

# Effect of Selected Macroeconomic Variables on the Profitability of Deposit Money Banks in Nigeria: 2007-2018

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**Abstract** This study examines the effect of selected macroeconomic variables on the profitability of deposit money banks in Nigeria. The study is based on the arbitrage pricing theory (APT) propounded by Ross (1976) and secondary data was used for the study. The hypotheses were tested using the OLS multiple regression analysis and results reveal that, Interest rate ( $H_{01}$ ) with  $B = -0.254$ ,  $t = -0.237$ ,  $p = .819$ ; Exchange rate ( $H_{02}$ ) with  $B = -0.076$ ,  $t = -2.093$ ,  $p = .075$  Gross domestic product ( $H_{03}$ ) with  $B = 0.643$ ,  $t = 0.545$ ,  $p = .602$  and Inflation rate ( $H_{04}$ ) with  $B = 0.182$ ,  $t = 0.343$ ,  $p = .743$  are not significant predictor of Net interest margin. The implication is that, the selected macroeconomic variables are not a significant predictor of deposit money bank profitability for the period of study.

**Keywords:** macroeconomic variables, profitability, multiple regression, deposit money banks

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## 1. Introduction

The effect of macroeconomic variables on the performance of banks has been an important point of interest to scholars in the current trend of research in finance. It is commonly concluded that the performance of commercial banks can be affected by internal and external factors. According to Ongore [1] the internal factors are regarded as bank specifics which affect the bank's performance, these factors are basically influenced by the internal decisions of management and board. While the external factors are sector wide or country wide factors which are beyond the control of the banks and affect their profitability [1]. These external factors include macroeconomic variables such as interest rate, gross domestic product, inflation and exchange rate. This study focused on the effect of selected macroeconomic variables on the profitability of deposit money banks (DMBs) in Nigeria. This study considered interest rates, exchange rate, gross domestic product and inflation rate and attempted to examine the association between these variables and the profitability of DMBs in Nigeria. The essence is to ascertain the extent to which the selected macroeconomic variables are able to predict the profitability of DMBs in Nigeria.

Macroeconomic variables such as interest rate, exchange rate, gross domestic product and inflation rate has the capacity of expanding or contracting bank lending behaviour through the bank lending channels [2,3]. Interest rate for instance, is an important factor in the survival of DMBs especially as changes could affect banks' overall profitability. This is elucidated in the difference between the lending rate and deposit rate referred to as interest rate spread. Interest rate spread helps to generate a sufficient margin for banks to continue their businesses since the spread is used to cover their operating expenses and other costs of performing intermediation function. According to Mirzaei, Moore and Liu [4], interest rate spread will be a crucial factor to raise the profits of emerging banks. This variable will determine the ability and willingness of banks to demand and channel funds to the market. Banks would adjust interest rate in order to raise revenue especially in emerging economies.

The variability of foreign exchange rates also, is a potentially interesting factor that drives the level of profitability of deposit money banks as it affects their financial intermediation process. Fluctuations in exchange rate may be a source of risk to an organization as well as deposit money bank. Huge losses in foreign exchanges may result to organizations failures in addition to instigating enormous burdens on profitability. Study carried out by scholars show that there is a relationship

between exchange rate fluctuations and financial performance and that exchange rate fluctuation is a source of potential risk to the profitability of deposit money banks [5,6,7,8,9].

Also, theoretically, real GDP growth positively affects banking performance through three main channels: net interest income, loan losses improving, and operating costs [10,11,12]. Firm's profitability increases during economic expansion, and declines in recession period. Thus, a higher GDP growth causes firms loans and deposits to increase and that in turn improves bank's net interest income and loans losses. Furthermore, a higher GDP growth implies a higher disposable income and lower unemployment and reduces defaults on consumer loans. Net interest income and loan losses are therefore pro-cyclical with GDP growth. However, the relation between banks' operating costs and GDP growth is ambiguous. Bolt et al. [11] show that unfavourable economic conditions, such as lower GDP growth rates may decrease deposits and loans and its managing costs as well. These conditions may possibly raise the costs of collecting payments on loans.

In similar vein, Revell [13] noted that variations in bank profitability can be strongly explained by the level of inflation. According to the literature, Revell [13] introduced the relationship between bank profitability and inflation, stating that the effect of inflation on bank profitability depends on how inflation affects both salaries and the other operating costs of the bank (overheads). An increase in inflation rate may raise salaries and operating costs, and therefore decrease bank's profitability. However, if the inflation rate is fully anticipated by the bank's management, the bank can adjust interest rates appropriately to increase revenues faster than costs, which should have a positive impact on profitability [14].

