

The Response of Banking Sector Development to Financial and Trade Openness in the Presence of Global Financial Crisis in Africa

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Abstract

Africa's financial system is strongly bank-based and so this paper investigate whether economic growth, financial openness and trade openness contribute to the development of the banking sector in the presence and absence of global financial crisis. The results from PMG/ARDL suggest that banking sector develops independently of economic growth in lower-middle and high income countries while it develops as demand for finance increases in low and upper-middle income countries in Africa. Being cautious of global financial crisis, trade openness is found to be more effective in high and lower-middle income countries, financial openness is more effective in low income countries and neither is more effective in upper-middle income countries. It is also discovered that, in the long run, global financial crisis generally reduce banking sector development in Africa but not in high income countries however the banking sectors of lower-middle and low income countries suffer the most from such crisis.

Keywords: Financial Openness, Trade Openness, Banking Sector Development, Global Financial Crisis, Africa, Income group

JEL Classification: F01, F21, G01, G21.

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1.0 Introduction

African countries' financial systems are strongly bank-based (Gries *et al.*, 2014). As such, since the late 1980s, they have been working hard on developing a strong banking sector by adopting banks' privatization and recapitalization, and strengthening the powers of monetary regulatory agencies (*ibid.*). Motivated by the recent debate on how trade and financial openness contribute to financial sector development, this paper investigates whether financial openness and trade openness contribute to the development of the banking sector in Africa using the theoretical concept of the Simultaneous Openness Hypothesis (SOH) postulated by Rajan and Zingales (2003).

Rajan and Zingales (2003) argue that developing a sound framework of institutions (such as strengthening monetary regulatory bodies) without concurrently opening trade and finance is inadequate to foster genuine financial development. This argument starts with the premise that leading (industrial and financial) firms in a country see financial sector development as a threat. Industrialists believe that there is no need for a developed financial sector because they can finance new projects with funds generated by their businesses and/or borrow from banks based on their reputation or collateral. This arrangement chokes infant firms that are yet to build such goodwill or collateral assets and they end up selling their businesses to leading firms or seek support through franchise or dealership. Once the financial system starts to develop, Rajan and Zingales (2003) state that leading firms become fearful of losing their profits and market share to infant firms and new entrants. For illustration, if the banking sector demand for increased disclosure when leading firms ask for loans, this leads to arm's length transactions which reduces the relative dealings of and preference given to incumbent industrialists while giving opportunities to infant firms who can comply with such regulations to source for finance (Baltagi *et al.*, 2007).

Bankers, also, do not see the need for the sector to develop because they enjoy a monopolized relationship-based arrangement with industrialists (Rajan and Zingales, 2003). They believe that increase in financial development levels the playing field by cutting down the barriers of entrance into the financial sector and increasing disclosure rules and regulations (for public consumption) which may deprive the bankers' of their competitive advantage. Aside from the loss of competitive advantage, Rajan and Zingales (2003) explain that when financial development occurs, existing bankers would have to continuously develop their skills if they

want to still be relevant players in the sector. For example, bankers may have to convert their branches from being service centres to sales centres by training their staff to become universal employees in order to raise their level of competition (Hauner and Prati, 2008).

To have a developed financial sector, the combined openness of product (trade) and capital (finance) markets is required to persuade incumbents that may not want to support financial development. Rajan and Zingales (2003) contend that applying trade openness alone may cause infant firms a reduced access to finance for investment purposes while large firms may be availed abundant loans with low charges and interest rates (from not only bankers but also from governments) that will end up enhancing their competitive advantage at the expense of infant firms. Alternately, if financial openness is chosen, larger and reigning firms would still be the ones to enjoy because they have the resources to tap into foreign funds thereby blocking infant firms. In the financial sector, existing bankers in the economy may be intimidated by this move as it may affect their profit making (Baltagi *et al.*, 2007). Rajan and Zingales (2003) maintained that existing bankers will witness their relationship-based arrangement with industrialists deplete because the reigning firms would want a slice of the funds the foreign financial sector has to offer. Rajan and Zingales' (2003) posit that simultaneous openness of trade and finance (i.e. SOH), is the way to a successful development of a financial sector because it has a win-win feature that will provide additional sources of funding to both old/large and new/small firms (Hauner and Prati, 2008).

While reigning firms tap into foreign finance (financial openness), old firms on the verge of collapsing have to comply with non-indulgent disclosure rules and regulations in order to borrow from existing bankers. As bankers watch their best clients tap into foreign finance, they will seek for new clients among the new entrants and infant firms. Since they do not have any prior relationship-based interaction with the new and infant firms, these clients are riskier and bankers will also have to request for compliance with disclosure requirements and strict contract enforcement. Thus, the new disclosure rules and regulations creates a levelled playing field for the leading firms, collapsing old firms, infant firms and new firms to competitively participate in the product market and so also for existing bankers and new bankers in the financial market (Rajan and Zingales, 2003). It suffices to mention that financial openness, as argued by Mishkin (2009), also fosters technology transfer in both the industrial and financial sector in an attempt to upgrade operational standards and follow international best practices.

Opening trade favours industrialists by allowing them to export their products and compete internationally. It also triggers demand for new or more sophisticated financial services by industrialists from existing bankers because of the level of risks associated with foreign competition and external shocks (Svaleryd and Vlachos, 2002). Opening finance and trade afford domestic existing bankers the opportunity to compete abroad by opening branches in foreign countries, so as to source for new clients and better serve their existing clients. Industrial firms may also seek to do the same in the fit of competing abroad (Rajan and Zingales, 2003).

In the end, although they may reduce the powers of leading firms and existing bankers by yielding external and new domestic competitors, trade and financial openness will end up compensating leading firms with profits that are more than what they might lose (Baltagi *et al.*, 2007). Based on this, government intervention to provide subsidised loans to existing firms in the product and financial market will reduce or not occur at all (Rajan and Zingales, 2003).

