Financial Deepening and Income of Selected Deposit Money Banks Listed In Nigeria

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Abstract
Financial Deepening boosts the income of deposit money banks (DMBs) which in turn enhances the profitability and contribution of such banks to economic growth and development. In the case of Nigeria, this has not been properly situated. The focus of this study is to determine how financial deepening has spurred the income diversification and growth of selected DMBs. Purposive sampling technique was adopted in selecting the DMBs studied. Descriptive Statistics and panel data regression analysis were used in estimating the econometric model for the study. Results showed that financial deepening had significant positive effects on the income of DMBs listed in Nigeria and recommendations include a policy rethink on the part of regulatory authorities by the provision of guidelines that will facilitate more credit to MSMEs and DMBs on their part should diversify their income sources by expanding their non-interest income base.
Keywords: *Deposit money banks, Economic growth, Financial deepening, Income, Nigeria*

1. Introduction

Profitability is the primary motivation for entrepreneurial drive and it is aimed at maximizing shareholders' wealth. It is the reward for risk taking by shareholders and forms the nucleus through which shareholders are rewarded. In the banking sector, owners provide the risk capital but this is justified by the opportunities to earn a rate of return from the spread between interest received and paid through the intermediation process. Also, profits are earned through other income sources not related to the interest margin.

A sound, profitable, well-managed and well-functioning banking system contributes to the stability of the financial system and thereby promotes economic growth. The Nigerian economy is dominated by banks, thus, its profitability and stability in line with the supply leading hypothesis is considered significant to the growth and development of the economy (Ogbebor & Siyanbola, 2018). The argument of Alenoghena, Osoba and Mesagan (2014) was that the role of banks remains central in financing economic activities in general and specific segments of the market in particular. In line with this postulation, the knowledge of the factors influencing the profitability of deposit money banks in Nigeria, according to Ogunbiyi and Ihejirika (2015) is not only important but essential in promoting economic stability. The banking industry plays an essential role in the economy in terms of resource mobilization and allocation and, is by far, the most important part of the financial system in developing economies, accounting for the bulk of the financial transactions and assets (Ifionu & Keremah, 2016). The financial system generally is more than just being a system that facilitates settlement of transactions but encompasses all functions relating to resource allocation especially in an open market.

Financial deepening on its part plays a critical role of mobilizing savings from surplus economic units and directing same to deficit economic units for investment purposes. The level of financial development of a nation has significant influence on the performance of the banking sector because of its ability to mobilize savings from surplus economic units to deficit economic units in an efficient manner through promotion of information sharing (Ibrahim, 2017).

Ngang'a (2016) defined financial deepening as the effectiveness of financial institutions in mobilizing savings for investment purposes. Ndege (2012) argued that a well-functioning financial institution will lead to economic efficiency, expanding liquidity, mobilizing savings, promoting capital accumulation and the transfer of resources from non-growth sectors to the more growth-inducing sectors, hence, encouraging entrepreneurial

growth. Anigbogu, Okoli and Nwakoby (2015) emphasized that deepening financing intermediation may promote economic growth by mobilizing more investments, and lifting returns to financial resources, which raises productivity.

Financial deepening is the product of the growth of financial intermediation. In almost all economies whether developed, developing or underdeveloped, banks being major risk bearing institutions can effectively carry out their obligations when the entire financial markets in their operating jurisdictions are well functioning and properly developed in order to contribute to economic growth. This is in line with the supply leading hypothesis as propounded by Schumpeter (1911) which argued that financial markets can lead to greater economic growth and development. However, the demand pulling hypothesis emphasizes that a well-developed economy can trigger the demand for financial services as it is the case with developed economies which in turn impacts the level of profitability of banks in such environments. However, this is not the case with emerging and underdeveloped economies such as Nigeria. Besides, the peculiarities of banks and the nature of their operations also affect their profitability despite the stage of growth of the economy they are operating in.
Financial deepening is often captured by a quantity measure that gauges the depth of financial markets such as the stock of private credit created as a share of GDP (Ito & Kawai, 2018). Beck (2015, 2014) however, argued that high levels of private credit as a share of GDP do not necessarily mean high levels of financial development. Beck (2015) further argued that what is captured by private credit differs among countries at different income levels because the roles of banks differ. In low- or middle-income countries, bank assets tend more to be composed of low-risk assets such as government bonds and corporate lending, lending to small and medium-sized enterprises (SMEs) or households.

For instance, Agbeja, Adelakun and Olufemi (2015) opined that for a bank to be successful in its operations, managers must weigh complex trade-offs between growths, return and risk, favoring the adoption of risk-adjusted metrics. Bank's performance measures can be classified into traditional, economic and market-based. For example, Stern, Stewart and Chew (1995) developed a model called Economic Value Added (EVA) which takes into account the opportunity cost for stockholders to hold equity in a bank, measuring whether it generates an economic rate of return higher than the cost of invested capital in order to increase its returns. Amassoma, Wosa and Olaiya (2012) were of the view that the adoption of Structural Adjustment Programme (SAP) in Nigeria as offering a sea of policy changes in financial development in Nigeria. To these authors, the deregulation exercise in the financial system, led to the adoption of indirect monetary policy with the open market operation as the primary tool which was complemented by reserve requirements, discount window operations, foreign exchange market intervention and injection/withdrawal of public sector deposits in and out of the Deposit Money Banks. These in aggregate have the capacity of impacting the income of banks in the case of Nigeria. Has this been the case? This study intends to investigate how financial deepening has contributed to the income of banks in Nigeria. The objective of this study is to examine the effect of financial deepening on income of deposit money banks in Nigeria.

