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PREFACE

This is the second international Conference organized by the school of Physical Sciences of the Federal University of Technology, Minna Nigeria the school is relatively new and comprising of the Departments of Chemistry, Geography, Geology, Geophysics, Mathematics, Physics and Statistics. It was exercised from the former school of Natural and Applied Sciences on the 6th of November 2014.

The school of Physical Sciences 2nd Biennial International Conference is an interdisciplinary forum for the presentation of new ideas, recent developments and research findings in the field of Science and Technology. The Conference provides a platform to scholars, researchers in the academics and other establishments to meet, share and discuss on energy, climate change and sustainable energy use and development. Submissions were received both nationally and internationally and severally reviewed by our international program committee. All contributions are neither published elsewhere nor submitted for publication as asserted by contributor.

We wish to express our gratitude to the school for challenging us to organize the second international conference. Special thanks to the former Dean of the School Prof. A. S. Abubakar who initiated the conference and to the present Dean Prof. Jonathan Yisa for keying into it. The Vice Chancellor Prof. Abdullahi Bala have given immense support to the Conference, thank you sir. Our special appreciation to the keynote speakers for accepting our invitation to give a talk at the conference. Special thanks to all members of the organizing committee and sub-committees for their dedication, determination and sacrifice towards achieving a fruitful and successful conference.

Prof. Kasim Uthman Isah
The Local Organizing Committee Chairman

Panel Data Regression Method for Evaluating Financial Performance of Commercial Banks in Nigerian

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Abstract

Evaluation of financial performance of the banking sector is an effective measure and indicator to check the soundness of economic activities of a nation because thesector's performance is perceived as the nation's replica of economic activities.The key indicators of banks' financial performance are their return on assets (ROA), which indicates the proportion of profit a company makes in relation to its assets and return on equity (ROE), whichmeasures a corporation's profitability by revealing how much profit a company generates with the money shareholders have invested. Panel data are data on two or more entities for multiple time periods.Therefore, this study sought to model the overall performance of some sampled commercial banks (in terms of ROA and ROE) in Nigeria using panel data regression methods. This performance is modeled in relation to the factors that affect it, which include capital adequacy ratio(CAR), credit risk(CRISK), management, liquidity ratio(LIQ.RAT.) and bank size. The results revealed that capital adequacy ratio (CAR), credit risk (CRISK), and liquidity ratio (LIQ.RAT) have highly significant effects on the estimated ROA model at both 1% and 5% significance levels with the given p-values. This model accounted for over 82% of the total variability in the data. However, for the fitted ROE model, only credit risk (CRISK) and liquidity ratio (LIQ.RAT)

were observed to have highly significant effects at both 1% and 5% significance levels and the fitted model accounted for about 69% of the total variation in the ROE data.

1.0 INTRODUCTION:

Financial sectors play crucial role in a nation's economic growth and industrialization through channeling funds from surplus units- the depositors, to the deficit units, the borrowers, and in the process gaining from the spread of the different interests charged. Banks are important component of the financial sector of any economy because of their role as financial intermediaries that helps facilitate capital to promote productivity and thereby enhancing growth and development in the economy (Onyema*et al*, 2018).The financial performance of a bank is its ability to make use of available resources to boost shareholders' wealth and, at the same time, strengthen its capital base to ensure future survival and profitability.Evaluation of financial performance of the banking sector is an effective measure and indicator to check the soundness of economic activities of a nation. This is so because the banking sector's performance is perceived as the replica of economic activities of the nation. The stage of development of the banking industry is a good reflection of the development of the economy (Misra&Aspal, 2013). Therefore, to sustain the development of a nation's economy, the financial performance of the banking sectorneeds to be checked and evaluated periodically.This periodic evaluation will enable the shareholders to assess which banks they can deem suitable for financialinvestment. This will also enable the banks to determine the efficacy and long term viability of their management decisions or goals so thatthey can alter the course and make changes whenever it is appropriate.