On the other hand, profitability of deposit money banks is measured through the following variables; Return on equity (ROE), which is the ratio of banks' profit to the total amount of shareholders equity. Return on asset (ROA) which is the ratio of banks' income to its total asset [15]. Net Interest Margin (NIM) is a measure of the difference between the interest income generated by banks (from loans and advances) and the amount of interest paid out to their lenders (for example, deposits). It is usually expressed as a percentage of what the financial institution earns on loans at a specific time period and other assets minus the interest paid on borrowed funds and deposits divided by the average amount of the assets on which it earned income in that time period (the average earning assets). The NIM variable is the net interest income divided by total earnings assets [16]. It measures the gap between the interest income the bank receives on loans and securities and interest cost of its borrowed funds. It reflects the cost of bank intermediation services and the efficiency of the bank. The higher the net interest margin, the higher the bank's profit and the more stable the bank is. Thus, it is one of the key measures of bank profitability. The NIM is adopted as proxy for profitability of DMBs in Nigeria for this study.

This study therefore, sought to examine the effect of four macroeconomic variables (interest rate, exchange rate,

gross domestic product growth and inflation) on DMBs profitability (measured by net interest margin) in Nigeria, from 2007 to 2018. This study differs from previous ones by employing Net Interest Margin as proxy for DMBs profitability. Literature has it that most studies in Nigeria utilized the return on assets or return on equity as proxy for profitability.

## 2. Theoretical Framework and Literature Review

### 2.1. Theoretical Framework

This study is based on the Arbitrage Pricing Theory (APT) proposed by Ross [17]. Ross [17] introduced the Arbitrage Pricing Theory (APT) as an alternative to the Capital Asset Pricing Model (CAPM). The APT is a multifactor model that has the potential to overcome CAPM weaknesses: it requires less and more realistic assumptions to be generated by a simple arbitrage argument and its explanatory power is potentially better. The APT permits the researcher to choose whatever factors that provides the best explanation for the data but it cannot explain variation in asset return in terms of a limited number of easily identifiable factors.

According to Ross [17] APT essentially seeks to measure the risk premium attached to various risk factors and attempts to assess whether they are significant and if they are priced into stock market returns. By employing factor analysis, he asserted that there are several systematic factors (industry specific and macroeconomic) that affect the security returns besides a security's beta, that is, the sensitivity of the individual security to the changes in the market return, such as gross domestic product, inflation and the structure of interest rates and so on, which could affect the firms differently.

Therefore, in examining the relationship between bank performances and some selected macroeconomic variables, the APT suffices. This is given that; the APT is based on Multi-factor linear model which permits a combination of factors in determining bank performance. The APT provides ideal theoretical foundations for the study since the study considers selected macroeconomic factors.

### 2.2. Empirical Literature

Some related empirical works by scholars are reviewed and presented below.

From the summary of empirical review in Table 1, there appears to be contradictions in the findings of the various works done by researchers reviewed. For instance, Staikouras and Wood [30] found that interest rate has a positive significant effect but GDP growth has a significant negative impact on ROA, while Ifuero and Chijuka [23] found that there is a positive relationship between GDP and ROE and a negative relationship between inflation and interest rate and ROE. These contradictions should form the basis for further research to ascertain the reason for the contradictions in research findings.