Empirically, Baltagi *et al.* (2009) concluded that opening up both trade and capital accounts is more beneficial in developing countries that are relatively closed while opening one without the other may also foster financial development. Like Hauner and Prati (2008) and Pham (2010), David *et al.* (2014) found that trade openness is more important to obtain a higher financial development than financial openness for sub-Saharan African (SSA) countries. David *et al.* (2014) argue that even though openness seems to be positively linked to financial development, the evidence for sub-Saharan African (SSA) countries is less clear-cut. Meanwhile, Onanuga and Onanuga (2016) found that a simultaneous opening of trade and capital contributes to financial development in Nigeria while an opening of capital without trade in Nigeria does more harm than good to financial development, vice versa. The conflict between David *et al.*'s (2014) summation and Onanuga and Onanuga's (2016) findings motivated the re-examination of the impact of financial and trade openness on banking sector development in African countries. To investigate this objective and based on the argument of David *et al.* (2014) that the evidence for SSA countries is less clear-cut, this study grouped the sample countries based on income levels.

Furthermore, the claim of Pham (2010) that global financial crisis may affect financial development in addition to financial and trade openness prompt this study to consider how the development of the banking sector in Africa reacts to financial and trade openness when there is global financial crisis. During the global financial crisis (2007-2009), the African Development Bank (AfDB, 2009) put forward an optimistic view that Africa's banking sector would

experience a minimal impact from the crisis due to four reasons. African countries had the lowest access to foreign finance compared to other developing countries and the access to foreign finance are regulated by monetary authorities; few African banks had derivatives portfolio backed by sub-prime mortgages; African banking assets was less than one percent of the global banking asset; and most African countries (especially the big four, South Africa, Algeria, Nigeria and Egypt (SANE)) had continuously been undertaking bank reforms.

However, N'zue (2010) claims that, empirically, global financial crisis had hit African countries hard and Africa will continue to suffer from the after-shocks of the crisis because of its lack of financial and skilled human resources needed for African banks' bail out. As argued by Murinde (2009), the major reason for this impact is that African banks are exposed to the contagion effects of the global crisis through foreign banks with subsidiaries in African economies. Botswana, Central Africa Republic, Chad, Cote d' Ivoire, Equatorial Guinea, Lesotho and Madagascar are some of the countries where foreign ownership of banks is high and they were vulnerable to the contagion effect (Ashamu and Abiola, 2012). South Africa and Nigeria, for illustration, were hit by the financial crisis through scarcity of foreign finance and off-shore credit lines while fragile countries such as Burundi and Liberia were found vulnerable due to their heavy dependence on concessionary financing (Murinde, 2009).

The impact of the global financial crisis on Africa is not limited directly to banking sector development. African economies also experienced indirect impacts on its banking sector through shrinks in trade openness via sharp fall in export volume, prices and revenue (N'zue, 2010). Due to the pressure of the financial crisis, the line of global credit was tightened by developed countries resulting to decrease in capital flows, foreign direct investment and economic growth (Balchin 2009). All these negative impacts could have slowed down the pace of banking sector development in Africa by weakening banks' balance sheets via increase in nonperforming loans and drying up of liquidity (Obiorah 2014). The thread that runs through is that global financial crisis may affect the contribution of financial and trade openness towards banking sector development in Africa. This is another objective this study intends to achieve by introducing a global financial crisis variable in its empirical analysis and considering its short and long run impacts using the methodology framework suggested by Baltagi *et al.* (2009). Also, Murinde's (2009) finding that the vulnerability of African economies to global financial crisis is not uniform strengthens this study's grouping of sample countries by income levels.

Achieving the aforesaid objectives, this study informs policymakers on whether to open capital or trade or both so as to increase the level of banking sector development by taking into consideration what action they are likely to take in cases of global financial crisis if it occurs. The rest of the paper is structured as follows: section 2 is on data, models and estimation procedure; the empirical results are interpreted in the section 3; while discussion of findings and the conclusion of the paper are presented in sections 4 and 5.

2.0 Methodology

2.1 Data

Choosing the measure of banking sector development, the measure of private credit as a share of GDP is the most frequently used proxy for banking sector development (see: Baltagi *et al.*, 2009, Pham 2010, David *et al.*, 2014). The main reason for its wide use is because the measure depicts the ease with which industrialists can obtain finance. However, the measure of private credit to GDP captures only the composition of the asset side of banks' balance sheet while ignoring the liability side. If the ratio of deposits to GDP is chosen, it has the shortcoming of capturing only the liability side of banks while ignoring the banks' assets (Rajan and Zingales 2003). The measures private credit to GDP and deposits to GDP depict the financial depth of the banking sector. Unlike these two measures, this study contributes to the literature by applying the ratio of bank credit to bank deposit as the measure of development in the banking sector (regressand). For a change, the regressand for this paper portrays the financial stability of the sector and not the depth. In addition; the variable captures both the liability and asset sides of the banking sector in a model.

The paper considers four regressors. First, real gross domestic product (GDP) per capita is the proxy for economic prosperity and demand for finance. This variable is selected based on demand-following hypothesis that development in the banking sector may be caused by economic growth. That is, industrialists (new or old) may request for new and more financial products and services as an economy prospers (Robinson, 1952). Second, the measure of trade openness utilised in this paper is the basic measure of trade openness under trade volume i.e. the ratio of exports plus imports to GDP.

The third regressor is financial openness. Due to data deficiency on *de jure*¹ measures of financial openness (Eichengreen, 2001) for African countries, *de facto* measures are used. *De facto* measures disclose a country's financial integration into the global financial markets (Quinn *et al.*, 2011). Although they may be influenced by political and economic factors, they depict elements of exogeneity (such as international politics, social unrest, etc.) which may not be featured in *de jure* measures (Baltagi *et al.*, 2009). The United Nations Commission on Trade and Development's (UNCTAD) *de facto* measure of the inward flow of Foreign Direct Investment (FDI) to GDP is applied for this study. In favour of this decision, compared to other types of capital flow, FDI tends to be long term and less volatile (Estrada *et al.*, 2015).

The three regressors are sourced from the World Bank's World Development Indicators (WDI) and the regressand is sourced from the World Bank's Global Financial Development Database (GFDD) for 28 African countries. The regressand and regressors, except for the real GDP per capita, are in percentages. The real GDP per capita are in 2005 constant prices (US\$). The fourth regressor is a dummy variable for the 2007-2009 global financial crises. The 28 African countries are presented in Table 1 and grouped into 10 low income countries (LIC), 10 lower-middle income countries (LMIC), six upper-middle income countries and two high income countries.

