrated at an order of zero $I(0)$ for Ghana, Nigeria and South Africa while financial development and trade openness are integrated at an order of one $I(1)$ for Ghana, Nigeria and South Africa at the 1% significance level. This shows that the model variables represent a mixture of $I(0)$ and $I(1)$ and that the ARDL bound test can be applied.

To determine the appropriate lag order of differenced variables included in the model, we apply the Akaike Information Criterion (AIC) via the unrestricted ARDL equation. The ADRL-bounds testing approach is then used to determine the existence of a cointegration relationship between financial development, trade openness and economic growth. The results presented in Table 3 show that according to Equation 1, a cointegration relationship exists between financial development, trade openness and economic growth when the latter is used as a dependent variable for Ghana, Nigeria and South Africa. Thus, the calculated F-statistic is greater than upper bound critical values at the 10 percent significance level. Hence, we reject our null hypothesis on the absence of a cointegration relationship between the variables and we fail to reject our alternative hypotheses supporting the existence of cointegration relationships between financial development, trade openness and economic growth for all of the countries examined.

In Equation 2, where financial development is the dependent variable, the cointegration relationship was only found for Nigeria. Hence, the null hypothesis is rejected in favor of the alternative hypothesis. Conversely, we fail to reject the null hypothesis of no cointegration for Ghana and South Africa, implying the absence of a cointegration association. Similarly, for Equation 3, wherein trade openness was used as a dependent variable, a cointegration relationship between the variables was only found for South Africa, thus rejecting the null hypothesis, and no such cointegration relationship was found for Nigeria. The calculated F-

Table 1. Summary of Descriptive Statistics

	Y	FDE	M2	TOP
Ghana				
Mean	1.794	8.930	22.890	62.794
Maximum	11.251	19.907	34.108	116.048
Minimum	-9.925	1.542	11.304	6.320
Standard Deviation	3.782	5.609	7.053	30.299
Nigeria				
Mean	1.061	15.021	24.439	51.903
Maximum	30.342	38.386	43.266	81.812
Minimum	-15.458	8.7096	13.230	23.608
Standard Deviation	7.4737	6.187	6.646	15.768
South Africa				
Mean	0.401	110.165	59.636	52.549
Maximum	4.171	160.124	80.799	72.865
Minimum	-4.330	55.600	45.500	38.645
Standard Deviation	2.455	32.683	10.148	8.185

Notes: Y= real GDP per capita growth rates, FDE= financial development proxy based on credit given to the private sector as a ratio of GDP M2= broad money supply as a ratio of GDP (alternative proxy of financial development) TOP= trade openness as a ratio of GDP.

statistic is lower than lower bound critical values of the 10 percent significant level. However, for Ghana it cannot be determined whether a cointegration relationship exists because the calculated F-statistic lies within the lower and upper bound critical values at the 5 percent significance level. The Error Correction Model can be used to determine the existence of a long-run association between the variables.

Furthermore, the presence of a cointegration relationship between two variables implies that one variable Granger causes the other, though cointegration does not determine the direction of causality. We thus use the Error Correction Model to determine the direction of Granger causality between financial development, trade openness and economic growth, and corresponding results are presented in Table 4. We show that long-run causality runs from financial development and trade openness to economic growth for Ghana,

Nigeria and South Africa. This is supported by the statistical significance of the coefficient of the lagged Error Correction Term [ECT(-1)] at the 5% level. This implies that economic growth tends to converge to its long-run equilibrium path in response to variations in financial development and trade openness. Bannerjee, Dolado, and Mestre, (1998) found that a negative and highly significant coefficient of lagged error correction terms further proves the existence of a cointegration relationship between variables.