Table 1. Summary of Empirical Literature

S/N	Author/Date	Objectives/Title	Problem	Methodology	Result
1	Athanasoglou, Brissimis and Delis [18]			GMM estimator approach	There is a significant positive effect of interest rate and inflation on profitability.
2	Akani et al. [2]	Investigates the effects of selected macroeconomic shocks on the performance of Nigerian banks.	Concerned about the falling bank performance and the extent to which macroeconomic variables affects performance.	The Johansen co-integration test, Vector Error (VECM) and Granger Causality tests were used to determine the extent to which the independent variables were used to affect the dependent variables.	Positive and significant relationship exists between selected macroeconomic variables and Commercial Banks performance in Nigeria.
3	Brunilda and Elvana [19]	To investigate the profitability behaviour of bank-specific, industry related and macroeconomic determinants in Albania.	Paucity of research in this area in Albania.	Multi linear regression analysis with secondary data using a sample of data from 16 banks in the period 1999 – 2014.	The results shows that almost all the factors were significant.
4	Combey and Togbenou [20]	Investigates short-run and long-run relationship between three main macroeconomic indicators (gross domestic product growth, real effective exchange rate, and inflation) and banking sector profitability (measured by return on assets and return on equity) in Togo, from 2006 to 2015.	Stylized facts raise questions about banking sector performance and macroeconomic environment nexus in Togo: Does macroeconomic factors affect banking sector performance in term of profitability?	Pool Mean Group Estimator	Results show that, in the short-run, banks' return on assets and return on equity are not related to macroeconomic variables. While, in the long-run, real gross domestic product growth and real effective exchange rate affect negatively and statistically significant banks' return on assets, while inflation rate has no effect.
5	Davydenko [21]			Fixed effects estimation method.	Inflation and gross domestic product have a positive relationship with ROA of banks in Ukrain.
6	Ghazi [22]	To identify the macroeconomic factors that affects the performance of commercial banks.	Do macroeconomic factors affect the degree of performance of commercial banks that are operating in Jordan?	used multiple regression analysis (Pooled Data Regression)	Positive correlation exists between financial performance and most of the independent variables as confirmed by the regression analysis.
7	Ifuero and Chijuka [23]	Investigate the impact of macroeconomic variables on profitability of banks in Nigeria from 1990-2013.	Recent evidence for the period of the global financial crisis is scarce till date in Nigeria.	Pooled Ordinary least square regression method	Positive relationship exists between gross domestic product (GDP) and return on equity (ROE). Interest rate and inflation rate have a negative relationship with return on equity (ROE).
8	Kiganda [24]	To establish effect of macroeconomic factors on bank profitability in Kenya with Equity bank in focus to understand country and bank specific characteristics.	Owing to the fact that there are few studies on the determinants of bank profitability, various studies indicate divergent views on the effect of macroeconomic factors on bank profitability. For these reasons, it is not clear whether or not macroeconomic factors affect bank profitability in Kenya.	The study was modelled on the theory of production and based on correlation research design and employed OLS to establish the relationship between macroeconomic factors and bank profitability	Macroeconomic factors (real GDP, inflation and exchange rate) have insignificant effect on bank profitability in Kenya with Equity bank in focus at 5% level of significance.
9	Ogunbiyi and Ihejirika [25]	Examined how interest rates affect the profitability of deposit money banks in Nigeria	As Interest rates keeps on changing as can be seen from the unstable interest rate regime in Nigeria, such frequent changes could affect banks' profitability. The question thus is: what truly is the relationship between interest rates and Deposit Money Banks' profitability?	Multivariate regression analysis under an econometric framework.	Maximum lending rate, Real Interest rate and Savings deposit rate have negative and significant effects on the profitability of Nigerian deposit money banks as measured by return on assets at the 5% level of significance.
10	Otambo [26]	To determine the effect of macro-economic variables on financial performance of commercial banking sector in Kenya.	The impact of macro-economic variables on financial performance of commercial banks in Kenya is yet to be fully explored and previous studies relied on one macro-economic variable and those that focused on several variables arrived at conflicting results.	Descriptive and correlational study.	There is a strong (R=0.792) relationship between macro-economic variables and financial performance of commercial banks.

S/N	Author/Date	Objectives/Title	Problem	Methodology	Result
11	Pasiouras and Kosmi [27]	Observed local and non-local commercial banks performance in 15 EU countries within a period of six years (1995-2001).			Profitability of local and non-local banks is affected by bank definite tenets and also by financial market arrangement and macroeconomic conditions
12	Saral and Muhammad [28]	Investigates the impact of macroeconomic variables on profitability of public limited commercial banks in Pakistan for years 2001-2011.	Pakistan is dominated by Commercial Banks and as such it is of vital concern to associate their profitability with country's progress.	Pooled Ordinary Least Square (POLS) method	The selected macroeconomic factors are found to have a negligible impact on earnings of commercial banks
13	Simiyu and Ngile [29]	To investigate the effect of macroeconomic variables on financial profitability of listed commercial banks in the Nairobi Securities Exchange (NSE) for years 2001 to 2012.	Lack of consensus of various studies indicate that to establish how these factors affect company profitability in a country, a study needs to be carried out.	Panel data analysis using Fixed Effects model was applied on the data to examine the effects of three major macroeconomic variables which included: Gross Domestic Product (GDP), Exchange rates, and interest rates on profitability of the listed commercial banks.	Real GDP growth rate had positive but insignificant effect on profitability of commercial banks. Further, real interest rates had a significant negative influence on profitability of listed commercial banks in Kenya. While the exchange rate had a positive significant effect on the profitability
14	Staikouras and Wood [30]	Reviewed the performance of banking industry in Europe between the period 1994 to 1998		The ordinary least square technique and fixed effects model	Interest rate has a positive significant effect but GDP growth has a significant negative impact on ROA.
15	Zawadi [31]	Investigates the effect of bank specific and macroeconomic factors on banks' profitability in Tanzania. Despite the monetary authorities' effort to stabilize the banking system, it is still germane to know what factors affect banks profitability in order to influence policy making in the banking industry in Tanzania.	The banking sector in Tanzania has undergone substantial structural change since the liberalization of the sector in 1991 by introducing a series of banking reforms measures.	The fixed effects regression model was used on a panel data obtained from 23 banks from 2009 to 2013.	Bank-specific factors (that are affected by bank-level management) significantly affect banks' profitability in Tanzania. However, macroeconomic factors do not seem to significantly affect banks' profitability