Table 1: List of countries

Low Income Countries (LIC) in Africa: Burkina Faso, Burundi, Central Africa Republic, Chad, Madagascar, Malawi, Mali, Niger, Togo and Uganda

Lower-Middle Income Countries (LMIC) in Africa: Cameroon, Cote d'Ivoire, Egypt, Ghana, Kenya, Lesotho, Morocco, Nigeria, Senegal and Sudan

Upper-Middle Income Countries (UMIC) in Africa: Algeria, Botswana, Gabon, Mauritius, South Africa and Tunisia

High Income Countries (HIC) in Africa: Seychelles and Equatorial Guinea

¹ *De jure* measures are measured by the extent to which legal hurdles impede the free flow of capital (Garita, 2009).

2.2 Model and estimation procedure for the study

The empirical model for the study is motivated by Baltagi *et al.* (2007):

$$BSD_{it} = \alpha_0 + \alpha_1 BSD_{it-1} + \alpha_2 GDP_{pc_{it}} + \alpha_3 FO_{it} + \alpha_4 TO_{it} + \mu_{it} \quad . \quad . \quad . \quad (1)$$

Equation 1 is a dynamic model where *BSD* is banking sector development; *GDP_{pc}* is real GDP per capita; *FO* is financial openness; *TO* is trade openness and μ is the error term. The lag of banking sector development (*BSD_{t-1}*) is considered as an explanatory variable which implies that its previous level drives the current level of development.

Using the theoretical foundation of the Simultaneous Openness Hypothesis (SOH), Baltagi *et al.* (2007) states that equation 1 only depicts the hypotheses of whether *TO* and *FO* do contribute to *BSD*. To test the hypothesis of the simultaneity effect of both *TO* and *FO* on *BSD* (*ibid.*), equation 2 is specified.

$$BSD_{it} = \alpha_0 + \alpha_1 BSD_{it-1} + \alpha_2 GDP_{PC_{it}} + \alpha_3 FO_{it} + \alpha_4 TO_{it} + \alpha_5 (FO_{it} \cdot TO_{it}) + \mu_{it} \quad . \quad . \quad . \quad (2)$$

However, the variable global financial crisis (*GFC*) is introduced into equation 1 and 2 and to obtain equation 3 and 4.

$$BSD_{it} = \alpha_0 + \alpha_1 BSD_{it-1} + \alpha_2 GDP_{pc_{it}} + \alpha_3 FO_{it} + \alpha_4 TO_{it} + \alpha_6 GFC + \mu_{it} \quad . \quad . \quad . \quad (3)$$

$$BSD_{it} = \alpha_0 + \alpha_1 BSD_{it-1} + \alpha_2 GDP_{PC_{it}} + \alpha_3 FO_{it} + \alpha_4 TO_{it} + \alpha_5 (FO_{it} \cdot TO_{it}) + \alpha_6 GFC + \mu_{it} \quad . \quad . \quad . \quad (4)$$

Equation 3 depicts the hypotheses of whether *TO* and *FO* contribute to *BSD* in the presence of *GFC* while equation 4 depicts the hypothesis of the simultaneity effect of both *TO* and *FO* on *BSD* in the presence of *GFC*. A priori of the parameters α_2 , α_3 and α_4 are expected to be positive and α_6 to be negative. If α_3 and α_4 are significantly positive, *BSD* may take place without a simultaneous opening of trade and finance (Baltagi et al 2007). If α_2 is positive and significant then accept the demand-following hypothesis but if not significant then accept the view that the banking sector evolves independently of economic growth i.e. they have an insignificant relationship (Chandavarkar, 1992).

Further the partial derivative of equation 2 and 4 are taken with respect to *FO* and *TO*, respectively:

$$\frac{\partial BSD_{it}}{\partial FO_{it}} = \alpha_3 + \alpha_5 TO_{it} \quad (5)$$

$$\frac{\partial BSD_{it}}{\partial TO_{it}} = \alpha_4 + \alpha_5 FO_{it} \quad (6)$$

In compliance with the SOH, the paper expect the partial derivatives in equation 5 and 6 to increase as *TO* and *FO* increase, respectively. Also, the paper expect the empirical findings from the panel analysis on the income groups to indicate a group-specific dimension on the impact of economic prosperity, financial and trade openness and financial crisis on the development of banking sector in African. Based on the hypotheses that more economic growth and financial and trade openness lead to more developed banking sector, the paper should be able to identify which is more effective at increasing banking sector development in the income groups as higher positive values of the coefficients implies more contributions to the development of the banking sector.

Firstly, the descriptive statistics of the data are obtained. Then, unit root tests are conducted using Levin, Lin and Chu (LLC) unit root test which assumes that all panels share a common autoregressive parameter and Im, Pesaran and Shin (IPS) unit root test which assumes that panels have individual autoregressive parameter. Some of the variables are integrated at first difference (I(1)) and others are integrated at level (I(0)), therefore the pooled mean group autoregressive distributed lag estimation method (PMG/ARDL) in E-Views 9 software package is employed. This method adapts the cointegration form of the ARDL model to a panel setting by allowing the intercepts, coefficients and the cointegrating term to differ across cross-sections (Pesaran, Shin and Smith 1999). Due to its ease to conduct and interpret compared to other cointegration tests, the Engle-Granger cointegration test is conducted on each estimated model to ensure that this study is not relying on a spurious regression by obtaining the residual series of the estimated models and conducting the Fisher type Augmented Dickey-Fuller (ADF) unit root test.

3.0 Interpretation of Results

Table 2 depicts the statistical summary of the data. High income countries (HICs) have the highest mean and median for real GDP per capita, followed by upper- and lower-middle income countries while low income countries (LICs) have the least mean and median statistic for real

GDP per capita in Africa. The same trend was noticed for trade openness but not for financial openness and bank credit to bank deposit (BCBD) (proxy for banking sector development).

