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Banks versus markets: Do they compete, complement or Co-evolve in the Nigerian financial system? An ARDL approach

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ABSTRACT

A long-standing debate about the financial structure of an economy has concerned the superiority of banks or capital markets as well as at what stage of economic development either plays a dominant role in an economy. More recently, there has been a paradigm shift in the debate, from superiority to the interplay between banks and markets in a financial system – whether they compete or complement each other. This paper explores the association between banks and stock markets, whether they are foes or friends in the Nigerian financial system. Using autoregressive distributed lag model Bounds testing technique on annual data obtained from the Central Bank of Nigeria Bulletin, we find a long-run link between bank models and market models– a complementary rather than a competing association, which suggests a co-evolving development in the Nigerian financial structure. We therefore recommend that efforts should be geared toward action-based approaches in the development of both the Nigerian banking system and capital markets for a rapid development in the financial system, which drives economic growth.

1. Introduction

Two questions have received much debate among financial economists. These questions concern- the type of relationship that exists between finance and growth, otherwise called the finance-growth nexus, and how the financial structure affects growth, otherwise known as the financial structure-growth nexus.

On the finance-growth debate, which focuses on the importance of financial systems in the economic growth in an economy, Bagehot (1873) and Schumpeter (1912) argue that economic development follows the decision of financial intermediaries. Robinson (1952), on the other hand, argues that economic growth drives intermediaries instead. Robinson insists that factors other than finance could explain the process of economic development. These two types of relationships between the financial sector and economic growth and development are described by Patrick (1966) as supply-leading and demand-following relationships. Whereas the former posits that economic growth induces the supplying of financial services, the latter holds that it is the financial services that motivate growth. Lucas (1988) believes that finance is not relevant in economic growth and describes the debate as being over-estimated. Authors like Mashayekhi et al., (2007) believe that developing economies like Nigeria are influenced by supply-leading relationships.

The second debate focuses on financial system models and economic growth. The two intermediation models are bank-based and

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market-based. La Porta et al., 1997, Levine (1999) and Ujunwa and Salami (2011) widened the classification by adding legal-based financial structure. The debate has centered on which of the models plays adominant role in economic growth and at what stage of the economic development (see, for example, Levine and Zervos, 1998; Beck, 2010; Demirgüç- kunt et al., 2011; Gambacorta et al., 2014). Levine and Zervos (1998), Beck (2010) and Gambacorta et al. (2014) find that banks and markets are significantly important in economic growth,while Beck and Levine (2002), Levine (2002), and Demirgüç-Kunt et al. (2011) conclude that the relationship between the financial structure and growth is dependent on the level of economic and financial development in the country in question. The third strand of debaters holds that what matters is the type of model (banks or markets) and not necessarily the services they provide. Beck (2010), for instance, states that the financial services provided by both contribute to economic growth jointly rather than severally. Chakraborty and Ray (2006) add that the key to economic growth is efficient financial and legal institutions given that one cannot clearly draw a line on which of the models is better.

Similarly, Beck and Levine (2002) argue that what is important is not the superiority of the financial structure model, but the capability of the model (banks or markets) to reduce thecosts of financing savings and borrowings for economic activities, while Čihák et al., 2012 assert that better-developed financial systems facilitate economic growth in the long-run. Along the same line of argument, authors like Allen and Gale (2000); Song and Thakor (2010a,b) and Osoro and Osano (2014) conclude that, after all, no economy operates a 'pure' model and that the strength in one aspect of the financial system (say, banks) should reflect on the other.

This interaction between banks and markets in financial systems has not received sufficient empirical evidence in the literature. There areeven fewercountry-based empirical studies on the subject. To the authors' knowledge, the only prior study on this subject matter in the African context is Ashoreand Osoro and Osano (2014) for Kenya, and there are none inthe case of Nigeria. The overall objective of this paper, therefore, is to examine whether banks and capital markets compete or complement each other in the context of the Nigerian financial system and to investigate whether the emergence of one is at the expense of the other and also how the development of one affects the other.