Source: Author, 2019.

### 3. Methodology

#### 3.1. Description of Variables

The variables for this study are specified as follows. The profitability of DMBs is the response variable while the macroeconomic variables are the predictors.

Table 2. Variable Description

Acronym	Variable	Description
NIM	Net Interest Margin	It is the difference between the interest charged on loanable funds and the cost of the funds.
INTR	Interest Rate (Monetary policy rate)	The price of credit which like other price is determined by the forces of demand and supply; in this case, the demand and supply of loan able funds.
EXCR	Exchange Rate	The rate at which two national currencies exchange for each other. It is often expressed as the amount of domestic currency needed to buy one unit of foreign currency
GDP	Gross Domestic Product growth rate	The total value of everything produced by all the people and companies in the country. It doesn't matter if they are citizens or foreign-owned companies. If they are located within the country's boundaries, the government counts their production as GDP.
INFR	Inflation Rate	Refers to the measure of sustained increases in general level of price for goods and services which can reduce the purchasing power of money.



The NIM, INTR, GDP and INFR are recorded in percentages while the EXCR is in Naira. These selected macroeconomic variables have been successfully used by various researchers. Akabom-Ita [32] examines interest rate and net asset on profitability, Kiganda [24] examined real GDP, inflation and exchange rate on profitability.

### 3.2. Model Specification and Validity

The research adopted the APT theoretical framework by Ross [17] considered ideal for this study. In other to test hypotheses, multiple regression model is specified as an explanation for changes in the profitability of DMBs in Nigeria. The model is specified as follows:

$$NIM = f(INTR, EXCR, GDP, INFR) \quad (1)$$

This can be stated algebraically as follows:

$$NIM = \beta_0 + \beta_1 INTR + \beta_2 EXCR + \beta_3 GDP + \beta_4 INFR + \varepsilon \quad (2)$$

Where:  $\beta_0$  = Intercept;

$\beta_1$ -  $\beta_4$  = Coefficients of the regressors as defined above;  
 $\varepsilon$ = stochastic term.

A Priori:  $\beta_1, \beta_3 > 0, \beta_2, \beta_4 < 0$ .

### 3.3. Decision Rule

To assist in evaluating the effect of macroeconomic variables on the profitability of deposit money banks in Nigeria, the study's decision rule is to reject the null hypothesis when  $p < 0.05$  otherwise accept the alternative hypothesis.

## 4. Results and Discussions

### 4.1. Results and Discussions

The empirical findings for this study are presented below.

#### 4.1.1. Descriptive Statistics and Test of Normality

The model of this study used four variables (Interest Rate, Exchange Rate, Gross Domestic Product and Inflation Rate) as predictors to test for four hypotheses raised in the study against a dependent variable (Net Interest Margin). Table 3 gives the results of the descriptive statistics/analysis of the variables employed for the purpose of this study.

A minimum and maximum of 1.43% and 23.76% respectively were recorded for the response variable Net interest margin for the period under review. This therefore, gives a range of 22.33%. The mean Net interest margin is 11.83% while the standard deviation is 8.02%. These imply that, the average Net interest margin from 2007 to 2018 is 11.83% with a standard deviation of 8.02%. Also, the result shows the evidence of positive skewness of 0.24 Net interest income indicating a long right tail distribution. A negative kurtosis (-0.98) is reported for the Net interest income an indication of a flat (platykurtic) distribution. Large kurtosis ( $>3$ ) is indicative of a leptokurtic (peaked) distribution while small kurtosis ( $<3$ ) is indicative of a platykurtic (flat) distribution [33].

