

Financial Deepening and Stock Market Development: Evidence from Nigeria

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ABSTRACT

This study was carried out to examine the long and short run relationship that exists between financial deepening and stock market development in Nigeria. Annual data for stock market capitalization, broad money/GDP ratio, financial sector contribution to GDP ratio, and credit to private sector/GDP ratio, commercial banks liabilities/GDP ratio and banking sector liquidity for the period 1981-2019 were analysed using Time Series analytical techniques. The study employed the Augmented Dickey Fuller unit root test, Johansen co-integration test, Vector auto-regression and Vector error correction mechanism. Findings from the analysis shows that financial deepening have significant positive effect on stock market development on the long run but negative insignificant effect in the short run. The study concludes that financial deepening has positive effect on stock market development in the long run in Nigeria. However financial deepening does not have significant effect on stock market development in the short run. The study therefore recommends that efforts should be made to enhance financial deepening which will make more funds available to the private sector. Furthermore, rates on short term loans and advances should also be reduced for stock purchase purposes.

Keywords: Financial deepening, Stock market development, Vector auto-regression, Vector error correction mechanism.

INTRODUCTION

Add appropriate original references to the sentences/paragraphs taken from

other media/sources. Adequate financial deepening is a necessity for both financial and real sector growth and development. The stock exchange market, being a major institution in the financial system plays a major role in the general economic development of the country, hence the need for it to be well lubricated with requisite funds for investment in stocks and other capital market instruments. Gurley and Shaw (1955), Hicks (1969) as well as Goldsmith (1969) posit that the stock market is crucial in funds mobilization and channeling to investment and that development in the stock market affect price decisions, liquidity in the financial system, risks and other monetary and real sector variables. Alenoghena, Enakali-Osoba and Mesagan (2014) state that to strengthen the stock market, economic policy makers across countries believe that financial deepening strategies form the fundamental means of achieving it. According to the authors – (Okeya and Dare) financial deepening fast-track the speed of stock market development.

Financial deepening is made possible through financial markets activities as often prescribed by the monetary authorities, particularly the Central Bank of a country. An economy with poor financial intermediation process will most probably have an inefficient stock market characterized by lack of financial depth. One of the indicators of a thriving stock market is an increasing market

capitalization, which will be the resultant effect of efficient financial deepening strategies put in place by monetary policy makers. Since domestic savings create the enabling platform for creating heterogeneous financial instruments and claims, there would also be ample financial institutions in the market who will supply such savings to where they are needed. This position assumes a financial system that is not limited by financial repression. In other words, for financial institutions to perform their intermediation role effectively, they must not be gagged by too stringent rules and regulations (Shaw, 1973). This does not, in any way, suggest that a Laissez-faire financial system is automatically efficient.

Werigbelegha and Nwamaka (2015) opined that the question around financial deepening over the years has been whether it represents a mere response impulse to economic growth or a trigger of it. This assertion is premised on the two major fundamental theories surrounding the effect of financial deepening on economic developments which are: the demand following and the supply leading hypotheses. These theories also form the basis for this study which seeks to examine the effect of financial deepening on the development of the Nigerian stock market to know whether it is the former that spurs the latter or vice versa.

In Nigeria, the Central Bank of Nigeria (CBN) rolls out monetary policy guidelines periodically with the overall goal of controlling monetary policy variables in order to influence the cost, direction and volume of credit in the economy. These policies are intended to foster improved financial deepening which in turn is expected to improve macroeconomic indicators, including stock market capitalization. The targets of such policies include volume of money in circulation, credit to private sector, improved financial sector performance and liquidity of the banking system, (CBN 2017).

Apart from theoretically divergent views on link between financial deepening

and capital market development, empirical researches have been generally inconclusive on such relationship. Again, greater attention has been placed on financial deepening versus economic development in terms of the real sector. The extent to which financial deepening efforts enabled by the Central Bank of Nigeria affect the development of the stock market is the focus of this study. First, the study seeks to confirm or refute previous findings on the nature of the effect of financial deepening on development of the Nigerian stock market on long and short run basis. Second, the study also seeks to establish the causal link between financial deepening and capital market development variables in order to ascertain which of the underlining theories on financial deepening and economic development is more applicable to the Nigerian situation.

Research Objectives

The general objective of this study is to examine the relationship between financial deepening and stock market development in Nigeria. However, and more specifically, the study is set to achieve the following objectives:

- To examine the short and long-run effects of financial deepening on the development of stock market in Nigeria; and
- To determine the causal relationship between financial deepening and stock market development in Nigeria.

LITERATURE REVIEW

The Nigerian Stock Market

The Nigerian stock market was established as the Lagos Stock Exchange (LSE) in 1960 as an avenue for trading in companies' shares and other capital market instruments. The Exchange transmuted to the Nigerian Stock Exchange (NSE) in 1977 with few branches in the country. NSE (2017) states that, the overall objective of establishing the NSE was to foster speedy economic development in Nigeria. The Exchange was to specifically create a

platform for efficient stock pricing system, monitoring of dealers and investors in the market, share and other long-term financial instruments issuance among other functions. Over the years, the NSE has witnessed several stages of development that reflected in annual increases in the number of listed securities, volume of trade and the market capitalization. For example, due to the bank re-capitalization exercise, the NSE (2019) reports that the value of new issue (equity) was more than tripled between 2005 and 2007, though this was later affected by the global stock market crash of between 2008 and 2010 when the market capitalization reduced drastically. As at December 2018, the value of securities listed on the NSE has risen to about N1.2trillion from N4.3m in 1961 when it commenced operations (NSE, 2018). By mid-2019, the NSE market capitalization stood at about N14trillion (NSE 2019). The Oxford Business Group, OBG (2020) reports that apart from providing the platform for conventional stock trading, there have been new efforts to further improve developments in the NSE since 2016. Such efforts include demutualisation of securities, regional integration and derivative instruments. The OBG rates the NSE as being among the largest and sophisticated Exchanges in Africa.