2. Literature Review

McKinnon (1973) and Shaw (1973) developed a theoretical model that explains the growth inducing effects of financial liberalization. It emphasized the contribution of financial development to the growth of an economy. The theoretical specification of the financial deepening equation draws on the literature of finance and development which postulate a symbiotic relationship between the evolution of the financial system and the development of the real economy. However, the McKinnon/Shaw approach suggests that any distortion and limitation on the banking sector, such as interest rate controls, reserve and liquidity requirement, and government rationing of available credit to so-called priority sectors, inhibit financial development mainly by depressing the interest rate (Capannelli, 2009). The supply leading hypothesis enthuses that financial development is essential to economic growth. The leading proponent of the supply-leading hypothesis is Schumpeter, (1911) supported by Gurley and Shaw, (1967) and McKinnon (1973). The hypothesis asserts that

financial development has a positive effect on economic growth. Accordingly, the effect runs from financial development to economic growth and it is caused by an improvement in the efficiency of capital accumulation or an increase in the rate of savings as well as the rate of investment. One of the most significant effects of the supply-leading approach is that, as entrepreneurs have new access to the supply-leading funds, their expectations increase and new horizons (or possible alternatives) are opened up. However, any deficiency in savings due to government intervention negatively affects the efficiency and effectiveness of financial intermediaries, hence, the need for financial liberalization which is devoid of government unnecessary interference in the functioning of the market system.

The main argument of McKinnon (1973) and Shaw (1973) is that financial repression has a detrimental effect on financial development, and this can negatively affect the income generating efforts of banks. Financial repression implies a series of constraints and for these reasons, the intermediation process are not efficient and effective, hence, there may not be enough funds to be channeled into the productive sectors of the economy. This study is anchored on the supply leading hypothesis as postulated by Schumpeter (1911).

A number of factors affect the income of deposit money banks (DMBs). Banks generate income from two broad sources, viz: net interest margin and non-interest income. Financial deepening measures the depth of financial intermediation in any given jurisdiction. Tabak & Cajueiro, (2011) argued that income diversification into non-interest income sources can help banks in the diversification of their income sources. Haque (2014) defined NIM as the balance of the interest income that the banks create and the amount of interest received by depositors. Vithyea (2014) attributed banks' product diversification to financial deregulation which encourages banks to be involved in non-traditional banking activities, such as cash management, bank account management and other off-balance sheet services. Fees from these services are normally regarded as non-interest margin. Marozva (2015) pointed out that majority of empirical work in the literature used net interest margin (NIM) as proxy for bank profitability. The significance of non-interest income of banks was emphasized by Bapat and Sagar (2016) when they argued that with increased pressure on interest income, banks are looking at the option of enhancing income from non-inter sources. Gundogdu and Taskin (2017) averred that NIM is another measure of bank performance but equally determines the efficiency of the banking system. Another common measure of profitability is called the net interest margin (NIM) which is the difference between interest income and interest expenses as a percentage of total assets. A bank's primary intermediation function is to issue liabilities and use the proceeds to purchase income-earning assets. If a bank manages its assets and liabilities in such a way that the bank earns reasonable income on its assets and has low costs on its liabilities, profits will be high (Ogunbiyi & Ihejirika, 2015). However, how well a bank manages its assets and liabilities is affected by the spread between the interest earned on the bank's assets and the interest costs on its liabilities. Net interest margin measures this spread. If the bank can raise funds with liabilities that have low interest costs and acquire assets with high interest income, then net interest margin will be high, and the bank is likely to make high profit. If the interest cost of its liabilities rises relative to the interest earned on its assets, then the net interest margin will fall, and bank profitability will be affected.

Non-Interest income is the revenue derived mostly from fees and other activities outside the core activity of lending. This is defined as revenue that banks earn from areas outside their lending activities other than its core intermediation business of taking deposits and creating loans (Khrawish, 2011). Unlike interest income, non-interest income is usually stable and largely unaffected by economic, financial and liquidity market cycles; it is usually not controlled by law or regulation (Chen, Huang & Zhang, 2015).

Non-interest income is largely grouped into Fee Income (Credit related) and Non-Fee Income. Examples of non-interest income include non-credit related fees and commissions, account maintenance charges, corporate finance/advisory fees, commission on foreign exchange transactions, trading income, e-business and digital banking income. According to Augie (2017), advances in information and communications technology (for example, e-business and digital banking), new intermediation technologies for processes like loan securitization and credit scoring, and the introduction and expansion of financial instruments and markets (high yield bonds,

commercial paper, cash swaps) all impact on the levels and types of non-interest income in deposit money banks.