The degree to which banks extend credits to the public for fruitful activities speeds up the0pace of0a0nation's economic0growth as well as the long-term0sustainability of the banking business (Kolapo, Ayeni&Oke, 2012). This explains why it is necessary to draft policies for the sector and why it is therefore0not0surprising that their0operations0are perhaps the0most0heavily0regulated of all businesses. In varying degrees, these policies are aimed at achieving macroeconomic objectives, stability, efficiency and soundness of the financial system (Adeusi and Familoni, 2004).

The productivity of a bank0largelydepends on the magnitude to which0it has performed0in the intermediation0procedure either0locally0or globally. Banks,through0their0intermediary role accrue0profits0and on the0other hand, might0incur0losses if not efficient0and0effective in0their operations.As rightly observed by (Flamini et al, 2009), bank earningsoffer asubstantial source of equity if reinvested into business. This could0lead to safe0banks, great profits and firmness in the economy. Therefore, bank profitability is of great importance both to the individual and the society at large.

Financial performance measurement of any firm is vital in determining the tactics to be expressed to ensure that the firm is on the right track, (ECB, 2010). First of all, a bank must be able to produce incomes to remain in operation. Furthermore, it should be effective,that is, it should be able to create revenue from the given assets and make profits. Thirdly, it should be able to regulate its earnings to overcome the numerous risks associated, such as credit risk, and finally it should be able to improve its results through the approach it functions, (Kuria, 2013).

The stage of development of the banking industry in any nation is a good reflection of the development of the nation's economy (Misra&Aspal, 2013). To sustain the development of the economy, the performanceand health of the banking sector have to be checked and evaluated periodically. Differentapproaches are often used by different regulatory bodies and scholars to evaluate banks' financial performance. For example, there is CAMEL (Capital adequacy, Asset quality, Managementquality, Earnings and Liquidity) rating criterion, CLSA-Stress test, Bankometer S-score model, etc. The most frequently-used approach to assess and evaluate the performance andfinancial soundness of the activities of the bank is the CAMEL approach (see Rehana and Irum, (2012), Jaffar and Manarvi, (2011), Onyema*et al* (2018), etc., for details). However, this study use panel data regression approach to evaluate financial performance of some selected commercial banks in Nigeria by assessing a bank's return on assets (ROA) and its return on equity (ROE). The banks' financial performance were measured by their return on asset (ROA) and return on equity (ROE). The return on asset (ROA) is an economic ratio that indicates the proportion of profit a company makes in relation to its assets. It is the ratio of the net profit to total assets. ROA measures how successfully a bank's assets are managed to create profits (Golin, 2001).

$$ROA = Net\ income\ /\ Total\ assets$$

Return on equity (ROE) measures a corporation's profitability by revealing how much profit a company generates with the money shareholders have invested. It is given as

$$ROE = Net\ income\ /\ Total\ capital$$

This work seeks to model the relationship between the sampled banks' financial performance (measured in terms of these statistics) and some key factors that are believed to affect such performance. Such factors include

Capital Adequacy Ratio (CAR), which is a ratio of the capital of a bank to its risk. It is used to shield investors and stimulates the stability and effectiveness of economic systems. CAR is a vital measure to ascertain the condition of financial institutions and the wellness of banks (Kosmidou (2008). The capital adequacy ratio (CAR) can be calculated as the proportion of shareholders' equity to total assets, which is seen as the overall utilization of the financial leverage of the bank. That is,

$$CAR = \left(\frac{total\ equity}{total\ assets}\right)$$

Credit Risk: Credit risk is the risk that a financial loss will be suffered if a borrower does not fulfill his obligations according to the agreed terms. It is the ratio of the total loans to total assets.

$$Credit\ Risk = \left(\frac{total\ loans}{total\ assets}\right)$$

Management: Management is a substantive element that determines a bank's accomplishment. It is given as

$$\text{Management} = \left(\frac{\text{operating expenses}}{\text{total assets}}\right)$$

Liquidity: the liquidity of a bank is the ability to realize its short-term liability and sustain its affluence at the same time. Loan-to-deposit ratio is used to assess the liquidity of the bank by comparing its total loans to total deposits at the same time period and expressed as a percentage. If the ratio is too high, then the bank may not have sufficient liquidity to cover any unpredicted fund requirements and if it is too low, the bank may not be making as much as it is expected. It is given as

$$\text{Liquidity} = \left(\frac{\text{total loans}}{\text{total deposits}}\ x\ 100\right)$$

Bank size: The size of a bank is also a substantive element on its performance or profitability. The natural logarithm of total assets is used to indicate the size of a bank. That is, bank size = $ln(total\ assets)$.