Financial Deepening

Shaw (1973) defines financial deepening as the process of financial assets accumulation faster than the rate at which other assets (non-financial) are accumulated while Levine (2005) defines it as the process of interaction among financial institutions, markets and instruments to make mobilized fund available for product investment by the borrowing section of the economy. Financial deepening refers to when the condition, costs, risks, quantity as well as options available to potential borrowers become more favourable. The parameter for measuring financial deepening, according to Ndebbio (2010) include credit advanced to the private

sector, commercial banks liabilities, assets of financial firms and stock market indicators such as market capitalization. But we know that market capitalization is in itself a metric for stock market development which is a subset of the general economy. Much later Ang (2008) opines that these variables should be evaluated on the basis of their contributions to the GDP in order to actually capture the deepening aspect. Adequate financial deepening is a necessity for economic development (Bakang, 2015).

Theoretical Underpinnings

The theoretical foundations on the financial deepening/economic growth nexus are traceable to the works of Patrick (1966) who theorized that the link between financial deepening and economic growth can either be demand following or supply leading. According to the author, the *demand following hypothesis* represents a situation when economic development spurs financial development; that is there exist a *uni-directional* causality running from economic growth to the development of the financial sector. The second theory, *supply leading hypothesis* posits that it is actually development in the financial sector that spurs economic growth. This means that there is a *uni-directional* causality that runs from financial development to economic growth. Early studies, by Goldsmith (1969), Hicks (1969), McKinnon (1973) and Shaw (1973) revealed that it was growth in the financial sector that led to economic growth. On the other hand, early studies that support the demand following hypothesis include Gurley and Shaw (1955), Goldsmith (1969) and Jung (1986). In attempt to recognize possibilities, Patrick (1966) states that it is not impossible to have these two relationships occurring simultaneously because financial sector development can induce real sector growth which will also make financial sector to depend on the real sector for its own growth.

Empirical Review

Empirical researches on the financial deepening and economic development in Nigeria have tilted towards examining the effect of financial deepening variables on real sector growth. There appears to be a dearth of recent studies on the relationship between financial deepening and stock market development, especially when market capitalization is used as a metric for stock market development. Alenoghena, Enakali-Osoba and Mesagan (2014) used the vector error correction mechanism to examine the relationship between financial deepening and the performance of the Nigerian capital. The authors found out that there is a positive association between financial deepening and stock market development in Nigeria.

Nnanna (2014) investigates the relationship between financial deepening and stock market returns in Nigeria using value of traded stocks as ratio of GDP as well as market capitalization as ratio of GDP. The researcher posited that there is positive relationship between the ratio of market capitalization to GDP and stock market returns while there is significant relationship between value of traded stocks to GDP and stock market returns. Earlier, Nnenna (2012) had studied the nexus between financial deepening and stock market development in Nigeria employing the GARCH model. While assessing the inconsistencies between financial deepening and stock market variables, the author observes that a significant association between stock market returns and financial deepening exists.

Karimo and Ogbona (2017) conduct a study to ascertain whether financial deepening and economic growth in Nigeria followed the demand following or supply leading hypothesis using the Toda–Yamamoto Augmented Granger test. The authors realized that the supply leading hypothesis is a more appropriate relationship that exists between financial deepening and economic growth in Nigeria. Other studies which find a positive

relationship between financial deepening and economic growth includes Nkoro and Uko (2013); Audu and Okumoko, (2013); Osuji and Chigbu, (2012); Olofin and Afangideh (2009), and so on. On the contrary, Maduka and Onwuka, (2012) found out that financial deepening has a statistically significant effect on the Nigerian economic growth. Moreover, Okafor, Onwumere and Chijindu (2016) obtained mixed results of significant positive and negative effects of financial deepening on economic growth in Nigeria.

RESEARCH METHOD

Model Specification

This research is premised on the demand following hypothesis by Patrick (1966) who posits that financial development is propelled by other sectors which it finances. This study modified the model used by Alenoghena, Enakali-Osoba and Mesagan (2014) to examine the relationship between financial deepening and capital market development in Nigeria. Whereas Alenoghena et al. regressed stock market capitalization on GDP growth rate, credit to private sector, narrow money and savings growth rate, this study recognizes financial deepening variables as ratios of financial activities to the GDP. Hence the variables used in this study include stock market capitalization as proxy for stock market development and ratio of broad money supply to GDP, financial sector contribution ratio to GDP, ratio of credit to private sector to GDP, ratio of commercial banks' liabilities to GDP and banking sector actual liquidity ratio for the period 1981 – 2019. These data were collected from the annual Statistical Bulletin of the Central Bank of Nigeria.