The degree to which banks rely on non-interest fees to generate revenue is a function of the economic environment, technological advancement and local regulations. Some banks rely heavily on fees from e-business and digital banking, while most banks rely on general transaction banking fees (Kenton, 2018).

There is dearth of empirical literature on the effects of financial deepening on the income of deposit money banks in Nigeria, hence, the contributions of this study is germane Adenusi (2010) examined the implications of financial development for commercial bank savings mobilization and economic performance in Ghana since the pursuit of financial reforms Programme in September 1987. Structural Vector Autoregressive (SVAR) model on quarterly time series data spanning from 1987 to 2009 was employed. The empirical results suggested that, in Ghana, financial development enhanced the performance of commercial banks by way of savings mobilisation but were adversely impacted in the long-run. Amediku (2012) established that both interest and non-interest activities significantly impacted positively on bank performance in the case of Ghanian banks for the period: 2006 – 2010.

Tarus, Chekol and Mutwol (2012) showed that operating expenses and credit risk has a positive and significant effect on net interest margin of commercial banks in Kenya during the study period of 2000-2009. Oniang'o (2013) used regression analysis to establish the effect of non-interest income on the profitability of commercial banks in Kenya. The author found that non-in this connection. interest income positively impacted profitability of commercial banks in Kenya.

Sindani (2013) adopted a quantitative comparative design. The target population for this study was 44 banking institutions operating in Kenya as at 31st December 2011. The study established that the financial sector was stable during the study period as witnessed by the stable number of banking institutions following stringent regulations by the Central bank of Kenya which had reduced the frequency of commercial banks becoming bankruptcy. During the period of the study (2007-2011), financial sector deepening was high as the commercial banks strived to leverage their operations through adoption of new technologies including automation of bank process and adoption of Automated Teller Machines as opposed to offering their services only through physical brick and mortar branches. Zhou (2014) studied the effect of income diversification on bank risk in the case of commercial banks in Kenya during the 1997-2012 period and the empirical results showed that there is no significant relation between income diversification and bank risk.

Alshatti (2015) studied the effect of liquidity management on profitability in thirteen Jordanian commercial banks from (2005–2012). The liquidity indicators used are investment ratio, quick ratio, capital ratio, net credit facilities/ total assets and liquid assets ratio, while return on equity (ROE) and return on assets (ROA) are the proxies for profitability. The empirical results showed that quick ratio and investment ratio of the available funds have a direct relationship, while capital ratio and liquid assets ratio showed an inverse relationship with the banks' profitability.

Nganga (2016) investigated the relationship between financial deepening and economic growth in Kenya from 1994 to 2015. The study employed a causal and longitudinal research designs. The targeted population was 44 commercial banks in Kenya excluding a bank under receivership. Secondary data was collected from published documents of the Kenya Bureau of Statistics and Central Bank of Kenya. The study found a significant relationship between the financial deepening on economic growth in the long run and concluded that financial deepening propels economic growth because the variables of financial deepening were more significant in explaining economic growth, therefore supporting the supply leading hypothesis.

Olawumi, Lateef and Oladeji (2017) empirically investigated the relationship between financial deepening and bank performance using financial deepening (M2/GDP), ratio of credit to private sector-GDP, ratio of deposit liabilities-GDP as variables of financial deepening while performance measure of interest is profitability.

Findings revealed that each component of financial deepening indicators has a strong relationship and are statistically significant which provide empirical evidence that financial deepening made positive contributions to the level of profitability of the selected commercial banks in Nigeria. The study concluded that contributions of each component of financial deepening to selected commercial banks profitability is strong and are statistically significance.

3. Methods

Ex post facto research design was adopted in this study and secondary data were employed. Specifically, data were extracted from published financial statements of selected listed deposit money banks, (various issues). The population of the study comprised deposit money banks in Nigeria. Presently, there are 21 of such banks out of which only 15 are listed on the Nigerian Stock Exchange (NSE) during the period covered by the study. This study focused on only 10 of the deposit money banks listed based on the size of their deposit liabilities during the period of 2009-2018. Purposive sampling technique was adopted, hence, the following 10 banks that met the criteria of size of deposit liabilities and continuous listing throughout the period of study constituted the sample size of this study. The banks are:

Access Bank Plc, Diamond Bank Plc, First Bank Nigeria Plc, Guaranty Trust Bank Plc, Stanbic IBTC Bank Plc, Sterling Bank Plc, Union Bank of Nigeria Plc, United Bank for Africa Plc, Wema Bank Plc and Zenith Bank Plc.