The study uses autoregressive distributed lag (ARDL) technique in the analysis. The choice of Nigeria is justified because it is the largest economy in Africa, a strategic position in African regional economic integration. The result of this study is significant as evidence-based for policymaking in financial system development, which impacts positively on economic growth. It also contributes to the extant literature in financial structure interactions, especially in developing economies. The rest of this work is arranged as follows: section two reviews related literature, while section three presents data and method of empirical analysis. The penultimate section discusses the result, and section five concludes the study.

2. Literature review

Literature documents both the specific roles and the "frictions" of intermediaries and markets in a financial system vis-à-vis their contributions to financial development that aids economic growth. For instance, Singh (2012, p. 231) enunciates ways that developed financial markets can be helpful to economic policymakers in emerging market economies, including the following:

(1) Deeper financial markets can more readily absorb flows. Financial markets in emerging market economies are dominated by the banking system; hence, liquidity tends to accumulate in the banking system. With more developed capital markets, the liquidity inflows tend to be more spread out across the financial system.
(2) A deep financial system can more effectively utilize the liquidity in a non-wasteful and non-distortionary manner.
(3) Developed financial markets give the central bank a broader range of tools to manage monetary policy.
(4) The greater variety of saving and borrowing instruments makes it easier for the central bank to change interest rates to manage monetary policy, unlike when, for example, savings are predominantly in the form of deposits with banks.

Song and Thakor (2010a) provide a theoretical basis for interactive relations between banks and capital markets. The authors identified three-dimensional interactions between intermediaries and markets, namely, competitive, complementary and co-evolving interactions. They argue that banks are seen as competitors in markets and vice-versa only when they are viewed on a stand-alone or dominance basis. This means that when they are viewed from and interactive standpoint, they complement and co-evolve rather than compete. For instance, the authors present two scenarios that are significant for connectivity between banks and markets– securitization and bank capital. The process of securitization removes the frictions ('certification' and 'financing) that hamper borrowers' ease in financing or cause a denial of financing for them as a result of wrong judgments from either bank (certification friction) or markets (financing friction). In the case of a bank capital scenario, bank financing frictions are reduced through markets, and capital requirements for riskier loans are boosted as that the previous would-have-been-denied loans could be granted, thereby reducing the certification friction and serving the previously unserved customers. These feedback effects on the interactions between banks and markets are what the authors described as a vicious cycle that confirms a co-evolution between these sectors. Song and Thakor (2010b) assert that what is necessary is a strong banking institution and well-functioning markets for a complementary existence. In sum, Song and Thakor (2010a,b) show that banks and markets depend on each other via securitisation and risk-sensitive bank requirements channels.

Drawing from Song and Thakor's (2010a) theoretical framework, Osoro and Osano (2014) empirically tested the interaction of banks and capital markets in the Kenyan financial system. They found a complementary and co-evolving relationship between the bank and the capital market in the Kenyan financial structure, as though it is a bank-based economy.

Earlier, Beck (2010) failed to find empirical support for either bank-based or market-based economies in the cross-country analysis of data from 40 developed and developing economies. He concludes that his results are consistent with the financial services view, which supports complementarity rather than dominance between intermediaries and markets. The financial services view is concerned with the question of "what" financial services are rendered, rather than "who" renders them. This isto say that the emphasis of the financial services is the complementarity of banks and markets in the financial system instead of their roles. The complementary relation between these sectors is justified in the fact that different segments of firms are financed by banks and markets except for large firms. Another position is that the negative effect of one structure in the system can be offset by the other side of the structure. For instance, "well-developed and liquid market" can negate the effect of "powerful banks" (Beck, 2010), and it can also aid banks in extending credit to riskier customers (Song and Thakor, 2010a, 2010b).