The general model expressing the link between financial deepening and stock market development is linear in the form:
 $MKCAP = f(FD) \dots\dots\dots(3.1)$
Where FD is financial deepening and MKCAP is market capitalization of the Nigeria stock exchange. Model (3.1) can be expressed in a complete functional way as:

$$MKCAP = \Omega_0 + \Omega_1 FD_{it} + \varepsilon_{it} \dots\dots\dots (3.2)$$

MKCAP = Stock market capitalization

FD = financial deepening variables

Where FD can be decomposed into five different financial deepening variables, namely ratio of broad money supply to gross domestic product (M2GDP); financial sector contribution to GDP (FSGDP); ratio of credit to private sector to GDP (CSGDP); ratio of commercial banks' liabilities to GDP (CLIAB) and banking sector liquidity ratio (BSLIQ), so

$$FD = f(M2GDP; FSGDP; CSGDP; CLIAB; BSLIQ) \dots\dots\dots (3.3)$$

The model for the study is now stated in econometric terms as

$$MKCAP = \Omega_0 + \Omega_1 M2GDP_{it} + \Omega_2 FSGDP_{it} + \Omega_3 CSGDP_{it} + \Omega_4 CLIAB_{it} + \Omega_5 BSLIQ_{it} + \varepsilon_{it} \dots\dots\dots (3.4)$$

Where:

M2GDP = Broad money a ratio of GDP

CSGDP = Credit to private sector ratio to GDP

FSGDP = Ratio of banking sector contribution to GDP

CLIAB = Liabilities of commercial banks' liabilities to GDP

BSLIQ = Liquidity ratio of the banking system (control variable)

$\Omega_i, \dots, \Omega_5$ = Estimation parameters

ε_{it} = Error term

Data from secondary sources are used in this study. Data were sourced from the Central Bank of Nigeria annual statistical bulletin that contains Time Series data from 1981 to 2019. These include yearly data on broad money supply, sum of credit granted by the banking system to the private sector, banking sector liabilities, banking industry contribution to GDP and the loan deposit ratio (actual). All the financial deepening variables are selected from the banking sector because this study concentrates on the relationship between banks financial intermediaries and stock

market development. The number of years studied is based on the availability of requisite data for the analysis.

Pre-Estimation Tests

Descriptive Statistics and Correlations

This study uses descriptive statistics to examine the statistical properties of the variables under study as well as correlation matrix to examine the correlation coefficients between the dependent variable (MKCAP) and financial deepening variables.

Unit Root Test

The study employs the Augmented Dickey Fuller (ADF) stationarity test to ascertain the level at which each of the variables is stationary. The result of the test of stationary is necessary for the determination of the estimation technique used in the study. A test of unit root is a pre-condition for testing for any long run link between dependent and independent variables.

Estimation Techniques

Estimation of Long-run relationship

The Johansen co-integration test is used to examine if there exists any long run relationship between financial deepening and stock market development in this study. The choice of Johansen co-integration is due to the nature of stationarity of the variables. Johansen (1988) is suitable for the analysis of variables that are stationary at order one, 1(1) that is at first difference and also gives room for estimating short as well as long-run dynamics. The long-run relationship is determined using the vector autoregressive method. For our model (equation 3.2) the following equation expresses the estimation of long-run relationship between financial deepening variables and stock market development.

$$\Delta(\text{MKCAP})_t = \Omega_0 + \Omega_1(\text{MKCAP})_{t-1} + \Omega_2(\text{FD})_{t-1} + \sum_{i=1}^p \Omega_3 \Delta(\text{MKCAP})_{t-i} + \sum_{i=1}^p \Omega_4 \Delta(\text{FD})_{t-i} + \sum_{i=1}^p \Omega_4 \Delta(\text{MKCAP})_{t-i} + \sum_{i=1}^p \Omega_5 \Delta(\text{FD})_{t-i} + \varepsilon_{it} \dots \dots \dots (3.5)$$

Where:

Δ = difference operator

$\Omega_1 \dots \Omega_2$ = long-run regression coefficients

$\Omega_3 \dots \Omega_5$ = short-run regression coefficients

p = maximum length

Estimation of Short-run Relationship

Engle and Granger (1987) posit that two co-integrating variables also have error correction characteristics. Hence, the error correction model (ECM) is used to establish the long run relationship between the dependent and the independent variables on one hand, and to specify the speed of adjustment given that the error is also embedded in the model.

The error correction model for equation (3.2) is :

$$\Delta(\text{MKCAP})_t = \Omega_0 + \sum_{i=1}^p \Omega_1 \Delta(\text{MKCAP})_{t-i} + \sum_{i=1}^p \Omega_2 \Delta(\text{FD})_{t-i} + \Omega_3 \text{ECT}_t = 1 + \varepsilon_{it} \dots \dots \dots (3.6)$$

where:

Ω_3 = the coefficient of error correction term

Causal relationship

The Granger causality test is carried out in this study to reveal if stock market development has any causal relationship with financial deepening variables.

Post-Estimation Test

Residual Diagnostic Tests

The main post-estimation tests carried out to validate the results of this research include the Breuch-Godfrey test of residual serial correlation, Breuch-Pagan-Godfrey test of homo/heteroscedasticity and the cumulative sum of the recursive residuals tests (CUSUM). While the first two are residual diagnostics, the CUSUM is a test of stability in the samples selected over the study time.

A-priori Expectation

Table 1 shows the theoretical expectation of the relationship between the stated variables.

Table 1. A-Priori Expectation

S/N	Dependent variable	Independent variables	A-Priori Expectation	Remark
1	MKCAP	M2GDP	+	Positive
2	MKCAP	FSGDP	+	Positive
3	MKCAP	CSGDP	+	Positive
4	MKCAP	CLIAB	+/-	Positive/Negative
5	MKCAP	BSLIQ	-	Negative

Source: Author's Compilation (2020)

ANALYSIS AND FINDINGS

Pre-estimation tests

Descriptive statistics

Table 2 contains the descriptive statistics obtained from the analysis of data under consideration. Our focus will be on the Jaque-Bera test of normality, skewness and kurtosis. The Jarque-Bera (JB) test posits that for a variable to be normally distributed, its probability must be close to zero. It tests the null hypothesis that the JB probability is not equal to zero, that is the variable is not normally distributed.