Funtional Equation and Model

Hypothesized Relationship

Y=Dependent variable (Income)

X= Independent variable (Financial Deepening)

Inc = *f* (FD)

Inc = f ($RIBCPS_{it,}$ $RDLTA_{it}$, BSZ_{it}, BLR_{it})

Decomposing Inc into its various components, it becomes:

Inc = NIM and NII

NIM_{it}= f($RIBCPS_{it}$,$RDLTA_{it}$,BSZ_{it}, BLR_{it})

NII_{it}= f($RIBCPS_{it,}$ $RDLTA_{it,}$$BSZ_{it,}$ BLR_{it})

Hence, the econometric model for the regression analysis is:

$$NIM = \beta_0 + \beta_1 \ RIBCPS_{it} + \beta_2 RDLTA_{it} + \beta_3 BSZ_{it} + \beta_4 BLR_{it} + \mu_{it} \quad \text{(i)}$$

$$NII = \beta_0 + \beta_1 RIBCPS_{it} + \beta_2 RDLTA_{it} + \beta_3 BSZ_{it} + \beta_4 BLR_{it} + \mu_{it} \quad \text{(ii)}$$

Where:

FD = Financial Deepening

Inc = Income

NIM=Net Interest margin

NII=Non- interest income

RDLTA= Ratio of Deposit liabilities to Total Assets

RIBCPS=Ratio of individual banks credit to private sector to banks total assets

BSZ = Bank Size

BLR =Bank Lending Rate

β = Coefficients

μ= Stochastic error term

I = Cross sectional data

t = Time Series

Note
RIBCPS is a disaggregated value to proxy individual bank's credit to the private sector.
Bank size is proxied by total assets
BLR is a disaggregated value to proxy each bank's lending rate
Ratio of Credit to Private Sector (RCPS) and BLR are macroeconomic variables; meanwhile, due to the scope of the study, data were disaggregated into individual bank values since micro-economics is the foundation of macro-economics, hence, its use is justified.

4. Result

$$NIM = \beta_0 + \beta_1 RIBCPS_{it} + \beta_2 \text{RDLTA}_{\text{it}} + \beta_3 BSZ_{it} + \beta_4 BLR_{it} + \mu_{it} \quad \text{(i)}$$

$$NII = \beta_0 + \beta_1 RIBCPS_{it} + \beta_2 \text{RDLTA}_{\text{it}} + \beta_3 BSZ_{it} + \beta_4 BLR_{it} + \mu_{it} \quad \text{(ii)}$$

Table 1

Descriptive Statistics

	NII	NIM	RDLTA	RIBCPS	BSZ	BLR
Observations	100	100	100	100	100	100
Mean	27.66	5.56	70.30	42.43	21.05	21.86
Median	27.13	5.28	70.97	42.50	21.18	20.77
Maximum	46.76	9.02	100.88	72.79	22.51	34.62
Minimum	11.07	2.53	50.57	7.62	18.83	15.82
Std. Dev.	7.27	1.46	8.02	13.78	0.87	3.64
Skewness	0.50	0.36	0.17	0.10	-0.43	0.96
Kurtosis	3.05	2.71	4.13	2.33	2.50	3.73
Jarque-Bera	4.16	2.55	5.83	2.03	4.07	17.62
Probability	0.12	0.28	0.05	0.36	0.13	0.00

Source: Author's Computation (2020) using E-views 10 where NIM is Net Interest Margin, NII is Non-Interest Income, RDLTA is Ratio of Deposit Liabilities to Total Assets, RIBCPS is Ratio of individual Banks Credit to private Sector to Banks Total Assets, BSZ is Bank Size and BLR is Bank Lending Rate.

The study comprised ten (10) Deposit Money Banks carefully selected from the financial sector listed on the Nigerian Stock Exchange with consistent data for the period ranging from 2009 to 2018. Table 1 showed the number of observations, mean, median, maximum, minimum and standard deviation of each of the dependent and independent variables. There are two categories of variables to be discussed in this section. The first category is the dependent variables which are the Non- Interest Income (NII) and Net Interest Margin (NIM). The second category is the explanatory variables which include Ratio of Individual Bank's Credit to Private Sector to Banks Total Assets (RIBCPS), Ratio of Deposit Liabilities to Total Assets (RDLTA), Bank Size (BSZ) and Bank Lending Rate (BLR).

Dependent variable

As outlined earlier the parameters we considered as dependent variables for assessing Financial Deepening and Profitability of Selected Deposit Money Banks Listed in Nigeria in this study are: Non- interest Income (NII) and Net Interest Margin (NIM).

Non- interest Income (NII)

Non- interest Income (NII) is the revenue derived mostly from fees and other activities outside the core activity of lending. The average value of the ratio from 2009 to 2018 for the sleeted banks was 27.66% while the median value was 27.13% suggesting that the selected banks' average NII stood at 27.66% during the period and as a matter of fact, the ratios among the banks are not far from the average value. Besides, the minimum and maximum with standard deviation values are 11.07%, 46.76% and 7.27 respectively.

Net Interest Margin (NIM)

Net Interest Margin (NIM) is measured as the difference between the interest income generated by banks and the amount of interest expense paid out to their lenders relative to the amount of their assets. The average value of the ratio from 2009 to 2018 for the selected banks was 5.56% while the median value was 5.28% suggesting that the selected banks' NIM on average stood at 5.56% during the period and as a matter of fact, the ratios among the bank do not widely vary. Besides, the minimum and maximum with standard deviation values are 2.53%, 9.02% and 1.46 respectively.