The predictor variable Interest rate recorded a minimum of 6.00% and a maximum of 14.00% interest rate within the period of study, which gives a range of 8.00%. The average Interest rate (mean) recorded was 11.13% with a deviation of 2.78%. Negative skewness of -0.90 was reported for Interest rate indicating a long left tail distribution. Also a small negative kurtosis (-0.14) is reported for the Interest rate an indication of a flat (platykurtic) distribution.

The second predictor variable Exchange rate showed a mean value of ₦185.90 and a standard deviation of ₦66.02. The minimum Exchange rate is ₦118.57 against a maximum value of ₦306.92 with a range of ₦188.35. The result also showed positive skewness of 1.18 reported for Exchange rate indicating a long right tail distribution. Also, a small negative kurtosis -0.01 is reported for the Exchange rate an indication of a flat (platykurtic) distribution.

The third predictor variable Gross domestic product gave -1.51% and 9.54% as minimum and maximum respectively with a range of 11.05% for the study period. The average GDP for the study period is 4.80% with a standard deviation 3.28%. A negative skewness of -0.51 is reported for the GDP indicating a long left tail distribution while a small negative kurtosis -0.41 is reported for the GDP, an indication of a flat (platykurtic) distribution.

Inflation rate which is the fourth predictor variable has a minimum rate of 6.60% and a maximum rate of 18.55% giving a range of 11.95% for the period under review. The mean inflation rate is 11.71% with a standard deviation of 3.53%. Inflation rate is positively skewed with the value 0.41 indicating a long right tail distribution while a small negative kurtosis -0.38 reported indicates a flat (platykurtic) distribution for the study period.

Table 3. Descriptive Statistics

Variable	Range	Min	Max	Mean	Std. Dev.	Variance	Skew.	Kurt.
NIM	22.33	1.43	23.76	11.83	8.02	64.32	0.24	-0.98
INTR	8.00	6.00	14.00	11.13	2.78	7.74	-0.90	-0.13
EXCR	188.35	118.57	306.92	185.90	66.02	4358.74	1.18	-0.01
GDP	11.05	-1.51	9.54	4.80	3.28	10.78	-0.51	-0.41
INFR	11.95	6.60	18.55	11.71	3.53	12.49	0.41	-0.38

Source: Author's SPSS Results, 2019.

Normal P-P Plot of Regression Standardized Residual

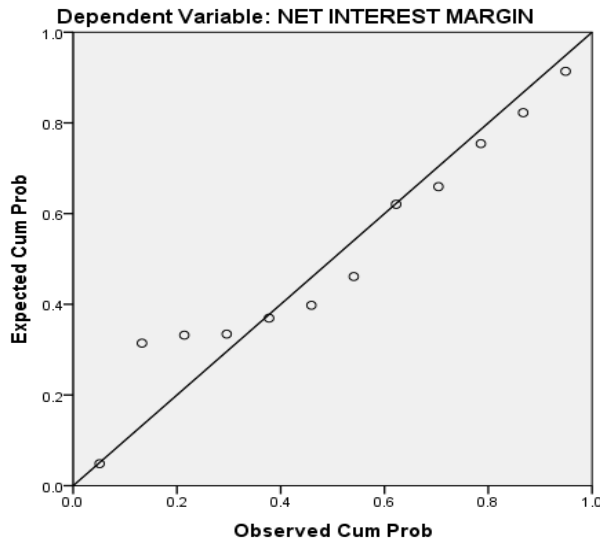


Figure 1. Normal P-P Plot of Regression Standardized Residuals (Source: Author, 2019)

Figure 1 above the Normal P-P Plot shows that dependent variable satisfies the assumption of normality. With the points (residuals) following the straight line, it is reasonable to assume that DV follows a normal distribution. This figure reasonably follows normality and is reflected as such.

4.1.2. Assessment of Regression Assumptions

Carefully assessing the variables, violation of multiple regressions was carried out, which failed to show violation of regression assumptions making it significant for use. Figure 1 above practically shows linearity with the standardized residuals reasonably following a straight line. Using Figure 2 below, to check for normality, the figure reasonably follows normality. In addition, to assess multicollinearity the Tolerance level should not be less than 0.10 and Variance Inflation Factor (VIF) in the regression model must not be more than ten (10). When such arise, that means there is a multicollinearity problem. From Table 4 below, the VIF table are all less than ten (10), which means they all fall within acceptable limits.