Table 2. Descriptive Statistics

	MKCAP	M2GDP	FSGDP	CSGDP	CLIAB	BSLIQ
Mean	4980.072	15.49479	1183.506	11.65979	9241.763	68.02575
Median	472.3000	12.73591	1151.592	8.211023	1568.839	70.77500
Maximum	21128.90	40.82000	2123.897	26.60000	43531.67	85.66147
Minimum	5.000000	9.151675	254.9934	5.917270	19.47750	37.96500
Std. Dev.	6794.271	6.920621	600.0827	6.174608	12903.73	12.35647
Skewness	1.012181	2.261757	-0.132024	0.933943	1.221519	-0.760855

Kurtosis	2.506678	8.479805	1.737808	2.273626	3.187481	2.929059
Jarque-Bera	7.054789	82.04695	2.702131	6.527010	9.755827	3.771026
Probability	0.029381	0.000000	0.258964	0.038254	0.007613	0.151751
Sum	194222.8	604.2967	46156.72	454.7318	360428.8	2653.004
Sum Sq. Dev.	1.75E+09	1820.010	13683771	1448.780	6.33E+09	5801.926
Observations	39	39	39	39	39	39

Source: Author's Computation (2020)

JB decision rule holds that the null hypothesis should not be accepted if its probability is less than the significance level (5%). From Table 2, the probability of JB statistics show that four out of the six variables under consideration, namely MKCAP, M2GDP, CSGDP and CLIAB with probabilities of 0.029381, 0.0000, 0.038254 and 0.007613 respectively. The remaining two variables FSGDP and BSLIQ are not normally distributed with probabilities of 0.258964 and 0.151751 respectively.

Furthermore, the skewness coefficients for MKCAP, M2GDP, CSGDP, CLIAB are 1.012181, 2.261757, 0.933943 and 1.221519 respectively are all positive revealing that the variables skewed to the right, while those of FSGDP and BSLIQ are -0.132024 and -0.760855 respectively which are negative, skewing to the left.

Moreover, the kurtosis coefficients of MKCAP, M2GDP, FSGDP, CSGDP, CLIAB and BSLIQ are 2.506678, 8.479805, 1.737808, 2.273626, 3.187481, and 2.929059 respectively. While variables MKCAP, CLIAB and BSLIQ have kurtosis approximately 3 (normally distributed), variables FSGDP and CSGDP are far less than 3 (platykurtic) and variable M2GDP is leptokurtic with coefficient greater than 3.

Correlation Matrix

The purpose of correlation is to show the rate at which a variable moves along with changes in one or more other variables. Table 3 shows the correlation matrix among financial deepening and stock market variables.

Table 3. Correlation matrix

	MKCAP	M2GDP	FSGDP	CSGDP	CLIAB	BSLIQ
MKCAP	1.000000	0.679225	0.815473	0.893276	0.909419	-0.128863
M2GDP	0.679225	1.000000	0.653483	0.878842	0.901470	0.050384
FSGDP	0.815473	0.653483	1.000000	0.786543	0.792086	-0.167666
CSGDP	0.893276	0.878842	0.786543	1.000000	0.964988	-0.024856
CLIAB	0.909419	0.901470	0.792086	0.964988	1.000000	0.006743
BSLIQ	-0.128863	0.050384	-0.167666	-0.024856	0.006743	1.000000

Source: Author's Computation (2020)

Correlation can either be negative, positive, none, perfect strong or weak depending on the magnitude and sign that accompany the correlation coefficient. From Table 3, four out of the five independent variables (M2GDP, FSGDP, CSGDP and CLIAB) have positive and strong correlation with the dependent variable (MKCAP) having correlation coefficients of 0.679225; 0.815447; 0.89276 and 0.909419 respectively. On its part BSLIQ has a weak and negative correlation with MKCAP (-0.128863).

Unit Root Test

This study uses the Augmented Dickey Fuller (ADF) unit root test to

establish the order of stationarity of variables studied. In using the ADF unit root test, stationarity is determined by the magnitude of the critical values, the ADF statistics in comparison with 1%, 5% and 10% significance levels. If the calculated value of the ADF is higher than its critical value, the null hypothesis of the presence of unit root cannot be accepted at the corresponding significance level. The results of the ADF unit root test are presented in Table 4.

Table 4 reveals that all the independent and dependent variables are stationary at order one, that is at first difference. For all these variables, the null hypothesis of the

presence of unit root cannot be accepted. among the variables is conducted. This necessitates that a test of co-integration

Table 4. Augmented Dickey Fuller Unit Root Test

Variables	Critical values	t-Statistic	Probability	Order of stationarity
MKCAP	-3.621023* -2.943427** -2.610263***	-7.677509	0.0000	I(I)
M2GDP	-3.621023* -2.943427** -2.610263***	-5.593271	0.0000	I(I)
FSGDP	-3.679322* -2.967767** -2.622989***	-3.694033	0.0097	I(I)
CSGDP	-3.621023* -2.943427** -2.610263***	-4.883455	0.0003	I(I)
CLIAB	-4.226815* -3.536601** -3.200320***	-3.642799	0.00396	I(I)
BSLIQ	-4.226815* -3.536601** -3.200320***	-5.908635	0.0001	I(I)

*, ** and *** implies stationary at 1%, 5% and 10% significance level respectively
Source: Authors' Computation (2020)

Co-integration Test.

We use the Johansen co-integration technique to test for the presence of long-run relationship between stock market development and financial deepening in Nigeria for the years under study especially because all the variables under consideration are stationary at first difference. The test reveals both the Trace and the Maximum Eigen results to determine if a long-run relationship exists between the variables. The decision rule is to compare the Trace and the Maximum Eigen statistics with the critical values. The null hypothesis cannot be rejected if the Trace and Max-Eigen statistics are less than their critical values. Table 5 shows the results of the Trace and Max-Eigen co-integration tests.