Independent variables

Again, in this study, we used the following as proxies for Financial Deepening: Ratio of Individual Banks' Credit to Private Sector to Banks Total Assets (RIBCPS), Ratio of Deposit Liabilities to Total Assets (RDLTA), Bank Size (BSZ) and Bank Lending Rate (BLR)

Ratio of Deposit Liabilities to Total Assets (RDLTA)

This is measured as the Ratio of Deposit Liabilities to Total Assets. This shows the ability of a bank to meet depositors' obligations from its total assets. The mean value of RDLTA was 70.30% while the median value was 70.97% indicating that the ratio of the total deposits to the asset was 70.30% on average and that the customers' deposit is about 70% (approximately) of the banks' assets during the period. In addition, the results showed that these ratios for the banks are relatively close. In addition, the minimum and maximum values of 50.57% and 100.88% with a standard deviation value of about 8.02 showed that during the period, one of the banks' assets is lower than the deposits from the customers.

Ratio of Individual Banks' Credit to Private Sector to Banks Total Assets (RIBCPS)

Focusing on the Ratio of Individual Bank's Credit to Private Sector to Banks' Total Assets, the mean value was 42.43% while the median value was 42.50% suggesting that on average, the banks' Credit to Private Sector is about 42.43% of the Total Assets. Besides, the minimum and maximum values of 7.62% and 72.79% respectively with a standard deviation of 13.78 showed that during the period, the banks approved as low as 7.62% of their assets as loans to the private sector and on the other hand, banks approved as high as 73% (approximately) of their total assets as loans to the private sector.

Bank Size (BSZ)

Bank Size is computed as the natural logarithm of total assets. As can be seen in Table 1, the average and median values of BSZ were 21.05 and 21.18 respectively. These indicate that the banks are relatively similar in terms of size. In addition, the minimum and maximum values of 18.83 and 22.51 with a standard deviation value of 0.87 further confirmed that during the period, all the banks' assets do not vary much.

Bank Lending Rate (BLR)

Bank Lending Rate is Individual bank lending rate. As seen from in Table 1, the average and median values of Bank Lending Rate were 21.86% and 20.77% respectively. These showed that the interest at which the banks lend to customer during the period was 22% (approximately). The average and median values of these interest rates among the banks vary relatively. In addition, the minimum and maximum values were 15.82% and 34.62% respectively with a standard deviation of 3.64%.

Generally, the Skewness, Kurtosis and especially J-Bera indicated that all the variables with the exception of Non-Interest Income (NII), Net Interest Margin (NIM), Ratio of Individual Banks' Credit to Private Sector to Banks' Total Assets (RIBCPS) and Bank Size (BSZ) are not normally distributed.

Table 2: Lagrange Multiplier and Hausman Test for Net Interest margin and Financial Deepening

Tests	Chi2	P-Value
Breusch-Pagan Lagrange Multiplier (LM)	42.232	0.000
Hausman test	11.049	0.026

Source: Author's Computation (2020), with underlying data from annual reports of selected banks listed on the Nigerian Stock Exchange (NSE).

Interpretation of Results

The regression result of Financial Deepening on the Net Interest Margin of (NIM) of Deposit Money Banks listed in Nigeria from 2009 to 2018 in terms of Net Interest Margin (NIM) using the pooled (OLS), random effect and fixed effect models are presented in this subsection. In achieving this, the variable that is regarded as dependent variable is Net Interest Margin (NIM) while the explanatory variables are Ratio of Individual Banks Credit to Private Sector to Banks Total Assets (RIBCPS), Ratio of Deposit Liabilities to Total Assets (RDLTA), Bank Size (BSZ) and Bank Lending Rate (BLR). From the results in Table 2, the Breusch and Pagan Lagrange multiplier (LM) [42.232 (p –value = 0.000)] and Hausman [11.049 (p–value = 0.026)] tests results for the model showed that the preferred model is Fixed Effect regression model. Therefore, the Fixed Effect regression model in column (3) of Table 2 is considered appropriate to establish the relationship that exists between Financial Deepening and Income of selected Deposit Money Banks Listed in Nigeria from 2009 to 2018 in terms of Net Interest Margin (NIM).

Table 3: Regression result of Net Interest margin and Financial Deepening

Variable	Pooled Coeff. Std. Dev. ( ) Prob.[ ]	Random Coeff. Std. Dev. ( ) Prob.[ ]	Fixed Coeff. Std. Dev. ( ) Prob.[ ]
Constant	1.985 (2.643) [0.455]	8.732** (4.086) [0.035]	18.8*** (4.844) [0.000]
RIBCPS	-0.017 (0.012) [0.157]	-0.001 (0.012) [0.965]	-0.002 (0.012) [0.900]
RDLTA	0.023 (0.015) [0.132]	0.014 (0.017) [0.413]	0.008 (0.016) [0.638]
BSZ	0.206* (0.120) [0.088]	-0.184 (0.200) [0.358]	-0.682*** (0.234) [0.005]
BLR	-0.077** (0.038) [0.044]	-0.012 (0.032) [0.701]	0.030 (0.031) [0.339]
Observations	**100**	**100**	**100**
R^2	**0.100**	**0.018**	**0.526**
Adj. R^2	**0.060**	**-0.024**	**0.454**
F-Statistic	**2.577**	**0.425**	**7.349**
Prob. (F-Stat.)	**0.042**	**0.790**	**0.000**