Table 2: Summary statistics

	BCBD	GDP _{pc}	FO	TO
Entire sample of 28 African countries				
Mean	81.72	2051.77	3.49	75.24
Median	78.35	660.71	1.54	60.90
Maximum	540.53	15912.14	161.82	531.74
Minimum	15.93	140.82	-8.59	11.09
Std Dev	38.85	2965.09	9.24	53.29
Obs	728	728	728	728
10 Low Income Countries (LIC) in Africa				
Mean	88.49	323.79	2.49	53.18
Median	88.07	320.99	1.09	47.44
Maximum	183.14	738.22	46.49	126.35
Minimum	30.81	140.82	-3.75	20.96
Std Dev	27.74	110.12	4.81	19.73
Obs	260	260	260	260
10 Lower-Middle Income Countries (LMIC) in Africa				
Mean	75.47	858.13	2.64	67.70
Median	73.37	787.99	1.69	57.96
Maximum	185.35	2521.59	35.23	209.89
Minimum	23.32	366.24	-2.07	11.09
Std Dev	31.01	405.22	4.45	37.52
Obs	260	260	260	260
6 Upper-Middle Income Countries (UMIC) in Africa				
Mean	84.49	4607.24	1.63	84.91
Median	80.06	4684.42	1.26	86.82
Maximum	148.20	8280.28	13.46	137.11
Minimum	15.93	1943.76	-8.59	38.11
Std Dev	36.37	1708.15	2.63	25.56
Obs	156	156	156	156
2 High Income Countries (HIC) in Africa				
Mean	70.82	8993.40	18.35	194.29
Median	42.47	10351.11	10.14	180.37
Maximum	540.53	15912.14	161.82	531.74
Minimum	16.67	374.13	-4.95	52.78
Std Dev	90.16	4896.00	27.09	108.88
Obs	52	52	52	52

The mean and median statistics depict that HICs are more open to capital than other income groups; lower-middle income countries (LMICs) are more open to capital than LICs and upper-middle income countries (UMICs) while UMICs have the least mean and median statistics for financial openness. Ironically, banking sector development (averagely) is highest in LICs and least in HICs while UMICs have a higher banking sector development than LMICs in Africa.

Table 3: Correlation matrix

Entire sample of 28 African countries				
	BCBD	GDP _{PC}	FO	TO
BCBD	1.0000			
GDP _{PC}	-0.1972	1.0000		
FO	-0.0209	0.1485	1.0000	
TO	-0.0395	0.4088	0.6439	1.0000
10 Low Income Countries (LIC) in Africa				
	BCBD	GDP _{PC}	FO	TO
BCBD	1.0000			
GDP _{PC}	0.1936	1.0000		
FO	-0.1125	0.1363	1.0000	
TO	-0.2945	0.4003	0.4461	1.0000
10 Lower-Middle Income Countries (LMIC) in Africa				
	BCBD	GDP _{PC}	FO	TO
BCBD	1.0000			
GDP _{PC}	0.1375	1.0000		
FO	-0.1548	-0.0899	1.0000	
TO	-0.1959	-0.0613	0.3987	1.0000
6 Upper-Middle Income Countries (UMIC) in Africa				
	BCBD	GDP _{PC}	FO	TO
BCBD	1.0000			
GDP _{PC}	0.0309	1.0000		
FO	0.0716	-0.0240	1.0000	
TO	-0.0989	0.1216	0.1354	1.0000
2 High Income Countries (HIC) in Africa				
	BCBD	GDP _{PC}	FO	TO
BCBD	1.0000			
GDP _{PC}	-0.5990	1.0000		
FO	0.1003	-0.3452	1.0000	
TO	0.2904	-0.4754	0.6937	1.0000

The correlation matrix displayed in Table 3 shows that there are weak positive and negative association among the study variables under LIC, LMIC and UMIC. This is also the case under the entire sample and HIC with the exception of the correlation between financial openness and trade openness under the entire sample and HIC and the correlation between bank credit to bank deposit and real GDP per capita under HIC. These exceptions have moderate positive and negative association. These results suggest no fear of the problem of multicollinearity in the estimated results.

Table 4: Summary of Unit root tests

	BCBD		GDP _{pc}		FO		TO	
	stat	Diag	stat	Diag	stat	Diag	stat	Diag
Entire sample of 28 African countries								
Levin, Lin & Chu (LLC)	-2.16**	I(0)	-11.83***	I(1)	-6.59***	I(0)	-1.77**	I(0)
Im, Pesaran & Shin (IPS)	-3.07***	I(0)	-12.09***	I(1)	-7.08***	I(0)	-21.6***	I(1)
10 Low Income Countries (LIC) in Africa								
Levin, Lin & Chu (LLC)	-2.67***	I(0)	-10.31***	I(1)	-11.4***	I(1)	-12.8***	I(1)
Im, Pesaran & Shin (IPS)	-2.69***	I(0)	-11.0***	I(1)	-1.73**	I(0)	-12.6***	I(1)
10 Lower-Middle Income Countries (LMIC) in Africa								
Levin, Lin & Chu (LLC)	-1.74**	I(0)	-3.24***	I(1)	-6.14***	I(0)	-2.35***	I(0)
Im, Pesaran & Shin (IPS)	-1.42*	I(0)	-2.72***	I(1)	-6.79***	I(0)	-1.95**	I(0)
6 Upper-Middle Income Countries (UMIC) in Africa								
Levin, Lin & Chu (LLC)	-9.04***	I(1)	-7.47***	I(1)	-3.99***	I(0)	-1.65**	I(0)
Im, Pesaran & Shin (IPS)	-1.45*	I(0)	-7.12***	I(1)	-4.23***	I(0)	-1.72**	I(0)
2 High Income Countries (HIC) in Africa								
Levin, Lin & Chu (LLC)	-6.63***	I(1)	-1.74**	I(1)	-1.38*	I(0)	-6.60***	I(1)
Im, Pesaran & Shin (IPS)	-6.31***	I(1)	-2.55***	I(1)	-12.2***	I(1)	-5.78***	I(1)

Note: The unit root tests are estimated with Eviews 9. *** is 0.01, ** is 0.05 and * is 0.1 level of significance. Stat means statistic while Diag means the diagnosis.

As expected, some variables have no unit root which means that they are integrated at level (I(0)) in Table 4 under the entire sample of African countries, LIC, LMIC, UMIC and HIC. Other variables have unit root but they are stationary at first difference (I(1)) under the entire sample and income groups.

Therefore, this study move on to estimate the models for the entire sample and all the income groups, and the results are presented in Table 5. Table 5A presents the empirical results for the

relationship between banking sector development and the explanatory variables at level (i.e. long run) while Table 5B presents the empirical results in first difference (i.e. short run).