Table 5. Results of Trace and Max-Eigen con-integration tests

Included observations: 37 after adjustments				
Trend assumption: Linear deterministic trend				
Series: MKCAP M2GDP FSGDP CSGDP CLIAB BSLIQ				
Lags interval (in first differences): 1 to 1				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.804656	159.7055	95.75366	0.0000
At most 1 *	0.678010	99.28463	69.81889	0.0000
At most 2 *	0.634034	57.35493	47.85613	0.0050
At most 3	0.354839	20.16203	29.79707	0.4119
At most 4	0.101047	3.946575	15.49471	0.9078
At most 5	0.000139	0.005150	3.841466	0.9418
Trace test indicates 3 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.804656	60.42084	40.07757	0.0001
At most 1 *	0.678010	41.92970	33.87687	0.0044
At most 2 *	0.634034	37.19290	27.58434	0.0022
At most 3	0.354839	16.21546	21.13162	0.2125
At most 4	0.101047	3.941426	14.26460	0.8655
At most 5	0.000139	0.005150	3.841466	0.9418
Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: Author's Computation (2020)

Table 5 reveals that in both Trace and Max-Eigen unrestricted co-integration tests, there are at least three (3) co-integrating equations at 0.05 significance level among the variables. This provides the basis for us to examine the long run effect of financial deepening on the development of stock market in Nigeria.

The *p* value which is the unrestricted VAR will first be estimated in order to determine the long-run relationship among the variables under consideration. This study uses the Schwarz to determine the lag used in the analysis. Tables 6 to 10 are the estimates of long-run regression models showing the nature of the effects financial deepening has on stock market variables.

Objective i(a): Long-Run Regression Estimation Results

Table 6. Long-run r results for MKCAP and M2GDP

Variable	Coefficient	Standard Error	t-Statistics	Prob.
C	-1111.498	624.9236	-1.778615	0.0840
MKCAP (-1)	0.845776	0.073163	11.56012	0.0000
M2GDP (-1)	147.5582	34.57269	4.268058	0.0001
R ² = 0.858735 Adjusted R ² = 0.850662 DW = 2.1386 Prob (F-Stat) = 0.000000				

Source: Authors' Computation (2020)

Table 7. Long-run r results for MKCAP and FSGDP

Variable	Coefficient	Standard Error	t-Statistics	Prob.
C	-998.0288	691.8739	-1.442501	0.1581
MKCAP (-1)	0.790014	0.143722	5.496826	0.0000
FSGDP (-1)	2.007443	1.085746	1.848907	0.0729
R ² = 0.862318 Adjusted R ² = 0.854451 DW = 2.356094 Prob (F-Stat) = 0.000000				

Source: Authors' Computation (2020)

Table 8. Long-run r results for MKCAP and CSGDP

Variable	Coefficient	Standard Error	t-Statistics	Prob.
C	-1298.960	1491.123	-0.871129	0.3896
MKCAP(-1)	0.735049	0.158939	4.624711	0.0000
CSGDP (-1)	257.7245	173.5505	1.485012	0.1465
R ² = 0.859967 Adjusted R ² = 0.851966 DW = 2.177979 Prob (F-Stat) = 0.000000				

Source: Authors' Computation (2020)

Table 9. Long-run r results for MKCAP and CLIAB

Variable	Coefficient	Standard Error	t-Statistics	Prob.
C	556.3954	372.5899	1.493319	0.1443
MKCAP (-1)	0.648418	0.117073	5.538566	0.0000
CLIAB (-1)	0.175261	0.057711	3.036879	0.0045
R ² = 0.863130 Adjusted R ² = 0.855309 DW = 1.958485 Prob (F-Stat) = 0.000000				

Source: Authors' Computation (2020)

Table 10. Long-run r results for MKCAP and BSLIQ

Variable	Coefficient	Standard Error	t-Statistics	Prob.
C	3075.108	2228.893	1.379657	0.1764
MKCAP(-1)	0.923154	0.067506	13.67514	0.0000
BSLIQ (-1)	-34.96738	28.71035	-1.217936	0.2314
R ² = 0.855545 Adjusted R ² = 0.847290 DW = 2.490720 Prob (F-Stat) = 0.000000				

Source: Authors' Computation (2020)

From Tables 6 – 10, it is shown that a unit change in M2GDP, FSGDP, CSGDP, CLIAB and BSLIQ will bring about a change of 147.5582, 2.007443, 257.724, 0.175261 and -34.96738 in MKCAP respectively. All these effects are in agreement with the *a-priori* expectation on the relationship between the dependent and explanatory variables. On the long-run, two

financial deepening variables (M2GDP and CLIAB) have positive and statistically significant effect market capitalization with probabilities of 0.0001 and 0.0045 respectively). Again two other variables (FSGDP and CSGDP) have positive effect on market capitalization but the effect is not statistically significant with probabilities of 0.0729 and 0.1465 respectively. The last

variable (BSLIQ) exerts a negative but statistically insignificant effect on MKCAP with probability of 0.2314.

The R²s which are the coefficients of multiple determination, indicators of the percentage of the dependent variable that is explained by the independent variables imply that about 0.858737 (86%); 0.862318 (86%); 0.859967 (86%), 0.863130 (86%) and 0.855545 (86%) of changes in MKCAP are explained by M2GDP, FSGDP, CSGDP, CLIAB and BSLIQ respectively. This further buttresses the position of high correlation between MKCAP and most of the independent variables.