Source: Author's Computation (2020) with underlying data from annual reports of banks listed on Nigerian Stock Exchange (NSE). Note: The dependent variable is NIM which is Net Interest Margin. The Independent variables are Ratio of Deposit Liabilities to Total Assets (RDLTA), Ratio of Individual Banks Credit to Private Sector to Banks Total Assets (RIBCPS), Bank Size (BSZ) and Bank Lending Rate (BLR). ; *** p<0.01, ** p<0.05, * p<0.1

Interpretation of Result

Based on the result in column 3 of Table 3, the F-statistics value [7.349; p - value = 0.000) showed that the explanatory variables are jointly statistically significant in explaining the variations in the dependent variable, Net Interest Margin (NIM). The coefficient of determination (Adjusted R^2) value of 0.454 indicated that the explanatory variables were able to explain about 45.4% changes that occurred in the dependent variable.

Based on the results, the coefficient of Ratio of Individual Banks Credit to Private Sector to Banks Total Assets (RIBCPS) was negative and statistically insignificant within the 1% and 10% conventional level of significance (coefficient = -0.002; p–value = 0.900). Alternatively, the insignificant result suggested that the influence of Ratio of individual banks credit to private sector to banks total assets (RIBCPS) on Income of the Selected Deposit Money Banks in Terms of Net Interest Margin (NIM) is insignificant.

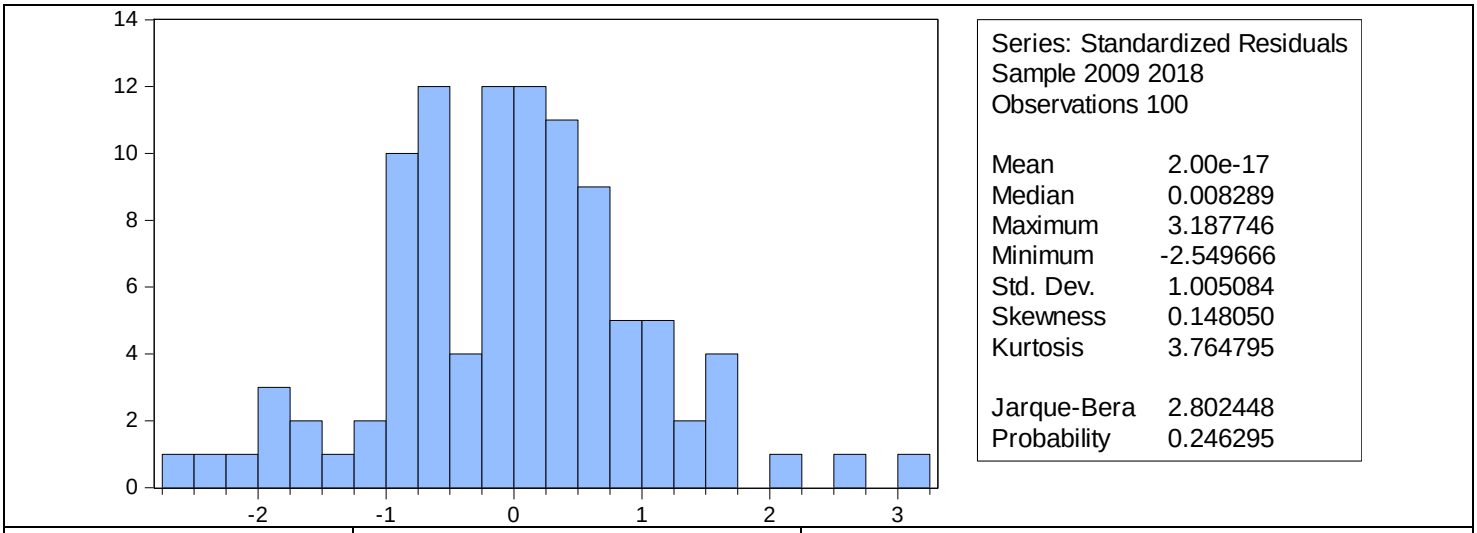
The results revealed that there is a positive and insignificant effect on Ratio of Deposit liabilities to Total Assets (RDLTA) and banks income in terms of Net Interest margin (NIM) (coefficient. = 0.008; P – value = 0.638). Alternatively, the insignificant result suggested that the influence of Ratio of Deposit liabilities to Total Assets (RDLTA) on Income of the selected banks in terms of Net Interest margin (NIM) is positive and insignificant.

Conversely, the results revealed that negative and significant effect exists between Bank Size (BSZ) and profitability in terms of Net Interest margin (NIM) at 1% significance level (coefficient. = - 0.682; p–value = 0.005). Then again, the significant result suggested that the influence of Bank Size (BSZ) on Income of the

selected banks in terms of Net Interest margin (NIM) is negative and significant. The results further revealed that positive and insignificant relationship exists between Bank Lending Rate (BLR) and banks Income in terms of Net Interest margin (NIM) (coefficient. = 0.030; p–value = 0.339). It also suggested that the influence of Bank Lending Rate (BLR) on Income of the selected banks in terms of Net Interest margin (NIM) is insignificant.