Table 5: Estimation results for the relationship between banking sector development and the explanatory variables

Table 5A: Long run relationship

	Without GFC		With GFC	
	Model 1A	Model 2A	Models 3A	Model 4A
Entire sample of 28 African countries				
GDP _{PC}	0.018*** [0.004]	0.020*** [0.005]	0.016*** [0.003]	0.011*** [0.001]
FO	1.467*** [0.424]	1.249 [0.928]	1.561*** [0.426]	3.327*** [1.028]
TO	0.584*** [0.130]	0.629*** [0.138]	0.676*** [0.166]	-0.173** [0.081]
FO*TO		0.004 [0.008]		-0.020*** [0.007]
GFC			-16.40*** [5.120]	-15.35*** [2.333]
10 Low Income Countries (LIC) in Africa				
GDP _{PC}	0.216*** [0.062]	0.204*** [0.038]	0.175*** [0.051]	0.125*** [0.044]
FO	4.119*** [0.656]	-21.39*** [2.943]	1.728** [0.831]	9.783*** [1.504]
TO	-1.273*** [0.276]	-1.101*** [0.369]	-0.926*** [0.224]	-1.529*** [0.238]
FO*TO		0.381*** [0.057]		-0.069*** [0.017]
GFC			-29.97*** [7.515]	-13.63** [6.843]
10 Lower-Middle Income Countries (LMIC) in Africa				
GDP _{PC}	0.014 [0.016]	0.022 [0.020]	0.026 [0.033]	0.032 [0.024]
FO	2.235*** [0.776]	6.827 [4.166]	2.457*** [0.885]	6.845 [4.410]
TO	0.796*** [0.197]	0.633*** [0.173]	1.924*** [0.652]	0.581*** [0.165]
FO*TO		-0.060		-0.059

Table 5B: Short run relationship

	Without GFC		With GFC	
	Model 1B	Model 2B	Models 3B	Model 4B
Entire sample of 28 African countries				
ECT	-0.210*** [0.035]	-0.196*** [0.035]	-0.202*** [0.035]	-0.278*** [0.046]
BCBD(-1)	-0.003 [0.047]	0.001 [0.048]	-0.002 [0.051]	0.062 [0.054]
GDP _{PC}	-0.01 [0.025]	-0.005 [0.026]	-0.011 [0.029]	0.005 [0.029]
FO	0.274 [0.502]	-2.409 [4.315]	0.223 [0.487]	-2.095 [4.257]
TO	-0.250** [0.125]	-0.444** [0.196]	-0.267** [0.134]	-0.347* [0.195]
FO*TO		0.032 [0.076]		0.034 [0.071]
GFC			1.832 [1.324]	1.592 [1.613]
Constant	3.152 [3.380]	1.5 [3.656]	2.632 [3.549]	19.81*** [3.365]
10 Low Income Countries (LIC) in Africa				
ECT	-0.323*** [0.074]	-0.329*** [0.079]	-0.335*** [0.061]	-0.341*** [0.086]
BCBD(-1)	-0.065 [0.077]	-0.066 [-0.066]	-0.059 [0.070]	-0.064 [0.084]
GDP _{PC}	0.017 [0.080]	0.034 [0.083]	0.062 [0.098]	0.067 [0.094]
FO	-0.094 [0.911]	3.754 [4.784]	0.086 [0.877]	-5.666 [4.427]
TO	-0.066 [0.279]	-0.434* [0.230]	-0.197 [0.257]	-0.413 [0.314]
FO*TO		-0.115 [0.105]		0.047 [0.096]

		[0.064]		[0.063]
GFC			-33.99**	-2.826
			[14.07]	[9.535]
6 Upper-Middle Income Countries (UMIC) in Africa				
GDP _{PC}	0.013***	0.003	0.012***	0.012***
	[0.002]	[0.004]	[0.001]	[0.001]
FO	-0.107	45.07*	0.55	-2.341
	[0.760]	[24.07]	[0.559]	[3.414]
TO	0.009	1.655*	0.048	-0.043
	[0.271]	[0.911]	[0.136]	[0.105]
FO*TO		-0.495*		0.025
		[0.265]		[0.031]
GFC			-10.12***	-14.03***
			[2.812]	[2.153]
2 High Income Countries (HIC) in Africa				
GDP _{PC}	0.000	-0.001	0.000	0.000
	[0.003]	[0.003]	[0.002]	[0.002]
FO	0.465	1.132	0.452	0.81
	[0.584]	[1.710]	[0.438]	[1.409]
TO	0.143**	0.167*	0.113**	0.126
	[0.061]	[0.095]	[0.049]	[0.081]
FO*TO		-0.002		-0.001
		[0.006]		[0.006]
GFC			12.64**	12.56**
			[5.894]	[5.955]

			1.352	-1.32
GFC			[2.058]	[3.168]
Constant	26.09***	26.17***	28.76***	42.53***
	[7.067]	[7.173]	[6.691]	[10.87]
10 Lower-Middle Income Countries (LMIC) in Africa				
ECT	-0.184***	-0.209***	-0.112*	-0.203***
	[0.068]	[0.055]	[0.063]	[0.052]
BCBD(-1)	0.072	0.113	0.065	0.128
	[0.096]	[0.078]	[0.110]	[0.085]
GDP _{PC}	-0.027	-0.032	-0.061	-0.036
	[0.022]	[0.022]	[0.040]	[0.023]
FO	-0.11	-15.49**	-0.059	-15.55**
	[0.561]	[6.564]	[0.550]	[6.888]
TO	-0.364**	-0.749**	-0.404**	-0.729**
	[0.162]	[0.345]	[0.199]	[0.367]
FO*TO		0.260**		0.259**
		[0.119]		[0.124]
GFC			4.936**	2.785
			[2.103]	[2.103]
Constant	5.781*	2.798**	1.861	1.954**
	[3.131]	[1.148]	[7.825]	[0.937]
6 Upper-Middle Income Countries (UMIC) in Africa				
ECT	-0.292***	-0.138*	-0.393***	-0.462**
	[0.073]	[0.077]	[0.135]	[0.190]
BCBD(-1)	0.046	0.019	0.106	0.204
	[0.071]	[0.121]	[0.093]	[0.152]
GDP _{PC}	-0.025*	-0.021	-0.027*	-0.024**
	[0.014]	[0.015]	[0.014]	[0.011]
FO	0.485	11.65	0.367	18.14
	[0.293]	[13.83]	[0.312]	[12.25]
TO	0.072	0.274	0.057	0.334
	[0.280]	[0.517]	[0.266]	[0.421]
FO*TO		-0.188		-0.224
		[0.226]		[0.170]
GFC			3.262	4.715*
			[2.428]	[2.563]
Constant	2.552	-13.11*	4.381	10.38*
	[3.176]	[6.958]	[3.422]	[5.695]
2 High Income Countries (HIC) in Africa				