3. Data and methodology

3.1. Data

The data used in this study are extracted from the Central Bank of Nigeria Statistical Bulletin 2014. The study covers monthly time series data from 1981 to 2014. The Central Bank of Nigeria is the apex of monetary authority in Nigeria that collaborates with the National Bureau of Statistics in Publishing, the annual statistical bulletin. This represents one of the major and verifiable sources of secondary data of a varied nature for research and other analyses in Nigeria. Essentially, the data are time series because they have regular time-ordering/frequency, and are secondary because they are collected from preexisting sources and are also scaled and quantitative.

3.2. Model specification

The study focuses on establishing a relationship between banking development and capital market development. Notably, capital market development is a function of development in stock and bond markets, but following the tradition of prior authors, only stocks market development indicators are used. Here, bank development is the dependent variable, while the capital market development indicators are the explanatory variables. Whereas bank development is measured by the number of credit facilities to the private sector, capital market development is measured by the stock market's size and liquidity. The indicators used in this regard are: market capitalization (MKTCAP), being a proxy for market size and equity turnover (TURNOVER) being a proxy for the liquidity of the stock market.

$$LCPS_t = f_0 + f_1 LMC_t + f_2 LR_t + f_3 LM_t + v_t$$

where CPS stands for credit to the private sector; MKTCAP represents market capitalization; TURNOVER stands for market turnover; TBR represents treasury bill rate; INF stands for inflation; M_2 represents broad money; and ε_t stands for the error term.

In this paper, we attempt to investigate the relationship among the natural logarithm of credit to the private sector (LCPS), the natural logarithm of market capitalization (LMC), the domestic treasury bill rate (LR), the logarithm of real money balances defined as broad money (m2) divided by the consumer price index and is denoted as LM and D2005 was coded as 1 in both 2005 and 2006 and −1 in 2007. Therefore, we are interested in the relationship among LCPI, LMC, LR and LM.

3.3. The ARDL approach

The ARDL method has several advantages compared to other cointegration methods. It is comparatively efficient in small or finite samples in the determination of cointegration and therefore can reject a false null hypothesis. Second, it allows the variables to exhibit different lag structure. Finally, it is not restrictive because it is applicable irrespective of whether the mix of the variables is stationary or nonstationary. Following Pesaran and Shin (2001), the formal augmented-ARDL model is defined as

$$\phi(L, p)y_t = \sum_{i=1}^{k} \beta_i(L, p)x_{it} + \delta' w_t + \mu_t \tag{1}$$

where

$$\phi(L, p) = 1 - \phi_1 L - \phi_2 L^2 - \cdots - \phi_p L^p$$

and

$$\beta_i(L, p) = \beta_{i1} + \beta_{i1} L + \beta_{i2} + \cdots + \beta_{iqi} L_i^{q} i = 1,2, \ldots, k \tag{2}$$

and where L is a lag operator such that $LY_t = y_{t-1}$, and w_t is an $s \times 1$ vector of deterministic variables such as the intercept term, dummy variables, time trends or exogenous I(1) variables with fixed lags.

The ARDL models are estimated by first obtaining ordinary least squares (OLS) estimates of equation (1). All possible values $p = 0, 1, 2, \ldots, m$; $q_i = 0, 1, 2, \ldots,$ m ; andi $= 1, 2, \ldots,$ ok, that is, for a total of three$(m + 1)^{k+1}$ different ARDL models. The choice of one of the estimated models was made using the SBC information criteria.