The F-statistics depicts the overall statistical significant of the effect of financial deepening on Net Interest Margin. Giving the F-statistics value of 7.349 with the probability value of 0.000 showed that the financial deepening have statistical effect on Net Interest Margin of the deposit money banks in Nigeria.
Decision: Hence the null hypothesis of no significant effect of financial deepening on Net Interest Margin of deposit money banks listed in Nigeria was rejected.

Figure 1: Diagnostic Tests for Net Interest margin and Financial Deepening



Test	**Breusch-Pagan LM Cross-Section Dependence Test**	**Heteroskedasticity**
Stat.	42.220	13.764
P-value	0.641	0.184

Source: Author's Computation 2020, underlying data from annual reports of banks listed on the Nigerian Stock Exchange (NSE).

Diagnostic Tests for Net Interest margin and Financial Deepening

In this study, we used Jarque-Bera statistic to check whether the residual (error term) of the estimated model when the Net Interest Margin is regressed on Financial Deepening indicators is normally distributed. From Figure 1, the test statistics (2.802) and its associated p-value (0.246) are statistically insignificant. This means that the residual is normally distributed. For heteroskedasticity test, the insignificant value of p-value suggests the acceptance of the null hypothesis of homoskedastic. This means that the model is free from heteroskedasticity problem. Further, the insignificant value of P-value of Breusch-Pagan LM Cross-Section Dependence Test result showed that the residual is free from cross-section dependence (correlation).

Table 4: Breusch and Pagan Lagrange multiplier and Hausman Test for Non- interest Income and Financial Deepening

Tests	Chi2	P-Value
Breusch-Pagan Lagrange Multiplier (LM)	30.042	0.000
Hausman test	2.495	0.646

Source: Author's Computation (2020), with underlying data from annual reports of selected banks listed on the Nigerian Stock Exchange (NSE).

Interpretation of Result

According to the result in Table 4 the Breusch and Pagan Lagrange multiplier (LM) and Hausman tests results for the model are [30.042 (p –value = 0.000)] and [2.495 (p –value = 0.646)] respectively. These showed that the available data is poolable. That is, Pooled (OLS) model is not appropriate for this particular relationship; rather Random Effect model is appropriate.

Table 5: Regression result of Non- interest Income and Financial Deepening

Variable	Pooled Coeff. Std. Dev. ( ) Prob.[ ]	Random Coeff. Std. Dev. ( ) Prob.[ ]	Fixed Coeff. Std. Dev. ( ) Prob.[ ]
Constant	40.466** (17.921) [0.026]	41.359 (42.537) [0.334]	64.164 (43.148) [0.141]
RIBCPS	0.002 (0.051) [0.964]	-0.200*** (0.072) [0.007]	-0.176** (0.076) [0.023]
RDLTA	-0.176* (0.094) [0.066]	0.025 (0.104) [0.81]	0.055 (0.103) [0.595]
BSZ	0.431 (0.666) [0.520]	-0.012 (1.851) [0.995]	-1.288 (1.968) 0[0.515]
BLR	-0.440* (0.225) [0.054]	-0.307 (0.363) [0.400]	-0.265 (0.297) [0.374]
Observations	**100**	**100**	**100**
R^2	**0.083**	**0.291**	**0.484**
Adj. R^2	**0.045**	**0.184**	**0.406**
F-Statistic	**2.160**	**2.717**	**6.216**
Prob. (F-Stat.)	**0.079**	**0.002**	**0.000**

Source: Author's Computation (2020), with underlying data from annual reports of selected banks listed on the Nigerian Stock Exchange (NSE). Note: The dependent variable is NII= Non-interest Income. The Independent variables are Ratio of Deposit Liabilities to Total Assets (RDLTA), Ratio of Individual Banks Credit to Private Sector to Banks Total Assets,(RIBCPS), Bank Size (BSZ) and Bank Lending Rate (BLR). ; *** p<0.01, ** p<0.05, * p<0.1

Interpretation of Results

From the results in column 2, of Table 5, the F-statistics value [2.717; p - value = 0.002) showed that the explanatory variables are jointly statistically significant in explaining the variations that occurred in the dependent variable, Non- interest Income (NII). The coefficient of determination (Adjusted R^2) value of 0.184

indicated that the explanatory variables were able to explain about 18.4% changes that occurred in the dependent variable.