A long-run causal relation runs from financial development and economic growth to trade openness for Ghana, but such causality was not found for Nigeria and South Africa. Similarly, we found no evidence of long-run causality from economic growth and trade openness to financial development for the examined countries. However, we found evidence of short-run causality running from financial development and

Table 2. Unit Root Test Results

Variables	Augmented Dickey Fuller (ADF)		Philip-Perron (PP)	
	Level [I(0)]	1st Difference [I(1)]	Level [I(0)]	1st Difference [I(1)]
Ghana				
Y	-3.415**	-6.465***	-3.324**	-15.164***
FDE	-0.870	-6.398***	-0.618	-7.844***
M2	-0.852	-6.462***	-0.714	-6.462***
TOP	-1.430	-4.737***	-1.446	-4.744***
Nigeria				
Y	-4.877***	-12.956***	-4.911***	-15.309***
FDE	-2.594	-5.107***	-2.431	-8.749***
M2	-3.249**	-4.876***	-2.139	-7.178***
TOP	-1.944	-7.459***	-1.958	-7.414***
South Africa				
Y	-3.922***	-7.188***	-3.916***	-9.466***
FDE	-1.698	-6.545***	-2.073	-7.188***
M2	-0.893	-4.124***	-0.728	-4.143***
TOP	-1.619	-5.287***	-1.753	-5.352***

Notes: *** and ** denote statistical significance at the 1% and 5% levels, respectively, and a rejection of the null hypothesis of the unit root. Y= real GDP per capita growth rates, FDE= a financial development proxy based on credit given to the private sector as a ratio of GDP, M2= broad money supply as a ratio of GDP (alternative proxy of financial development), TOP= trade openness as a ratio of GDP.

Table 3. Cointegration Test Results

Dependent variable	Function	Ghana	Nigeria	South Africa
		F-Statistic	F-Statistic	F-Statistic
Y	$Y = f(\text{FDE}, \text{TOP})$	12.816***	8.650***	9.388***
FDE	$\text{FDE} = f(Y, \text{TOP})$	1.675	4.435*	1.527
TOP	$\text{TOP} = f(Y, \text{FDE})$	3.798	2.038	5.991**
Bounds test critical values				
		Lower Bounds	Upper Bounds	
1%		5.15	6.36	
5%		3.79	4.85	
10%		3.17	4.14	

Notes: ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively. Y= real GDP per capita growth rates, FDE= financial development proxy based on credit given to the private sector as a ratio of GDP, TOP= trade openness as a ratio of GDP.

Table 4. Granger Causality Tests

Dependent variable	Causal Flow	F- Statistic (Short-run causality)	ECT [T- Statistic] (Long-run causality)	R ²
Ghana				
Y	FDE → Y	4.471 (0.107)	-0.628*** [-18.929]	0.975
Y	TOP → Y	5.319* (0.070)		
FDE	Y → FDE	5.518* (0.063)	-0.043 [-0.917]	0.384
FDE	TOP → FDE	2.462 (0.292)		
TOP	Y → TOP	1.893 (0.338)	-0.158*** [-3.907]	0.519
TOP	FDE → TOP	0.308 (0.858)		
Nigeria				
Y	FDE → Y	4.952* (0.084)	-0.749*** [-3.289]	0.534
Y	TOP → Y	1.213 (0.545)		
FDE	Y → FDE	2.249 (0.325)	0.432*** [3.222]	0.343
FDE	TOP → FDE	7.227** (0.027)		
TOP	Y → TOP	3.114 (0.210)	0.075 [0.575]	0.260
TOP	FDE → TOP	0.742 (0.690)		
South Africa				
Y	FDE → Y	3.370 (0.185)	-0.774 *** [-2.903]	0.558
Y	TOP → Y	4.391 (0.111)		
FDE	Y → FDE	0.546 (0.761)	0.003 [0.251]	0.190
FDE	TOP → FDE	4.475 (0.107)		
TOP	Y → TOP	9.791*** (0.008)	-0.010 [-0.996]	0.512
TOP	FDE → TOP	11.494*** (0.003)		

Notes: ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively. Figures shown in parenthesis are probability values while T-statistics are shown in square brackets. Y= real GDP per capita growth rates, FDE= financial development proxy based on credit given to the private sector as a ratio of GDP, TOP= trade openness as a ratio of GDP.

economic growth to trade openness for South Africa. Short-run causal relations were also found running from trade openness to financial development and from financial development to economic growth for Nigeria. In the case of Ghana, short-run causality runs from trade openness to economic growth and from economic growth to financial development. These findings are supported by the statistical significance of calculated F-statistics of the variables at the 10% level.