	-0.365*** [0.003]	-0.381*** [0.014]	-0.419*** [0.055]	-0.422*** [0.045]
ECT				
BCBD(-1)	0.053 [0.058]	0.098 [0.138]	-0.024 [0.137]	0.014 [0.212]
GDP _{pc}	-0.003 [0.004]	-0.001 [0.002]	-0.003 [0.004]	0 [0.002]
FO	0.051 [0.063]	1.144 [1.520]	0.029 [0.084]	1.177 [1.590]
TO	-0.038*** [0.012]	0.005 [0.046]	-0.039*** [0.005]	0.007 [0.059]
FO*TO		-0.001 [0.003]		-0.001 [0.003]
GFC			3.525 [3.376]	-0.333 [0.589]
Constant	12.55 [8.444]	15.14 [9.580]	14.58 [8.693]	14.75 [8.900]

Note: The estimated results are generated with Eviews 9. *** is 0.01, ** is 0.05 and * is 0.1 level of significance.

The effect of real GDP per capita, financial openness and trade openness on banking sector development in the absence (Model 1A&1B) and presence (Model 3A&3B) of global financial crisis in the long (Model 1A&3A) and short run (Model 1B&3B).

In the long run, real GDP per capita, financial openness and trade openness significantly contribute to the development of the banking sector in Africa (Model 1A: under the entire sample); this meets the a priori expectation. Only trade openness significantly but negatively affects banking sector development in the short run (Model 1B). This contradicts the a-priori expectation. Meanwhile, global financial crisis (GFC) significantly reduces banking sector development in the long run (Model 3A) but not in the short run (Model 3B). This reduction in banking sector development by GFC is as expected. With the introduction of financial crisis, real GDP per capita, financial openness and trade openness still significantly contribute to banking sector development in the long run while trade openness is also the only factor that significantly reduces banking sector development in the short run in Africa.

None of the explanatory variables significantly affect banking sector development in African low income countries (LIC) in the short run. However, in the long run, real GDP per capita and financial openness are found to have a significant positive effect on banking sector development while trade openness has a significant negative effect on banking sector development in LIC. Like the entire sample, GFC significantly reduce banking sector development in the long run but not in the short run. Real GDP per capita and financial openness still have a significant positive effect and trade openness has a significant negative effect on banking sector development in the presence of financial crisis in the long run while they have no significant effect on the explained variable in the short run in LIC.

Lower-middle income countries (LMIC) in Africa are found to experience an insignificant relationship between real GDP per capita and banking sector development while financial openness and trade openness significantly contribute to the explained variable in the long run. Similar to the entire sample, all the explanatory variables, except trade openness, have no significant effect on banking sector development in the short run in LMIC. Trade openness, however, significantly reduces banking sector development in the short run. Interestingly, GFC crisis significantly increased banking sector development in the short run while it significantly reduced the explained variable in the long run. The relationship between banking sector development and the explanatory variables remain the same with the introduction of GFC to Model 1A&1B (i.e. Model 3A&3B).

While real GDP per capita has a significant contribution to banking sector development, financial openness and trade openness are found to have an insignificant relationship with the explained variable for upper-middle income countries (UMIC) in Africa in the long run. In the short run, financial openness and trade openness have no significant relationship with the explained variable while real GDP per capita significantly lead to decrease in banking sector development in the short run in UMIC. Like the entire sample and LIC, GFC significantly reduce banking sector development in the long run but not in the short run in UMIC. The findings on the relationship between banking sector development and the explanatory variables remain the same after the introduction of GFC.

Trade openness is found to significantly raise banking sector development in high income countries (HIC) in Africa while other explanatory variables have no significant relationship with the explained variable in the long run. Trade openness significantly decreases banking sector

development in HIC in the short run while other variables have no significant relationship with the explained variable. In all the income groups, the relationship of the explanatory variables with the explained variable remains the same in the presence of GFC but the magnitude of their respective coefficients differs. Financial crisis have no significant effect on the development of the banking sector in the short run but, surprisingly unlike other income groups, they significantly raise banking sector development in the long run in HIC.

The coefficients of the error correction term (ECT) are presented in Table 5B and they are all significant with the expected a priori. The ECT expresses the proportion of correction that takes place within a year in case of disequilibrium. For illustration, at least 32% of any disequilibrium between banking sector development and the explanatory variables should converge to the long run effect within a year in LIC. This implies that it would take at most 3 years and 47 days for such disequilibrium to adjust back to equilibrium in LIC. The speed of adjustment in other income groups are at most 8 years and 11.30 months for LMIC, 7 years and 3 months for UMIC, and 2 years and 9 months for HIC. The speed of Adjustment back to equilibrium is quickest in HIC and slowest in LMIC.

The simultaneous effect of financial openness and trade openness on banking sector development in the absence (Model 2A&2B) and presence (Model 4A&4B) of global financial crisis in the long and short run

After estimating the models in equation 2 and 4 and presenting them as Model 2A and 4A (long run relationship) in Table 5A and Model 2B and 4B (short run relationship) in Table 5B, the marginal effects of financial openness and trade openness on banking sector development are obtained. The marginal effects are presented in Table 6.