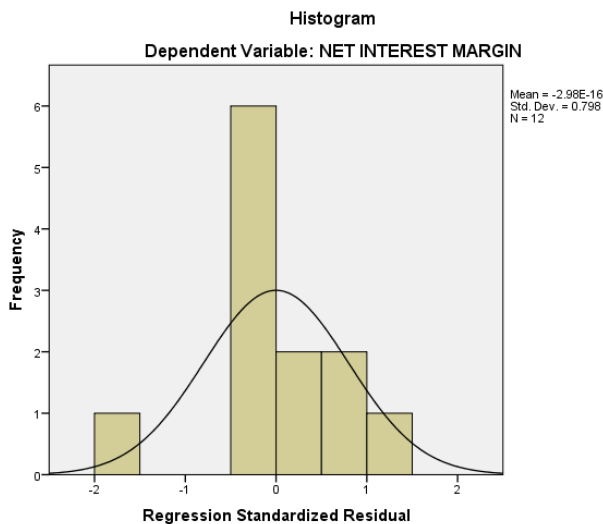


Figure 2. Histogram on Net Interest Margin (Source: Author, 2019)

Table 4. Tolerance and VIF Statistics

Model	Collinearity Statistics	
	Tolerance	VIF
INTEREST RATE	0.22	4.65
EXCHANGE RATE	0.33	3.03
GROSS DOMESTIC PRODUCT	0.13	7.82
INFLATION RATE	0.54	1.85

a. Dependent Variable: NET INTEREST MARGIN  
 Source: Author's SPSS Results, 2019.

4.1.3. Regression Analysis

This study attempts to examine the effect of macroeconomic variables on the profitability of deposit money banks in Nigeria. To achieve this, the study predicts profitability of deposit money banks in Nigeria proxied by net interest margin (NIM) using the predictor variables: interest rate (INTR), exchange rate (EXCR), gross domestic product (GDP) and inflation rate (INFR) from 2007 to 2018. Table 5 (ANOVA Table) below shows the overall significance of the model. The F-value and the P-value indicate that these variables (explanatory or predictor variables) are jointly significant in predicting the response variable  $F(4,7) = 6.676, p < 0.05$ . It means that the independent variables of the study are good predictors of the dependent variable; that is, they explain the dependent variable well.

Table 5. ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	560.559	4	140.140	6.676	.015 <sup>b</sup>
Residual	146.947	7	20.992		
Total	707.506	11			

a. Dependent Variable: NET INTEREST MARGIN  
 b. Predictors: (Constant), INFLATION RATE, INTEREST RATE, EXCHANGE RATE, GROSS DOMESTIC PRODUCT  
 Source: Author's SPSS Results, 2019.

Table 6. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.890 <sup>a</sup>	.792	.674	4.58175	1.322

a. Predictors: (Constant), INFLATION RATE, INTEREST RATE, EXCHANGE RATE, GROSS DOMESTIC PRODUCT  
 b. Dependent Variable: NET INTEREST MARGIN  
 Source: Author's SPSS Results, 2019.

The model summary on Table 6 above shows the predictive power or ability of the regression model as confirmed by the F-value, which explains the variation in the response variable measured as Net interest margin. This is measured using the R<sup>2</sup> statistics showing the explanatory variables explaining 79.20% of the variation in the response variable (Net interest margin) while the adjusted R<sup>2</sup> is 0.674, which shows 67.4% of variance in the net interest margin. This indicates that, the prediction power of the model is adequate. The remaining 20.8% are explained by other factors not captured in the model.

4.1.4. Test of Hypotheses

Test of hypothesis is achieved through evaluating the t-statistic with its significant value. Table 7 summarize the regression result of the model.

Table 7. Test of Hypotheses

Model	B	Std. Error	T	Sig.	Remark
1 (Constant)	23.609	22.84	1.034	.336	
INTEREST RATE (H0 <sub>1</sub> )	-0.254	1.07	-0.237	.819	Accepted
EXCHANGE RATE (H0 <sub>2</sub> )	-0.076	0.04	-2.093	.075	Accepted
GROSS DOMESTIC PRODUCT(H0 <sub>3</sub> )	0.642	1.18	0.545	.602	Accepted
INFLATION RATE(H0 <sub>4</sub> )	0.182	0.53	0.343	.742	Accepted

a. Dependent Variable: NET INTEREST MARGIN

Source: Author's SPSS Results, 2019.

**H0<sub>1</sub>: Interest rate does not significantly affect net interest margin of DMBs in Nigeria.**

**H1<sub>1</sub>: Interest rate significantly affect net interest margin of DMBs in Nigeria.**

The regression result shows that null Hypothesis (H0<sub>1</sub>) should be accepted. The result B = -0.254, t = -0.237, p = 0.080 indicates that interest rate is not a significant predictor of net interest margin of DMBs in Nigeria. It can also be seen from the result that interest rate has a negative but statistically insignificant effect on net interest margin for the period under review.