Our findings on causality running from financial development to economic growth for South Africa are consistent with those of Gries et al. (2009) and Menyah et al. (2014). This implies that the supply-leading hypothesis prevails for this country, as the financial sector can be used to accelerate economic growth. This can likely be attributed to the development of the financial sector in South Africa. However, our findings on causal relations between financial development and

Table 5. Granger Causality Tests based on an alternative proxy for financial development

Dependent variable	Causal Flow	F-Statistic (Short-run causality)	ECT [T-Statistic] (Lon-run causality)	<i>R</i> ²
Ghana				
Y	M2 → Y	2.457 (0.293)	-0.455*** [-16.004]	0.972
Y	TOP → Y	4.864* (0.088)		
M2	Y → M2	0.552 (0.759)	0.066*** [2.723]	0.467
M2	TOP → M2	1.077 (0.583)		
TOP	Y → TOP	2.004 (0.367)	-0.122*** [-3.706]	0.528
TOP	M2 → TOP	0.419 (0.811)		
Nigeria				
Y	M2 → Y	2.280 (0.319)	-0.745*** [-3.072]	0.438
Y	TOP → Y	3.779 (0.151)		
M2	Y → M2	0.302 (0.859)	0.049 [0.410]	0.145
M2	TOP → M2	2.039 (0.361)		
TOP	Y → TOP	1.855 (0.395)	0.242 [1.716]	0.227
TOP	M2 → TOP	4.381 (0.112)		
South Africa				
Y	M2 → Y	0.378 (0.828)	-0.541 [-1.468]	0.379
Y	TOP → Y	2.459 (0.292)		
M2	Y → M2	6.415** (0.041)	0.243*** [4.551]	0.576
M2	TOP → M2	1.381 (0.501)		
TOP	Y → TOP	4.951* (0.084)	-0.171 [-1.365]	0.303
TOP	M2 → TOP	3.208 (0.201)		

Notes: ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively. Figures shown in parenthesis are probability values while T-statistics are shown in square brackets. Y= real GDP per capita growth rates, M2= financial development proxy based on broad money supply as a ratio of GDP, TOP= trade openness as a ratio of GDP.

economic growth for Ghana and Nigeria contradict those of Gries et al. (2009), who report a demand-following hypothesis for Ghana and a feedback hypothesis for Nigeria. In general, we find that financial development and trade openness can be used to enhance economic performance.

On causal relations between financial development and trade openness, the findings of this study are consistent with the finance-openness hypothesis reported

for Nigeria in Gries et al. (2009) but contrast with trade openness-finance and feedback relationships reported for Ghana and South Africa, respectively. Generally, there is evidence of causal relations between financial development and trade openness, and this is consistent with Huang and Temple (2005) and Wolde-Rufael (2009). Finally, overwhelming evidence found in support of causality between economic growth and trade openness is consistent with Berthelemy and Varouda-

kis (1996). Thus, trade openness induces economic growth, and the reverse causation is also found.

To measure the robustness of our results we use broad money supply as a ratio of GDP as an alternative proxy for financial development and corresponding results are reported in Table 5. The results are similar to those obtained when credit to the private sector was used as a proxy for financial development.

For our robustness check of the cointegration results, we conducted a structural breaks test using the method proposed by Bai and Perron (2003) to measure the presence of structural breaks in the series. After controlling for structural breaks, the co-integration results were not significantly altered. We also conducted various diagnostic tests (the results are available on request) to further measure the robustness of the results. We found no signs of autocorrelation or heteroscedasticity, and the models are generally stable. The stability tests show that the models are stable, as plots of the charts lie within the critical bounds at the 5% significance level. Bahmani-Oskooee and Nasir (2004) found that the null hypothesis stating that the regression equation is correctly specified cannot be rejected when plots of these statistics fall within critical boundaries at the 5% significance level.