The error-correction model of the ARDL ($\widehat{p}$, $\hat{q}_1$, $\hat{q}_2$, ...,$\hat{q}_k$) model can be obtained by rewriting w_t Eq. (1) in terms of the lagged levels and the first differences of y_t, x_{1t}, x_{2t}, …, x_{kt} and w_t

Substituting these lagged and differenced terms into Eq. (1) and rearranging gives

$$\triangle y_t = -\phi(1-\hat{p})EC_{t-1} + \sum_{i=1}^{k}\beta_{i0}\Delta x_{1t} + \delta'\Delta w_t$$
$$-\sum_{j=1}^{\hat{p}-1}\phi^* y_{t-j} - \sum_{i-1}^{k}\sum_{j=1}^{\hat{q}_{i-1}}\beta_{ij}^*\Delta x_{i,t-j} + \mu_t \tag{3}$$

where the error-correction term, EC_t, is defined as

$$ECj_t = y_t - \sum_{i=1}^{k}\theta_i x_{it} - \hat{\psi}' w_t \tag{4}$$

The long-run coefficients for the response ofy_t to a unit change in x_{it} are estimated by

$$\theta_i = \frac{\hat{\beta}_i(1,\hat{q}_i)}{\varphi_i(1,\hat{p})} = \frac{\hat{\beta}_{i0}+\hat{\beta}_{i1}+\cdots+\hat{\beta}_{iqi}}{1-\hat{\phi}_1-\hat{\phi}_2-\cdots--\hat{\phi}_p} \tag{5}$$

and where $\hat{p} and \hat{q}_i$, $i = 1, 2, \ldots, k$ are the selected estimated values of $p and q_i$, $i = 1, 2, \ldots, k$.

The ARDL procedure consists of two steps (Pesaran and Pesaran, 1997). First, the existence of the long-run relation between the variables in the system is tested. In order to do so, the null hypothesis of no cointegration or no long-run relationship is tested against the alternative of cointegration by computing F-statistics. The asymptotic distributions of this F-statistic are non-standard, and the critical values of the F-statistics are provided by Pesaran and Pesaran (1997) and Pesaran et al. (2001). The authors provide two sets of criticalvalues in which one set is computed with the assumption that all variables in the ARDL model are I (1) and another with the assumption that these variables are I (0).

For each application, the two sets provide the bands covering all the possible classifications of the variables into I(0) or I(1), or including fractionally integrated ones. If the computed F-statistic is larger than the relevant upper bound of the critical value, then the null hypothesis of no cointegration is rejected. On the other hand, if it is below the appropriate lower bound, the null hypothesis cannot be rejected. Also, if the computed F-value falls between the lower and upper bounds, the test outcome is inconclusive. In the process of computing the F-statistic to test for the existence of a cointegrating relationship, the lag lengths of p and q are set equal. But when the ARDL model is estimated after having found a cointegration, the lag lengths are selected using appropriate information criteria, which may lead to an unequal p and q.

Likewise, the long-run coefficients associated with the deterministic/exogenous variables with fixed lags are estimated by

$$\hat{\psi} = \frac{\hat{\delta}(\hat{p},\hat{q}_1,\hat{q}_2,\ldots,\hat{q}_k)}{1-\hat{\phi}_1-\hat{\phi}_2-\cdots-\hat{\phi}_p} \tag{6}$$

where $\hat{\delta}(\hat{p},\hat{q}_1,\hat{q}_2,\ldots,\hat{q}_k)$ represents the OLS estimates of δ for the chosen ARDL model.

3.4. Bounds test approach

At the first stage, we perform some diagnostic tests to check the validity of the following unrestricted error-correction regressions on which is based the analysis of cointegration among the variables:

$$\Delta LCPS_t = \pi_p + \sum_{i=1}^{k}\delta_{ip}\Delta LCPS_{t-i} + \sum_{i=1}^{k1}\tau_{ip}\Delta LMC_{t-i} + \sum_{i=1}^{k2}\theta_{ip}\Delta LR_{t-i} + \sum_{i=1}^{k3}\sigma_{ip}\Delta LM_{t-i} + \varpi_{1p}LCPS_{t-1} + \varpi_{2p}LMC_{t-1} + \varpi_{3p}LR_{t-1} + \varpi_{4p}LM_{t-1} + \xi_{1t} \tag{1}$$