**H0<sub>2</sub>: There is no significant relationship between exchange rate and profitability of DMBs in Nigeria.**

**H1<sub>2</sub>: There is a significant relationship between exchange rate and profitability of DMBs in Nigeria.**

The null hypothesis is accepted according to the result of the regression analysis. The result, B = -0.076, t = -2.093, p = 0.075 indicates that exchange rate does not significantly predicts Net interest margin. Thus, exchange rate has a statistically insignificant negative effect on the net interest margin.

**H0<sub>3</sub>: Gross domestic product does not significantly affect the net interest margin of DMBs in Nigeria.**

**H1<sub>3</sub>: Gross domestic product significantly affects the net interest margin of DMBs in Nigeria.**

Based on the results of the regression analysis the null hypothesis is accepted. The regression result shows that; Gross domestic product (H0<sub>3</sub>) with B = 0.642, t = 0.545, p = 0.602 does not significantly predicts the net interest margin of DMBs in Nigeria. Though as shown in the result the gross domestic product has positive effect on the net interest margin but it is statistically insignificant for the period of the study.

**H0<sub>4</sub>: Inflation rate does not significantly affect the profitability of DMBs in Nigeria.**

**H1<sub>4</sub>: Inflation rate significantly affect the profitability of DMBs in Nigeria.**

As indicated in the results of the regression analysis, null hypothesis H0<sub>4</sub> is accepted. The result B = 0.182, t = 0.343, p = 0.742 provides sufficient evidence that inflation is not significant predictor of net interest margin. While inflation rate have a positive effect on net interest margin of DMBs for the period under review, it is statistically insignificant. The detailed result is shown on the coefficient table on appendix.

From the regression model stated in the methodology, the variables are therefore operationalized by substituting in the equation as follows showing its implications.

$$NIM = \beta_0 + \beta_1 INTR + \beta_2 EXCR + \beta_3 GDP + \beta_4 INFR$$

$$NIM = 23.609 - 0.254INTR - 0.076EXCR + 0.642GDP + 0.182INFR.$$

This indicates that if INTR increases by 1%, NIM will decrease by 0.254% holding other variables constant. This implies that INTR contributes negatively to the NIM but this is insignificant. Also, an increase in EXCR by 1%, leads to an insignificant decrease in NIM by 0.076% holding all other variables constant. This means that increases in Exchange rate does not significantly decrease the Net interest margin of DMBs in Nigeria. Again as seen in the output, an increase in GDP by 1% would result in an increase in NIM by 0.642% though the result is insignificant. A look at the result for H0<sub>4</sub> reveals that an increase in INFR by 1% results in an increase in the NIM by 0.182% though insignificantly. However, when INTR, EXCR, GDP and INFR are all zero, then NIM will increase by 23.609% implying that the predictor variables have insignificant and negative effects on the Net interest margin save for GDP and inflation rate that have positive effects though insignificant. Nevertheless, it is obvious that the selected macroeconomic variables do not significantly predict or explain changes in the profitability of DMBs in Nigeria measured by NIM.

#### 4.1.5. Discussion of Findings

This study tested four hypotheses to find out if macroeconomic variables significantly affect the profitability of Deposit Money Banks in Nigeria. **Hypothesis one**, which states that there is no significant relationship between interest rates and net interest margin of deposit money banks in Nigeria, is accepted based on the evidences of this study. **Hypothesis two**, which states that there is no significant relationship between exchange rates and net interest margin of deposit money banks in Nigeria, is accepted based on evidences from findings. **Hypothesis three**, which states that there is no significant relationship between gross domestic product and net interest margin of deposit money banks in Nigeria, is accepted based on evidences from findings. In similar vein, **hypothesis four**, which states that there is no significant relationship between inflation rates and net interest margin of deposit money banks in Nigeria, is also accepted based on evidences from findings. In sum, the implication is that the interest rates, exchange rate, gross domestic product and inflation are not significant predictors of net interest margin of deposit money banks in Nigeria. Though, evidence from findings show that interest rate and exchange rate contribute negatively to net interest margin of deposit money banks in Nigeria. Whereas gross

domestic product and inflation rate show positive contribution to net interest margin of deposit money banks in Nigeria. The findings of this study may be due to the fact that the profitability of most banks as measured by NIM could result from other factors or activities unrelated to the economic outlook of the country. This may include the competition structure of the banking sector and market power as canvassed by [34].