The (DW) statistics for M2GDP, FSGDP, CSGDP, CLIAB and BSLIQ are 2.138616, 2.356094, 2.177929, 1.958485 and 2.490720 respectively which signify the absence of autocorrelation problem in any of the variables as they all hover around the benchmark of 2 (Gujarat, 2004). The probabilities of *F-Statistics* for all the models are 0.00000, confirming these models are reliable and valid.

Objective i(b): Error Correction Models for Short Run Relationship

Tables 11 – 15 are the summaries of the ECM regression results meant to examine the effects of financial deepening on stock market development.

Table 11. Short-run results for MKCAP and M2GDP model

Variable	Coefficients	Std Error	t-Statistics	Prob
C	547.5147	478.8726	1.143341	0.2611
DMKCAP(-1)	-0.255904	0.255013	-1.003496	0.3229
D(M2GDP (-1))	-153.5946	176.6240	-0.869614	0.3908
ECT1 (-1)	-0.097662	0.123745	-0.789215	0.4356
R ² = 0.104221 DW = 2.059312				

Source: Authors' Computation (2020)

Table 12. Short-run results for MKCAP and FSGDP model

Variable	Coefficients	Std Error	t-Statistics	Prob
C	526.8756	445.7968	1.181874	0.2457
DMKCAP(-1)	-0.145001	0.174820	-0.829430	0.4128
D(FSGDP (-1))	-3.217469	3.256659	-0.987966	0.3304
ECT2 (-1)	-0.183166	0.106300	-1.723100	0.0942
R ² = 0.154015 DW = 2.091167				

Source: Authors' Computation (2020)

Table 13. Short-run results for MKCAP and CSGDP model

Variable	Coefficients	Std Error	t-Statistics	Prob
C	522.4669	452.7619	1.153955	0.2568
D(MKCAP (-1))	-0.096905	0.225937	-0.428901	0.6708
D(CSGDP (-1))	-314.9783	253.3040	-1.243479	0.2225
ECT3 (-1)	-0.221854	0.212855	-1.042278	0.3049
R ² = 0.127372 DW = 2.085376				

Source: Authors' Computation (2020)

Table 14. Short-run results for MKCAP and CLIAB model

Variable	Coefficients	Std Error	t-Statistics	Prob
C	565.9015	570.7065	0.991581	0.3286
D(MKCAP (-1))	-0.191652	0.268862	-0.712827	0.4810
D(CLIAB (-1))	-0.150654	0.356401	-0.422710	0.6752
ECT4 (-1)	-0.083836	0.250619	-0.334515	0.7401
R ² = 0.071898 DW = 2.057417				

Source: Authors' Computation (2020)

Table 15. Short-run results for MKCAP and BSLIQ model

Variable	Coefficients	Std Error	t-Statistics	Prob
C	447.7766	441.3235	1.014622	0.3177
D(MKCAP (-1))	-0.322400	0.172160	-1.872679	0.0700
D(BSLIQ(-1))	-14.75842	43.78707	-0.337050	0.7382
ECT5 (-1)	-0.002797	0.002838	-0.985465	0.3316
R ² = 0.111090 DW = 2.107370				

Source: Authors' Computation (2020)

Tables 11 – 15 show that the coefficients of the estimated models for M2GDP, FSGDP, CSGDP, CLIAB and BSLIQ are -153.5946, -3.217469, -314.9783, -0.150654 and -14.7584 respectively. This means that a unit increase in M2GDP, FSGDP, CSGDP, CLIAB and BSLIQ in the short-run will make the MKCAP to reduce by 153.5946, 3.217469, 314.9783, 0.150654 and 14.7584 respectively. These coefficients are negatives and are (apart from BSLIQ) contrary to the *a-priori* expectation of a positive effect of financial deepening variables on stock market development. However, none of the negative effects is statistically significant in the short run.

The speed of adjustments (error correction terms - ECT) show that about -0.097662 (9.77%), -0.183166 (18.37%), -0.221854 (22.19%), -0.083836 (8.38%) and -0.002797 (0.28%) of past year's deviations in M2GDP, FSGDP, CSGDP, CLIAB and BSLIQ are corrected in the present year. The values for the ECTs show that they are not statistically significant. Apart from the result of BSLIQ, the short run results

contradict those of the long-run relationship between M2GDP, FSGDP, CSGDP, CLIAB and MKCAP. While in the long-run, M2GDP, FSGDP, CSGDP and CLIAB have positive effect on MKCAP, in the short-run, all these variables have negative effect on MKCAP.

Objective ii: Determination of causation between financial deepening and stock market development

Having found the long and short run relationships between financial deepening and stock market development, the second objective of this study is to determine the causal relationship between them. The null hypothesis to be tested is that there is no causal link between financial deepening and stock market development. Table 16 contains the results of Granger causality test.

Table 16. Granger causality test results for financial deepening and stock market development

Pairwise Granger Causality Tests				
Sample: 1981 - 2019				
Null Hypothesis:	Obs	F-Statistic	Prob.	Remarks
M2GDP does not Granger Cause MKCAP	37	0.79316	0.4611	Uni-directional causality from MKCAP to M2GDP
MKCAP does not Granger Cause M2GDP		5.78850	0.0071	No causality
FSGDP does not Granger Cause MKCAP	37	1.48667	0.2413	
MKCAP does not Granger Cause FSGDP		0.09924	0.9058	Uni-directional causality from MKCAP to CSGDP
CSGDP does not Granger Cause MKCAP	37	0.86186	0.4319	
MKCAP does not Granger Cause CSGDP		9.33727	0.0006	
CLIAB does not Granger Cause MKCAP	37	0.67924	0.5142	Uni-directional causality from MKCAP to CLIAB
MKCAP does not Granger Cause CLIAB		11.5408	0.0002	No causality
BSLIQ does not Granger Cause MKCAP	37	0.92988	0.4050	
MKCAP does not Granger Cause BSLIQ		0.30734	0.7375	

Source: Author's Computation (2020)

Table 16 shows that there is a uni-directional causality that runs from MKCAP to M2GDP, CSGDP and CLIAB respectively. This decision is based on their probabilities which are less than the 5% level of significance, implying that the null hypothesis of no causal relationship cannot be accepted. On the other hand, no causal relationship exists between MKCAP and FSGDP as well as BSLIQ.