$$\Delta LMC_t = \pi_q + \sum_{i=1}^{k}\delta_{iq}\Delta LMC_{t-i} + \sum_{i=1}^{k1}\tau_{iq}\Delta LCPS_{t-i} + \sum_{i=1}^{k2}\theta_{iq}\Delta LR_{t-i} + \sum_{i=1}^{k3}\sigma_{iq}\Delta LM_{t-i} + \varpi_{1q}LMC_{t-1} + \varpi_{2q}LCPS_{t-1} + \varpi_{3q}LR_{t-1} + \varpi_{4q}LM_{t-1} + \xi_{2t} \tag{2}$$

$$\Delta LR_t = \pi_m + \sum_{i=1}^{k}\delta_{im}\Delta LR_{t-i} + \sum_{i=1}^{k1}\tau_{im}\Delta LCPS_{t-i} + \sum_{i=1}^{k2}\theta_{im}\Delta LMC_{t-i} + \sum_{i=1}^{k3}\sigma_{if}\Delta LM_{t-i} + \varpi_{1m}LR_{t-1} + \varpi_{2m}LCPS_{t-1} + \varpi_{3m}LMC_{t-1} + \varpi_{4m}LM_{t-1} + \xi_{3t} \tag{3}$$

$$\Delta LM_t = \pi_n + \sum_{i=1}^{k}\delta_{in}\Delta LM_{t-i} + \sum_{i=1}^{k1}\tau_{in}\Delta LCPS_{t-i} + \sum_{i=1}^{k2}\theta_{in}\Delta LMC_{t-i} + \sum_{i=1}^{k3}\sigma_{in}\Delta LR_{t-i} + \varpi_{1n}LM_{t-1} + \varpi_{2n}LCPS_{t-1} + \varpi_{3n}LMC_{t-1} + \varpi_{4n}LR_{t-1} + \xi_{4t} \tag{4}$$

where ΔLCPS, ΔLMC, ΔLR and ΔLM are changes in the natural logarithm of the variables in Eq. (1). The coefficients $\doteqdot_{ij}, \tau_{ij}$, θ_{ij} and σ_{ij} for $j = p, q, m, n$ are the short-run coefficients, and ϖ_{1j}, ϖ_{2j}, ϖ_{3j} and ϖ_{4j} for $j = p, q, m, n$ are the long-run parameters. It is important to stress that according to Pesaran et al. (2001), the above unrestricted regressions may also be interpreted as an ARDL model of

Table 1
Time Series Properties.

	ADF H_0: $X_{t\sim}I(1)$ H_a: $X_{t\sim}$ $I(0)$	
	Without Trend	With Trend
LCP	−1.7153	−1.612
LMC	−1.7278	−1.5262
LR	−2.006	−2.2752
LM	−0.9856	−2.0873

orders (k, k_1, k_2, k_3). Before computing the observed values of the diagnostic tests, we have to select the optimal lag lengths $\hat{k}$ and $\hat{k}_i$(i = 1, 2, 3) using the Schwarz Bayesian information criterion by estimating $(m + 1)^4$ regressions, where m is the maximum lag length.

The results for the augmented Dickey-Fuller (ADF) test along with a lag length selected by Schwarz criterion confirm nonstationarity of the variables.

Assuming that the variables are nonstationary, we next tested for cointegrating relationships. Table 2 reports the test statistics based on Bounds test F statistics in Panel A. Panel B of Table 1 reports the diagnostic tests of our models. These results presented in Panel B are theempirical statistics of the Breusch–Godfrey LM test for autocorrelation of order 1and the Box Pierce test of order 2. The Ramsey RESET test for the correct functional form of the above equationsis also shown. According to the RESET test, the models are correctly specified, and the Jarque-Bera (JB) normality test indicates residual normality. In a similar fashion, there is no evidence of heteroskedasticity according to the HET test of Kronker and Basset as well as Engle's ARCH test. Therefore, the models performance do not deviate from the classical regression assumptions, indicating that they are correctly specified and can be used to test for cointegration among variables. In addition, to ensure that the results are not dependent on the technique used, we cross-checked our work by implementing Shin's cointegration test for various lag lengths where the null hypothesis is cointegration. This null hypothesis is different from the case of the Bounds test, where the null hypothesis is no-cointegration.