In sum, the findings of this study are three-fold. First, there is a long-run causal relation running from financial development and trade openness to economic growth, thereby supporting the finance- and trade-led growth hypotheses. This implies that financial development and trade openness are jointly growth-enhancing in Ghana, Nigeria and South Africa. This strongly refutes the notion that financial development and trade openness do not affect or hinder economic growth in Sub-Saharan African countries. Unlike previous studies, this study finds joint long-run causality from financial development and trade openness to economic growth. This finding is consistent with theories emphasizing the positive role of financial development and trade openness in economic growth. In terms of individual causality, there is evidence of short-run causality running from financial development and trade openness to economic growth.

Second, there is a joint long-run causal relation running from financial development and economic growth to trade openness, thereby confirming the finance- and growth-openness hypotheses. There is

also evidence of individual short-run causality from financial development and economic growth to trade openness. The implication of this finding is that financial development and economic growth can be deployed to accelerate trade openness. Thus, policies and reforms that boost financial development and economic growth can also spur trade openness in these countries. Finally, there is no strong evidence for joint long-run causal relations from trade openness and economic growth to financial development, but we find marginal evidence of short-run causality from trade openness to financial development. This contrasts with the results of Kim et al. (2010b), who found long-run complementarity and short-run substitutionarity between trade openness and financial development for non-OECD countries and a negligible effect of financial development on trade in OECD countries. Thus, the tripartite relationship found between financial development, trade openness and economic growth is evident, as finance and trade spur growth; finance and growth spur trade; and trade spurs finance.

The findings of this paper are robust to alternative proxies of financial development and to various diagnostic tests (e.g., structural break, autocorrelation, heteroscedasticity and stability tests). Econometrically, the techniques used in this study reveal the presence of joint and individual causality and of long-run and short-run causality between the examined variables.

6. Conclusion

This study examines cointegration and causal relationships between financial development trade openness and economic growth for Ghana, Nigeria and South Africa. The study results support the existence of cointegration relationships between the variables. We found that a long-run causal relation runs from financial development and trade openness to economic growth for all of the examined countries, thereby supporting the finance- and trade-led growth hypotheses. We also found long-run causality running from financial development and economic growth to trade openness for Ghana. Though we found no long-run causality from trade openness to financial development, we found evidence of short-run causality. Hence, a tripartite relationship between finance, trade and growth is evident from this study. These

findings are robust to alternative proxies of financial development and to various diagnostic tests.

This study shows that financial development and trade openness can be deployed to accelerate economic growth in all of the countries examined. This rejects the notion that financial development and trade openness are unimportant to economic growth in developing countries. Thus, long-run economic benefits in terms of economic growth and trade openness can be attained by developing countries when they embark on reforms/restructuring that can stimulate the development of their financial sectors. Furthermore, countries with relatively closed economies can derive long-term economic benefits in terms of financial development and economic growth by encouraging trade. However, the examined countries would secure more long-term economic benefits in terms of economic growth and development if they facilitated trade while developing their financial sectors. Hence, policies focused on the development of the financial sector and on trade openness to enhance economic growth appear justified. In other words, we justify development strategies that underscore economic openness and/or financial sector development as feasible options for countries. Additionally, policies directed at stimulating financial development are likely to shape trade as an additional outcome. To stimulate economic growth, the financial and trade sectors must be developed owing to their fundamental role in economic growth. Policies and reforms that enhance (or dampen) economic growth will also enhance (or dampen) the development of the financial and trade sectors due to the essential role of economic growth in promoting finance and trade. Thus, policymakers must understand the tripartite relationship between finance, trade and in making policy decisions.

Though the findings of this study show that financial development and trade openness are fundamental for economic growth, we do not conclude that these are the only variables required for economic growth and development in all countries. Evidence from other countries may indicate that other variables (besides finance and trade) contribute to economic growth. Thus, employing a more balanced development approach that considers various fundamental determinants of economic growth and development should be the most appropriate development strategy for different countries.

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Acknowledgement:

Kizito Uyi Ehigiamusoe acknowledges support received from Universiti Sains Malaysia (USM) through Teaching Fellowship.