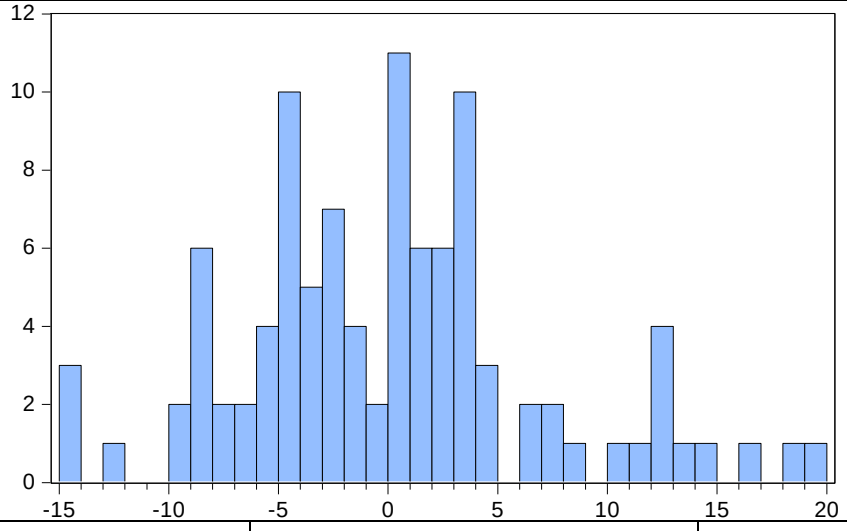
As in Table 5, the inferences from the results showed that the coefficient of Ratio of Individual Banks' Credit to Private Sector to Banks' Total Assets (RIBCPS) appeared to be negative and statistically significant at 1% levels. This is evident in the coefficient which is (-0.200; p – value = 0.007). This suggested that Ratio of Individual Banks' Credit to Private Sector to Banks' Total Assets (RIBCPS) had negative and significant effect on Non- Interest Income of the selected banks. Alternatively, the significant result suggested that the influence of Ratio of Individual Banks Credit to Private Sector to Banks Total Assets (RIBCPS) on Income of the selected banks in terms of Non- interest Income (NII) is highly significant. Also, it showed that a unit rise in RIBCPS leads to about 0.200 units reduction in Non- Interest Income (NII).

On the contrary, the coefficient of Ratio of Deposit Liabilities to Total Assets (RDLTA) was positive and insignificantly related to Non- interest Income (NII) (coefficient. = 0.025; p – value = 0.810). This implied that RDLTA had positive and insignificant effect on Non- Interest Income of the selected banks. The insignificant result further suggested that the influence of Ratio of Deposit liabilities to Total Assets (RDLTA) on Income of the selected banks in terms of Non- interest Income (NII) is positive and insignificant.

Also, Bank Size (BSZ) showed a negative and insignificant effect on Bank Size (BSZ) and banks' profitability in terms of Non- interest Income (NII) (coefficient = -0.012; p – value = 0.995). This suggested that the influence of Bank Size on Income of the selected banks in terms of Non-interest Income (NII) is negative and insignificant. Furthermore, the results revealed that negative and insignificant effect existed between Bank Lending Rate (BLR) and banks profitability in terms of Non- interest Income (NII) (coefficient = - 0.307; p – value = 0.400). The insignificant result suggested that the influence of Bank Lending Rate on Profitability of the selected banks in terms of Non- interest Income (NII) is insignificant.

Giving the F-statistics value of 2.717 with the probability value of 0.002 showed that the financial deepening had statistical effect on non-interest income of the deposit money banks in Nigeria on 5% inference.
Decision: The study rejected the null hypothesis of no significant effect of financial deepening on Non Interest-Income of deposit money banks listed in Nigeria. Therefore the study concluded that there is significant effect of financial deepening on Non Interest-Income of deposit money banks listed in Nigeria.

Figure 2: Diagnostic Tests for Non- interest Income and Financial Deepening



Test	Breusch-Pagan LM Cross-Section Dependence Test	Heteroskedasticity

Stat.	51.441	40.882
P-value	0.236	0.000

Source: Author's Computation 2020, underlying data from annual reports of banks listed on the Nigerian Stock Exchange (NSE).

Diagnostic Tests for Non-interest Income and Financial Deepening

Also, this study used Jarque-Bera statistics to check whether the error term of the estimated model when the Non-Interest Income is regressed on Financial Deepening indicators is normally distributed. From the Figure 2, the test statistics (4.4099) and its associated p-value (0.110) are statistically insignificant. This means that the residual is normally distributed. For heteroskedasticity test, the significant of p-value suggests rejection of the null hypothesis of homoskedastic. Therefore, the study used heteroskedasticity consistent with the standard error. Further, the insignificant value of P-value of Breusch-Pagan LM Cross-Section Dependence Test result showed that the residual is free from cross-section dependence (correlation).

5. Discussion

Empirically, the findings of this research revealed that financial deepening had significant effect on income of Deposit Money Banks listed in Nigeria. This finding is in line with theoretical expectation and also in line with empirical findings in studies by Oniang'o (2013), Tabak and Cajueiro, (2011), Amediku (2012).

6. Conclusion and Recommendation

In accordance, with the results obtained from the regression analysis, with positive and significant relationship between financial deepening and income, the following recommendations were given:

i. Monetary authorities should have a policy rethink by putting guidelines in place that will encourage more credit from the Deposit Money Banks to the private sector especially the MSMEs in order to deepen the financial sector since their effects were negative but significant on Net Interest Margin.
ii. Deposit money banks should focus more attention on the spread between interest income and interest expense in order to boost their Net-Interest Margin.
iii. Deposit money banks should broaden their Non-Interest Income base by widening the scope of services they render towards boosting earnings from non-interest yielding activities due to the significant but negative effect of the independent variables on the Non-Interest Income.

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