The null hypothesis of a non-cointegrating relationship among the variables is formu- lated as follows: $\varpi_{1j} = \varpi_{2j} = \varpi_{3j} = \varpi_{4j} = 0$ for j = p, q, m, n,and can be denoted by F (LCPS |LMC, LR, LM) (model 1), F (LMC |LCPS, LR, LM) (model 2), F (LR |LCPS, LMC, LM) (model 3) and F (LM |LCPS, LMC, LR) (model 4), respectively. All of these are an F-test of joint significance of the lagged variables. In this context, we conclude in favor of cointegration among the variables, regardless of whether they are stationary or not,

Table 2
Cointegration Test Result.

Dependent Variable Functions	LCP F(LCP|LMC, LR,LM)		LMC F(LMC|LCP, LR,LM)	LR F(LR|LMC, LCP,LM)	LM F(LM|LMC, LR,LCP)	
A: Bounds–tests						
F- test Statistics	18.042*		19.086*	1.047	3.685	
Asymptotic Critical Values						
	Bounds-test				Shin's Critial Value	
K	90% level		95% level		90%	95%
	I(0)	I(1)	I(0)	I(1)		
3	2.72	3.77	3.23	4.35	0.121	0.159
B: Diagnostic Tests						
BG F(1.22)	2.991		4.249	0.105	0.114	
	(0.098)		(0.051)	(0.749)	(0.739)	
Box Pierce $\chi^2(2)$	4.076		5.516	3.205	0.143	
	(0.130)		(0.063)	(0.201)	(0.931)	
RESET $\chi^2(1)$	0.035		0.039	3.942	1.420	
	(0.852)		(0.844)	(0.047)	(0.233)	
JB $\chi^2(2)$	0.136		0.184	0.827	661.461	
	(0.934)		(0.912)	(0.661)	(0.000)	
HET $\chi^2(1)$	0.791		0.835	0.037	7.208	
	(0.374)		(0.361)	(0.848)	(0.007)	
ARCH (1)	0.036		0.192	1.888	0.002	
	(0.851)		(0.661)	(0.169)	(0.961)	
C: Shin's Test						
Lag1	0.0261		0.0364	0.0229	0.0552	
Lag2	0.0501		0.0753	0.0573	0.0602	
Lag3	0.0716		0.1095	0.0791	0.0697	
Lag4	0.0989		0.0961	0.0881	0.0824	
Lag5	0.1056		0.1001	0.1037	0.1102	

* denotes significance at the 5% level.

Table 3
Long-run Elasticities.

	LCPS[a]	LMC[b]	LR[c]	LM[d]
LCPS	–	1.034	8.995	0.876
	–	[30.905]*	[1.976]*	[0.133]
LMC	0.958	–	−8.380	−2.013
	[34.380]*	–	[1.976]*	[0.380]
LR	0.009	−0.0003	–	0.204
	[0.369]	[0.01]	–	[0.288]
LM	0.134	−0.136	−0.623	–
	[4.922]*	[4.368]*	[0.809]	–
Intercept	−0.039	−0.062	11.202	−4.040
	[0.138]	[0.184]	[7.191]*	[0.405]
D2005	0.428	−0.492	−2.900	−2.563
	[1.592]	[1.592]	[0.581]	[0.294]

*Notes:*D2005 is a dummy variable where 2005 and 2006 equals 1 and 2007 equals −1, and 0 otherwise. * denotes significance at 5% level.
[a] The selected model in an ARDL (2,2,2,1).
[b] The selected model in an ARDL (2,2,2,1).
[c] The selected model in an ARDL (1,0,2,0).
[d] The selected model in an ARDL (1,0,0,0). The values in [.] are the *t*-statistics.

if the observed test statistic exceeds the upper critical band. According to the data in Table 2, the null hypothesis is rejected in the case of the model of LCP and LMC, whereas in the case of LR, it is statistically insignificant and for LM no conclusion can be drawn since the test statistic fell between the lower and upper critical bands. The results suggest evidence of a long-run relationship between the variables at the 5% level. Our results imply the presence of two cointegrating vectors of long-run equilibrium relationships between the variables of interest.