Again, these results further confirm the nature of long run relationship that exists between the variables.

Residual Diagnostics

To test for the presence of serial correlation and homoscedasticity in the residuals, the Breusch-Godfrey (L-M) and Breusch-Pagan-Godfrey tests are used respectively while the Cumulative Sum Recursive Residuals (CUSUM) is used to test for the stability of residuals. Table 17 contains the summary of these tests.

Table 17 shows that none of the financial deepening variables have a serial autocorrelation with market capitalization as

the respective Chi-square probabilities are greater than the 0.5 level of significance. However, two of the variables (M2GDP and CSGDP) are homoscedastic with their Chi-square probabilities greater than the 5% significance level whereas three (FSGDP, CLIAB and BLISQ) are heteroscedastic with their Chi-square probabilities less than the 5% significance level.

Table 17. Summary of residual tests

Serial correlation Test (Breusch-Godfrey (L-M)) Prob. (Chi-square)	
MKCAP and M2GPD model	0.2333
MKCAP and FSGDP model	0.4045
MKCAP and CSGDP model	0.3890
MKCAP and CLIAB model	0.0603
MKCAP and BSLIQ model	0.3564
Breusch-Pagan-Godfrey test of Homo/heteroscedasticity Prob. (Chi-square)	
MKCAP and M2GPD model	0.0722
MKCAP and FSGDP model	0.0214
MKCAP and CSGDP model	0.0584
MKCAP and CLIAB model	0.0007
MKCAP and BSLIQ model	0.0027

Source: Authors' Computation (2020)

Figure 1 is the cumulative sum of recursive residual of the models under study. It shows that the study models and sample were stable during the period under

study. This is evident in the position of the equation line which falls in-between the critical bounds lines of 5%

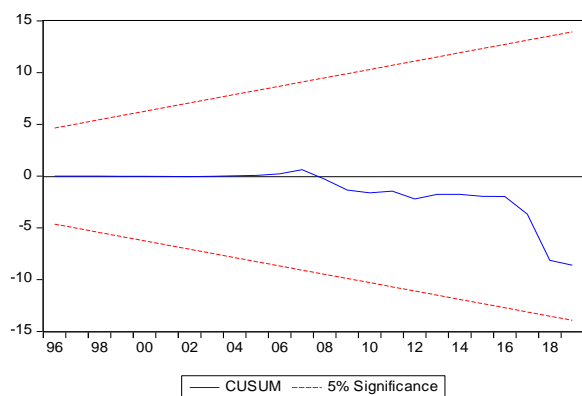


Fig 4.1: CUSUM test
Source: Authors' Design (2020)

DISCUSSION OF FINDINGS

Findings from the data analysis show that there exists strong correlation between at least four out of the five financial deepening variables and market capitalization. The Durbin Watson statistics reveal that there exists no autocorrelation problem in the variables. Also, there are at least three co-integrating equations between financial deepening and market capitalization. On the long-run, financial deepening, to some extent, exerts positive and statistically significant effect on stock market development. The explanatory variables strongly explain the behaviour of the dependent variable (averagely 86% of the changes in stock market development are explained by financial deepening). Equally, the probabilities of F-statistic show that all the models employed in this research work are reliable.

The test of causality reveals that there exists a uni-directional causality that runs from stock market capitalization to ratio of broad money supply to GDP, ratio of credit to private sector to GDP and ratio of commercial banks' liabilities to GDP.

The established positive influence of financial deepening on stock market development is expected. Theoretically, the more funds made available to individual and corporate investors, the more they are expected to invest in the stock exchange

market, *ceteris paribus*. Increase in broad money supply, credit to private sector and financial aspect of the gross domestic product for example would spur greater investment in stock and other capital market instruments.

However, all negative effects (though not significant) of financial deepening on stock market development in the short run calls for particular attention. This runs contrary to the *a-priori* expectation on the relationship between these variables as it signifies that, financial deepening efforts on the short run, actually impairs stock market development. Nonetheless, it is important to know that lags exist in transmitting monetary and credit policies effects to the targeted. The gap between making policies and implementing them as well as the lag between granting credit and getting the expected results is large such that gains that should accompany such policies are negated by bottlenecks.

In summary this study reveal that financial deepening spurs stock market development on the long-run while it does not in the short run though the error correction model results show that some variations in the variables under study can subsequently be adjusted.

This research was carried out to examine the short and long run relationship between financial deepening and stock market development in Nigeria. Specifically, the study examined the short and long run effect of financial deepening variables (ratio of broad money supply to gross domestic product, ratio of financial sector contribution to the gross domestic product, ratio of credit to private sector to the gross domestic product, ratio of commercial banks' liabilities to the gross domestic product and banking sector liquidity on stock market development proxied by market capitalization). Furthermore, the study was also carried out to ascertain the existence (or otherwise) of any causal link between financial deepening

and stock market development in Nigeria for the period 1981-2019.