Table 6: Marginal effects of financial openness and trade openness on banking sector development

Marginal Effect of Financial Openness					Marginal Effect of Trade Openness				
	Long run		Short run			Long run		Short run	
	Model 2A	Model 4A	Model 2B	Model 4B		Model 2A	Model 4A	Model 2B	Model 4B
Entire sample of 28 African countries					Entire sample of 28 African countries				
Minimum	1.293	3.105***	-2.054	-1.718	Minimum	0.594	-0.001**	-0.719	-0.639
Median	1.492	2.109***	-0.460	-0.024	Median	0.635	-0.204**	-0.395	-0.295
Mean	1.549	1.822***	-0.001	0.463	Mean	0.643	-0.243**	-0.332	-0.228
Maximum	3.376	-7.308***	14.61	15.98	Maximum	1.276	-3.409**	4.734	5.155
10 Low Income Countries (LIC) in Africa					10 Low Income Countries (LIC) in Africa				
Minimum	-13.40***	8.337***	1.344	-4.681	Minimum	-2.529***	-1.270***	-0.003	-0.589
Median	-3.315***	6.509***	-1.702	-3.436	Median	-0.686***	-1.604***	-0.559	-0.362
Mean	-1.128***	6.114***	-2.362	-3.167	Mean	-0.152***	-1.701***	-0.720	-0.296
Maximum	26.75***	1.065***	-10.78	0.272	Maximum	16.61***	-4.737***	-5.780	1.772
10 Lower-Middle Income Countries (LMIC) in Africa					10 Lower-Middle Income Countries (LMIC) in Africa				
Minimum	6.162	6.191	-12.61**	-12.68**	Minimum	0.757	0.703	-1.287**	-1.265**
Median	3.349	3.425	-0.420**	-0.538**	Median	0.532	0.481	-0.310**	-0.291**
Mean	2.765	2.851	2.112**	1.984**	Mean	0.475	0.425	-0.063**	-0.045**
Maximum	-5.766	-5.539	39.08**	38.81**	Maximum	-1.481	-1.498	8.411**	8.396**
6 Upper-Middle Income Countries (UMIC) in Africa					6 Upper-Middle Income Countries (UMIC) in Africa				
Minimum	26.21*	-1.388	4.485	9.603	Minimum	5.907*	-0.258	1.889	2.258
Mean	3.039*	-0.218	-4.313	-0.879	Median	1.031*	-0.011	0.037	0.052
Median	2.094*	-0.170	-4.672	-1.308	Mean	0.848*	-0.002	-0.032	-0.031
Maximum	-22.80*	1.087	-14.13	-12.57	Maximum	-5.008*	0.294	-2.256	-2.681
2 High Income Countries (HIC) in Africa					2 High Income Countries (HIC) in Africa				
Minimum	1.026	0.757	1.091	1.124	Minimum	0.177	0.131	0.009	0.012
Median	0.771	0.630	0.964	0.997	Median	0.147	0.115	-0.005	-0.003
Mean	0.743	0.616	0.950	0.983	Mean	0.130	0.108	-0.013	-0.011
Maximum	0.069	0.278	0.612	0.645	Maximum	-0.157	-0.036	-0.157	-0.155

Note: The estimated results are generated with Eviews 9. *** is 0.01, ** is 0.05 and * is 0.1 level of significance.

The marginal effects of financial openness on banking sector development were obtained by substituting the minimum, median, mean and maximum statistics of trade openness into equation 5 and they are presented on the left side of Table 6. Although the marginal effect of financial openness under Model 2A, 2B and 4B increases as the values of trade openness increase as a

priori expected, they are statistically insignificant under the entire sample of African countries. However, it is found that the significant marginal effect of financial openness is declining as trade openness increases in Africa in the long run when global financial crisis (GFC) was introduced, i.e. the marginal effect of financial openness significantly moves in the opposite direction of increase in trade openness. The marginal effects of trade openness on banking sector development were obtained by substituting the minimum, median, mean and maximum statistics of financial openness into equation 6 and they are presented on the right side of Table 6. The same finding as the marginal effect of financial openness was discovered for the marginal effect of trade openness. Thus, the paper does not observe a simultaneous openness effect in the entire sample of African countries in the long or short run and in the presence or absence of GFC.

The marginal effects of financial openness and trade openness are statistically significant in the long run (in the absence and presence of financial crisis) but not in the short run for LIC. Under Model 2A, the marginal effect of financial openness increases as trade openness increases and the marginal effect of trade openness increases as financial openness increases in the long run. This agrees with the a priori expectation but Model 4A does not agree with the expectation as the marginal effect of financial openness increases as trade openness decreases, the same for the marginal effect of trade openness. Thus, the paper observe the simultaneous openness effect on banking sector development for LIC in the long run in the absence of GFC but this study do not find a simultaneous openness effect in the long run in the presence of GFC and in the short run in the absence or presence of financial crisis.

For LMIC, the study detect a statistically significant simultaneous openness effect on banking sector development in the long run in neither the absence nor presence of GFC but in the short run in the absence and presence of GFC. This is because the marginal effect of trade openness (financial openness) increases as financial openness (trade openness) increases under Model 2B and 4B.

There is weak evidence for marginal effect of financial and trade openness on banking sector development and it does not fulfil the a priori expectation of a simultaneous openness effect on the development of the banking sector in UMIC. Like the entire sample, the study does not observe a simultaneous openness effect on banking sector development for UMIC in Africa in either the long or short run and presence or absence of GFC.

The study found no significant simultaneous openness effect on banking sector development in HIC in Africa in both long and short run in the absence or presence of GFC. This is because the marginal effects of financial and trade openness on banking sector development are not statistically significant for all the models as shown in Table 6.

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Table 7: Engel-Granger Cointegration Test

	Model 1		Model 2		Model 3		Model 4	
	statistics	Diag	statistics	Diag	statistics	Diag	statistics	Diag
Entire sample of 28 African countries								
ADF Fisher Chi-square	423.9***	I(0)	406.6***	I(0)	409.3***	I(0)	401.9***	I(0)
ADF Choi Z-stat	-17.18***	I(0)	-16.65***	I(0)	-16.44***	I(0)	-16.31***	I(0)
10 Low Income Countries (LIC) in Africa								
ADF Fisher Chi-square	149.5***	I(0)	152.6***	I(0)	135.5***	I(0)	155.6***	I(0)
ADF Choi Z-stat	-10.06***	I(0)	-10.28***	I(0)	-9.198***	I(0)	-10.39***	I(0)
10 Lower-Middle Income Countries (LMIC) in Africa								
ADF Fisher Chi-square	146.4***	I(0)	151.1***	I(0)	147.9***	I(0)	154.7***	I(0)
ADF Choi Z-stat	-10.13***	I(0)	-10.33***	I(0)	-10.20***	I(0)	-10.49***	I(0)
6 Upper-Middle Income Countries (UMIC) in Africa								
ADF Fisher Chi-square	85.99***	I(0)	76.88***	I(0)	96.51***	I(0)	77.96***	I(0)
ADF Choi Z-stat	-7.719***	I(0)	-6.471***	I(0)	-8.335***	I(0)	-6.901***	I(0)
2 High Income Countries (HIC) in Africa								
ADF Fisher Chi-square	29.95***	I(0)	31.58***	I(0)	36.27***	I(0)	34.49***	I(0)
ADF Choi Z-stat	-4.608***	I(0)	-4.769***	I(0)	-5.198***	I(0)	-5.019***	I(0)

Note: The unit root tests are estimated with Eviews 9. *** is 0.01, ** is 0.05 and * is 0.1 level of significance. Stat means statistic while Diag means the diagnosis.