This finding disagrees with studies reported by other scholars such as Akani et al. [2], Ghazi [22], Simiyu and Ngile [29] and Ifuero and Chijuka [23]. These scholars in their various study concluded that there is a significant relationship between macroeconomic variables and profitability of banks. Specifically, the work of Akani et al. [2] concluded that there is significant relationship between macroeconomic variables and performance of deposit money banks in Nigeria. They argued that, the selected macroeconomic variables were found to significantly influence performances of deposit money banks in Nigeria. Nevertheless, it is difficult to rely on their conclusion because most of the selected variables report insignificant relationship in their results and this is confirmed by granger causality tests they performed. The granger causality test they performed reported that the selected macroeconomic variables do not granger cause the dependent variable. Thus, it simply shows that, the selected macroeconomic variables could not significantly influence performance of banks in Nigeria.

However, to validate the findings of this study, the works of scholars such as Zawadi [31], Saral and Muhammed [28], Ogunbiyi and Ihejirika [25] and Kiganda [24] suffice. These authors all agreed that there is no significant relationship between macroeconomic variables and profitability of banks in their respective works. Also, this study is contrary to apriori expectation with respect to interest rate and inflation rate. It is expected that interest rates and inflation rate would have positive and negative effects respectively on profitability of banks but in this study they are reported to have contrary effect this is consistent with findings of Simiyu and Ngile [29] and Ogunbiyi and Ihejirika [25] in the case of interest rate and Davydenko [21] for inflation rate.

## 5. Conclusion and Recommendations

### 5.1. Conclusion

Several internal and external factors can influence the profitability of deposit money banks in Nigeria, but this study employs only four external factors; interest rate, exchange rate, GDP and inflation rate, and investigates their impact on earnings of banks. The four major macroeconomic variables were selected because quantified data of these variables are easily available from secondary sources and historically, these variables have been analyzed, hence the cumulative study would help in getting a clear picture. Based on the findings, the study concluded that macroeconomic variables do not significantly influence profitability of deposit money banks in Nigeria. However, the study is limited to the selected variables: interest rates (INTR), exchange rates (EXCR), gross domestic product (GDP) and inflation rate

(INFR) used as proxy for macroeconomic variables. As such the study did not investigate other factors that could be responsible for profitability of deposit money banks in Nigeria. The results of the OLS multiple regression test provided evidences that there is a negative but insignificant relationship between the net interest margin (NIM) as proxy for profitability of DMBs in Nigeria and the selected macroeconomic variables except for gross domestic product and inflation rate where a positive but insignificant relationship was recorded. Therefore, it is concluded that macroeconomic variables do not significantly impact on the profitability of DMBs in Nigeria. The implication of these findings is that the changes in the macroeconomic outlook are not reflected in the profitability of DMBs in Nigeria within the study period. This is consistent with findings recorded by other scholars such as Zawadi [31], Saral and Muhammed [28], Ogunbiyi and Ihejirika [25] and Kiganda [24].

### 5.2. Recommendations

Since the findings of this study show that macroeconomic variables observed do not significantly predict the profitability of DMBs. It is recommended that:

1. Deposit Money Banks in Nigeria should focus more on other external factors or devise policies to improve the internal factors in order to maximize the risk-adjusted returns.
2. DMBs should pay close attention to exchange rate since it has the potential to deteriorate profitability. They should devise means of managing volatility of exchange rate. This can be done by limiting their exposure to foreign businesses.

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## Appendix

### Research Data

YEAR	NIM (%)	INTR (%)	EXCR	GDP (%)	INFR (%)
2007		9.50	125.83	7.32	6.6
2008		9.75	118.57	7.20	15.10
2009	22.87	6.00	148.88	8.35	13.90
2010	11.24	6.25	150.29	9.54	11.80
2011	12.13	12.00	153.86	5.31	10.30
2012	11.92	12.00	157.50	4.21	12.00
2013	13.10	12.00	157.31	5.49	7.96
2014	11.71	13.00	158.55	6.22	7.98
2015	7.40	11.00	193.28	2.79	9.55
2016	1.96	14.00	253.49	-1.51	18.55
2017	1.43	14.00	306.31	0.8	15.37
2018	1.85	14.00	306.92	1.9	11.44

Source: CBN Statistical Bulletin 2018 and NDIC Annual Report for various years.

Data for Net Interest Margin (NIM) which is the response variable was gotten from NDIC Annual Report for the various years, while data for Interest Rate (INTR), Exchange Rate (EXCR), Gross Domestic Product (GDP) and Inflation Rate which are the predictors were sourced from the CBN Statistical Bulletin 2018.



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