Panel data are data on two or more entities for multiple time periods. Such data have a cross-section component and a time-series components as the values of the variables of interest are registered for several time periods or at several time points for each individual. Practice shows that panel data has an extensive use in biological and social sciences (Frees, 2004). There are considerable advantages of using panel data as opposed to using only time series or only cross-sectional data. They are extensively addressed by Frees (2004). The panel data estimation methods require less assumptions and are often less problematic than simpler methods. One basic advantage of using panel data is the use of individual-specific components in the models.

2.0 RESEARCH METHODOLOGY

The population0of this0study comprises of all the commercial banks in Nigeria out of which five banks were sampled. The sampled banks include Zenith Bank, Guarantee Trust Bank (GTB), United Bank for Africa (UBA), Access Bank and First Bank. The data used for this work were secondary data gotten from the published and audited annual financial report of each of the banks for the period 2010 -2017.

Secondary data on each of the two dependent variables (ROA) and (ROE) and the five independent variables were generated from the published and audited annual financial report of each of the banks for the period 2010 -2017.Two estimation methods are used in this work, which include the pooled and the fixed effects models.

2.1 The pooled Model

The pooled model does not differ from the common regression equation. It regards each observation as unrelated to the others ignoring panels and time. No panel information is used. A pooled model can be expressed as:

$$y_{it} = \beta_0 + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \cdots + \beta_k X_{k,it} + \epsilon_{it} \tag{1}$$

A pooled model is used under the assumption that the individuals behave in the same way, where there is homoscedasticity and no autocorrelation. Only then OLS can be used for obtaining efficient estimates. The assumptions for the pooled model are the same as for the simple regression model as described by Greene (2012).

2.2 The Fixed effects Model

One of the advantages of using panel data as mention in Section 1 above is that models like the fixed effects model can deal with the unobserved heterogeneity. The fixed effects model for factors can be expressed as

$$y_{it} = \alpha_i + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \cdots + \beta_k X_{k,it} + \epsilon_{it} \tag{2}$$

Wherey_{it} denotes the observed outcome of entity i at time t,X_{it} is the $(1\text{x}K)$ vector of covariates of this entity measured contemporaneously, and β is the corresponding $(K\text{x}1)$ vector of parameters to be estimated. The α_i are stable, entity-specific characteristics. That is, α_i are unobserved effects capturing time-constant individual heterogeneity. ϵ_{it} is an idiosyncratic error that varies across subjects and over time.

There is no constant term in the fixed effects model. Instead of the constant term β_0 in the pooled model (1) above, now we have an individual-specific component α_i that determines a unique intercept for each individual. However, the slopes (the β parameters) are the same for all individuals. Two methods are available for computing the estimates of the fixed effects model (Josef and Volker, 2015), which include the within-groups method and least squares dummy variable method (LSDV). The two methods yield equivalent results. However, the technique of including a dummy variable for each variable (that is, the second method) is feasible when the number of individuals N is small. When the number of individuals is large, the within-groups method is the best because there will be too many dummy variables.

2.2.1 The within-group method

Given the fixed effects model in (2) above, for the within-group method when the sample size is large, first, one has to compute the means of all observed variables within individuals across time as follows.