Due to its ease to conduct and interpret, the Engle-Granger residual-based test for cointegration was conducted and they are presented in Table 7. After obtaining the residuals of the estimated models and applying the Fisher type Augmented Dickey-Fuller (ADF) unit root test, the study reject the null hypothesis and accept the alternate hypothesis of no unit root in the residuals of all the models at level (I(0)). Thus, all the models estimated in this study are cointegrating regressions; as such the inferences from the estimated models are reliable and not spurious.

4.0 Discussion of findings

This paper investigates whether financial openness and trade openness contribute to the development of the banking sector in Africa and it further considers how financial and trade openness affect banking sector development in the presence of global financial crisis (GFC) using the Simultaneous Openness Hypothesis (SOH) by Rajan and Zingales (2003).

It is found that the banking sector develops independently of real GDP per capita in the short run while economic prosperity (real GDP per capita) raises the level of development of the banking sector in the long run in low income countries (LIC) in Africa, even when there is GFC. In support of Baltagi *et al.* (2009), the study found the SOH for LIC in Africa in the long run but only when there is no GFC. When there is GFC, exclusive opening of capital is more effective at raising banking sector development than trade openness or both of them in the long and short run.

There is no evidence that demand for finance as the economy prosper (real GDP per capita) increases the development of the banking sector in lower-middle income countries (LMIC) in Africa in both the long and short run, whether there is GFC or not. This finding supports Chandavarkar (1992) that the banking sector may develop independently of economic growth. The finding on LMIC affirms that of Onanuga and Onanuga (2016) as the study found the SOH for LMIC in the short run, but not in the long run. In the long run, opening either finance or trade significantly contributes to banking sector development and financial openness is more effective. This is because if trade is solely opened, it may negatively affect banking sector development in the short run and then positively affect banking sector development in the long run but if finance is solely opened, it may not have any significant effect on banking sector development in the short run but it should increase banking sector development in the long run. Opening both finance and trade also increase banking sector development in the short run but not in the long run in LMIC when there is GFC.

There is evidence that demand for finance increases banking sector development in the long run while it decreases banking sector development in the short run in upper-middle income countries (UMIC) in Africa when there is or is no GFC. There is no evidence of the SOH and there is weak evidence that either financial or trade openness yield increase in banking sector development in the long run (only when there is no crisis) and they may not have any effect in the short run whether there is GFC or not.

Like LMIC, it is found that the banking sector in high income countries (HIC) in Africa develops independently of economic growth. There is no evidence of the SOH but the study found that trade openness alone, although may reduce banking sector development in the short run, increases banking sector development in the long run in HIC without or with GFC. Trade openness is also more effective in HIC because the study found no evidence that financial openness contributes to banking sector development even though HIC has the highest net inflow of FDI to GDP in Africa.

From the findings obtained under the entire sample of African countries, this study corroborates the optimistic view of AfDB (2009) that Africa experienced a minimal negative impact from the global financial crisis (GFC). Generally, the negative impact of GFC on banking sector development in Africa was experienced in the long run and not in the short run. In fact, the effect of financial and trade openness on banking sector development when there is GFC did not change in the long and short run. However, when the sample was categorized into income groups, the findings support David *et al.* (2014) that the link between financial and trade openness to banking sector development in Africa is less clear-cut. This is because the negative impact of GFC on banking sector development experienced in the long run was not apparent in HIC while the contribution of financial and trade openness toward banking sector development when there is GFC changed in the long and short run for UMIC and in the short run for LIC. This study supports N'zue (2010) that Africa continued to suffer from the after-shocks of the crisis as LIC, LMIC and UMIC experienced the negative impact of GFC on banking sector development into the future and neither financial nor trade openness contributed to banking sector development in UMIC in the long run.

To the contrary, this study does not support David *et al.*'s (2014) suggestion that trade openness is more important than financial openness to obtain higher banking sector development in Africa. Instead it is of the view that, if policymakers want to be cautious of unforeseen occurrence of global financial crisis in the long and short run, trade openness is more effective in HICs. In the long run, policymakers in LMIC may open either trade or finance but trade is more effective while, in the short run, simultaneous openness benefits LMICs. Trade, finance or both does not contribute to banking sector development in LICs, as such, policymakers may simultaneously open both or finance alone but financial openness is better effective at fencing the impact of GFC. Policymakers may open finance or trade in UMICs, however, that is only good for when

there is no GFC because, when there is GFC, finance nor trade contributes to banking sector development in UMICs.

5.0 Conclusion

After investigating the contributions of financial and trade openness to the development of the banking sector in the absence and presence of global financial crisis in Africa using the Simultaneous Openness Hypothesis (SOH), this study concludes that banking sector develops independently of economic growth in LMIC and HIC while the sector develops as demand for finance increases in LIC and UMIC. In support of Pham (2010), global financial crisis generally reduce banking sector development in Africa but not in HIC and in the long run the banking sectors of LMIC and LIC suffer the most from the crisis. This may be that HIC has more robust banking rules and regulation than other income groups and/or HIC's higher income (than LIC, LMIC and UMIC) transforms into higher savings which may serve as a buffer in the presence of global financial crisis. Another reason why global financial crisis did not reduce banking sector development in HIC, from the findings, may be credited to the income group's relatively lower ratio of bank credit to bank deposit. Thus, policymakers in LIC, LMIC and UMIC need to continuously put in place preventive measures, and not reactive measures which may be more expensive, such as building a strong foreign reserve and regulation on the maximum volume of off-shore credit that can be held to reduce the negative effect of unforeseen global financial crisis on banking sector development. However, for further research efforts, conducting time series analysis on country specific African countries is desirable.

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