Pre-estimation tests which include tests through descriptive statistics, the Augmented Dickey Fuller unit root test, correlations and the Johansen co-integration test were carried to form the basis for further analysis in the study. Vector autoregressive (VAR) was used to determine the long run relationship while error correction mechanism (ECM) was used to examine the short run relationship between financial deepening variables and stock market development in Nigeria. Findings show that while there is positive and statistically significant relationship between financial deepening and stock market development in Nigeria on the long run, the short run relationship is negative but statistically insignificant. The test of causality revealed a uni-directional causality from stock market development to financial deepening variables.

CONCLUSION

This research was necessitated by the dearth of recent literature on the relationship between financial deepening and stock market development in Nigeria, particularly with respect to whether the former causes the latter or vice-versa. From the findings of the analysis done in this study, we conclude that financial deepening exerts considerable positive influence on stock market development on the long run but has no significant effect in the short run. Also, we also conclude that rather than financial deepening propelling stock market development, it is the other way round. These findings support the demand following hypothesis advanced by Patrick (1966) on the relationship between financial development and economic growth.

The findings and conclusions from this study necessitate that some recommendations are preferred, especially since increased financial deepening activities are seen as fundamental necessities for stock market growth. Therefore, this researcher recommends that:

- i. There should be increased efforts tailored towards improving financial deepening and thus make more funds available to the private sector which is the main players in the stock exchange market. With increased funds available for trading in stocks, market capitalization will increase and the stock market will also propel growth in financial deepening variables.
- ii. The time lag between monetary policy announcements and its actual effects on targets should be strategically managed so as to mitigate against the negative effect of financial deepening on stock market development in the short run.
- iii. Rates on short term loans and advances can also be reduced for stock purchase purposes since trading in stocks is now done on both short and long term basis

REFERENCES

1. Alenoghena, R.O., Enakali-Osoba, C. & Mesagan, P.E. 2014. Financial deepening and performance of the Nigerian capital market: empirical evidence. *Global Journal of Commerce and Management*, 3, 142–151.
2. Ang J.B. 2008. Are financial sector policies effective in deepening the Malaysian financial system? *Malaysian Central Bank Discussion Paper* 33, 1-13.
3. Audu N. P, Okumoko T.P. 2013. Financial development and economic growth in Nigeria. *European Journal of Business and Management*, 5(19): 45-63.
4. Bakang, K. 2015. Effects of financial deepening on economic growth in Kenya. *International Journal of Business and Commerce* 4(7):1-15.
5. Central Bank of Nigeria. 2017. *Monetary policy, surveillance activities and operations of the CBN*. CBN Annual Reports, Available <https://www.cbn.gov.ng>
6. Goldsmith, R.W. 1969. *Financial structure and development*. Yale University Press, Newhaven.
7. Gujarati, D. N., 2004, *Basic Econometrics*. New York: McGraw Hill.
8. Gurley, J. & Shaw, E. 1955. Financial aspects of economic development. *The American Economic Review*, 45: 515-538.
9. Hicks, J. A., 1969. *A theory of economic history*. Clarendon Press Oxford, U.K.

10. Jung, W. S. 1986. Financial development and economic growth: International evidence. *Economic Development and Cultural Change*, 34: 336–346.
11. Karimo, T. M. and Ogbonna, O. E., 2017. Financial deepening and economic growth nexus in Nigeria: Supply-leading or demand-following? *Economies* 5(4): Available: www.mdpi.com/journal/economies.
12. Levine, R. 2005. Finance and Growth: Theory and Evidence. Philippe A, Steven D. (ed.), *Handbook of Economic Growth*, 1(1): 865-934.
13. McKinnon, R. I. 1973. *Money and capital in economic development*. Washington, The Brookings Institution. In Hansen BE (2016). *Econometrics*.
14. Ndebbio, J.E.U., 2010, *Financial deepening, economic growth and development: Evidence from Selected Sub-Saharan African countries*. Paper No. 142 African Economic Research Consortium.
15. Nigerian Stock Exchange (NSE), (2019). History of the Nigeria Stock Exchange. Retrieved from: www.nse.com.ng
16. Nigeria Stock Exchange (NSE), 2018. Annual reports and accounts for 2017. Available: www.nse.org.ng
17. Nkoro, E. & Uko, A.K. 2013. Financial sector development-economic growth nexus: Empirical evidence from Nigeria. *American International Journal of Contemporary Research*, 3(2): 87-94.
18. Nnanna, S. M. 2014. *Money, banking and finance: Theory and practice*. Owerri: Hudson Jude Nigeria Publishers.
19. Nnenna, O.M. 2012. Evaluating the nexus between financial deepening and stock market in Nigeria, *European Scientific Journal*, 8, 18 - 29.
20. Okafor, I. G., Onwumere, J.U. & Chijindu, E. H. 2016, Financial deepening indicator and economic growth in Nigeria: A causality and impact analysis, *Asian Journal of Economics, Business and Accounting*, 1(2): 1-11.
21. Olofin, S.O. & Afangideh. U.J. 2009. Financial structure and economic growth in Nigeria A macro econometric approach. *Nigerian Journal of Security and Finance* 13(1): 1–27.
22. Oxford Business Group (2020). Structural reforms to expand Nigeria’s capital markets. Available: <http://oxfordbusinessgroup.com>
23. Patrick, H.T. 1966. Financial development and economic growth in underdeveloped countries. *Economic Development and Cultural Change*, 14: 174-189.
24. Shaw, E.S. 1973. *Financial deepening in economic development*. New York: Oxford University Press.
25. Werigbelegha, A.P. & Nwamaka, I.M. 2015. A causality analysis of financial deepening and performance of Nigerian economy, *An International Multidisciplinary Journal, Ethiopia*, 9(4), 249 – 263. Available: <http://dx.doi.org/10.4314/afrev.v9i4.19>.

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