To cross-check our cointegration results, we perform Shin's test for cointegration, We report results using results for Lags 1–5, and in all cases the null hypothesis of cointegration cannot be rejected at either the 10% or 5% level.These results confirm cointegration.

3.5. *Long-Run elasticities*

We now investigate the short-run and long-run dynamics in the error-correction model (ECM) associated with the appropriate ARDL. This procedure allows drawing conclusions about the dynamic adjustments of short-run deviations of the variables from their long-term state. Tables 3 and 4 show the long-run elasticities.

Focusing on Table 3 we find that market capitalization (LMC) and real money supply (LM) have a significant influence. Interest rates do not exact an effect on credit to the private sector (LCPS). Second, there is a significant long-run impact of market capitalization on credit to the private sector. The real money balances variable, has a negative influence on market capitalization. The interest rate variable appears not to be statistically significant at the 5% level. In the case of the domestic interest rate (LR) variable, credit to the private sector has a positive, but moderate long-run influence on LR, whereas the effect on market capitalization is negative and moderate. Finally, in the last cointegrating relationship none of the variables appear to be statistically significant in the variation in LM. The results reported in Table 4 appear to corroborate those reported in Table 3.

Turning to Table 5, we observe the following estimated coefficients of −0.664, −0.597 and −0.416 for the error-correction terms of DLCPS, DLMC and DLR, respectively. For these detected cointegrating relationships in Table 5, the results show evidence of a certain return to the long-run equilibrium for the LCPS, MC and LR models. In each of these specifications, the corresponding error-correction terms are significantly negative. These negative values suggest that the adjustment speed from short-run disequilibrium

Table 4
Long-run from DOLS.

	LCPS[a]	LMC[b]	LR[c]	LM[d]
LCPS	–	1.073	−16.459	7.760
	–	[222.189]*	[3.520]*	[8.018]*
LMC	0.9279	–	15.036	7.183
	[201.379]*	–	[3.531]*	[7.783]*
LR	−0.0027	0.007	–	−0.128
	[0.540]	[1.455]	–	[0.608]
LM	0.1146	−0.137	2.212	–
	[28.056]*	[38.449]*	[3.476]*	–
Intercept	0.070	−0.101	13.810	0.248
	[1.344]	[2.198]*	[24.100]*	[0.087]
D2005	0.3492	−0.809	−55.552	14.349
	[1.000]	[2.213]*	[6.454]*	[0.659]

*Notes:*See notes in Table 3, and an * denotes significance at 5% level.

Table 5
Error-correction representation.

	DLCPS[a]	DLMC[b]	DLR[c]	DLM[d]
$DLCPS_t$	–	1.013	4.205	0.079
	–	[28.024]*	[2.667]*	[0.117]
$DLCPS_{(t-1)}$	0.400	−0.372	−1.010	–
	[2.372]*	[2.097]*	[2.803]*	–
$DLMC_t$	0.963	–	−3.487	−0.181
	[28.025]*	–	[2.300]*	[0.284]
$DLMC_{(t-1)}$	−0.359	0.332	–	–
	[2.068]*	[1.826]	–	–
DLR_t	0.036	−0.032	–	0.018
	[2.394]*	[2.016]*	–	[0.332]
$DLR_{(t-1)}$	0.033	−0.035	–	–
	[2.344]*	[2.484]	–	–
DLM_t	−0.023	0.022	−0.259	–
	[0.557]	[0.530]	[0.860]	–
$DLM_{(t-1)}$	–	–	–	–
	–	–	–	–
Dintercept	−0.026	−0.037	4.661	−0.363
	[0.136]	[0.189]	[2.637]*	[0.529]
D2005	0.285	−0.294	−1.207	−0.230
	[1.738]	[1.750]	[−0.602]	[0.304]
ECM(-1)	−0.664	−0.597	−0.416	−0.898
	[4.109]*	[3.560]*	[2.972]*	[0.711]

Notes:* denotes significance at 5% level.
[a] The selected model in an ARDL (2,2,2,1).
[b] The selected model in an ARDL (2,2,2,1).
[c] The selected model in an ARDL (1,0,2,0).
[d] The selected model in an ARDL (1,0,0,0). The values in [.] are the *t*-statistics.

towards the long-run equilibrium is faster when LCPS is considered as a dependent variable. In this situation, the error-correction term coefficient is equal to (−0.664), which implies that a deviation from the equilibrium level in the current year will be corrected by 66.4% in the next year; consequently, it takes about one and half years to restore the long-run equilibrium state. In a similar fashion, in the case of LMC, about (−0.597),which implies that a deviation from the equilibrium level in the current year will be corrected by 59.7% in the next year; consequently, it takes approximately about two years to restore the long-run equilibrium. Observe that when the domestic interest rate is the dependent variable in the error-correction model, we need almost two and a half years to restore the long-run equilibrium. Nevertheless, the fact that all error-correction term coefficients are between 0 and 1 signifies that the relationships have no oscillatory explosion and hence can be predicted.

For the detected cointegrating relationships obtained using estimates of the long-run obtained through the DOLS estimator (not reported here for space considerations) we note that results similar to those in Table 5. The an error-correction coefficient is −0.642, and it implies that a deviation from the equilibrium level in the current year will be corrected by 64% in the next year; consequently, it takes about two years to restore the long-run equilibrium state.

In sum, there is a bidirectional causal link between credit to the private sector and market capitalization. In the short and the long run this indicates a strong association between the two variables. In the case of domestic interest rates, the causal link appears weak.

4. Conclusions

The finance-growth debate has been a long-standing one that has evolved over the years, giving birth to a number of theories—bank-based, market-based, financial service and legal-based. Many studies provide evidence in support of the fact that developing economies' financial systems are bank dominated, but the present study addressed the prominent question of whether bank domination overshadows or completes capital market development in the Nigerian context. This question was motivated because they (bank-based and market-based models) depend on each other to achieve an efficient financial system.

The cardinal aim of this study was to examine whether banks and capital markets compete or complement each other in the context of the Nigerian financial system and to investigate whether the emergence of one is at the expense of the other and also how the development of one affects the other. Adopting an ARDL technique in the data analysis, short-run and long-run relationships were found between the bank and market developments. This finding supports the financial service theory of Levine (2002), which puts emphasis on the quality and efficiency of financial service rather than the superiority of either a bank-based or market-based economy and upholds the evidence provided by Osoro and Osano (2014) in the Kenyan financial system. The focus is on complement and not competition between the models in the financial architecture of the Nigerian economy. In the other words, they are friends rather than foes.

The major policy implication is that governments should make policies that aim at balancing the banks' involvement in the industries via long-term financing and capital market development for long-term productivity financing. Again, regulation of one sector should not be in isolation of the other to ensure complimentarity in the laws guiding the interactions of these models as well as providing seamless operations, all of which is aimed at achieving efficiency in both banks and markets for financial system development that will in turn ensure economic growth.

This finding has provided further insight into the dynamics of financial architecture in the developing economies in general and in sub-Saharan Africa (SSA) in particular. For further studies, more bank and market development variables could be included for an in-depth study on the bank-market financial architectural nexus. Again, this study could be replicated in another country within or outside the SSA region.

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