$\bar{y}_{i.} = \frac{1}{T}\sum_{t=1}^{T} y_{it};\ \bar{x}_{l,i.} = \frac{1}{T}\sum_{t=1}^{T} x_{l,it},\ \ l = 1, \dots, K$

Equation (2) then takes the form

$$\bar{y}_{i.} = \alpha_i + \beta_1\bar{x}_{1,i.} + \beta_2\bar{x}_{2,i.} + \cdots + \beta_k\bar{x}_{k,i.} + \bar{\epsilon}_{i.} \qquad (3)$$

The term $\bar{\epsilon}_{i.}$ is assumed to be 0. Also, since α_i is time-invariant, its mean across time would stay as the original value for each individual. Next, equation (3) is subtracted from equation (2) as

$$y_{it} - \bar{y}_{i.} = \beta_1(X_{1,it} - \bar{x}_{1,i.}) + \beta_2(X_{2,it} - \bar{x}_{2,i.}) + \cdots + \beta_k(X_{k,it} - \bar{x}_{k,i.}) + (\epsilon_{it} - \bar{\epsilon}_{i.}) \qquad (4)$$

By this subtraction, the individual specific component disappears. Also if a constant term had been used, it would have also disappeared.

Let $\tilde{y}_{it} = y_{it} - \bar{y}_{i.}$, $\tilde{X}_{l,it} = X_{l,it} - \bar{x}_{l,i.}$, for $l = 1, \dots, K$ and $\tilde{\epsilon}_{it} = \epsilon_{it} - \bar{\epsilon}_{i.}$, then equation (4) can be written as

$$\tilde{y}_{it} = \beta_1\tilde{X}_{1,it} + \beta_2\tilde{X}_{2,it} + \cdots + \beta_k\tilde{X}_{k,it} + \tilde{\epsilon}_{it} \qquad (5)$$

The parameters and the individual-specific component can then be computed using the formulas:

$$\hat{\beta}_i = \frac{\sum\sum\tilde{X}_{l,it}\tilde{y}_{it}}{\sum\sum\tilde{X}_{l,it}^2};\ \hat{\alpha}_i = \bar{y}_{i.} - \hat{\beta}_1\bar{X}_{1,i.} - \hat{\beta}_2\bar{X}_{2,i.} - \cdots - \hat{\beta}_k\bar{X}_{k,i.}$$

These estimates are consistent.

2.2.2. The Fixed Effects Least-Squares Dummy Variable Model (LSDV)

Now, since this work considers five commercial banks (where N is not too large) for eight time periods, the LSDV is fitted to the collected data sets using ROA and ROE as the dependent variables.For our data with five banks, the fixed effects model with dummy variables, where intercepts α_i are different for different banks but each individual intercept does not vary over time is

$$y_{it} = \alpha_0 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \beta_3 X_{3,it} + \beta_4 X_{4,it} + \beta_5 X_{5,it} + \epsilon_{it} \quad (6)$$

Where D_k denotes the k^{th} bank, $k = 1, \dots, 5$, (Zenith, First, UBA, GTB and ACCESS), X denotes cash adequacy ratio(CAR), credit risk, management, liquidity ratio, and size, respectively, i stands for the i^{th} bank, $i = 1, \dots, 5$ and t stands for the t^{th} time period ($t = 2010, \dots, 2017$).Thus the individual effect is picked up by the dummy variable D_{mi} where $m = n-1$ and the dummy variables are defined as

$$D_{1i} = \begin{cases} 1, & i = 1 \\ 0, & otherwise \end{cases}$$

$$D_{2i} = \begin{cases} 1, & i = 2 \\ 0, & otherwise \end{cases}$$

$$D_{3i} = \begin{cases} 1, & i = 3 \\ 0, & otherwise \end{cases}$$

$$D_{4i} = \begin{cases} 1, & i = 4 \\ 0, & otherwise \end{cases}$$

3.0 Results and Discussion

We first look at the correlation structure of the variables with themselves as given in the table below.

Table 3.1: Correlation0coefficients, using0the observations 1:1 - 5:8
5% critical0value (two-tailed) = 0.3120 for n = 40

	ROA	ROE	CAR	CRISK	MGT	LIQ_RAT	BANK_SIZE
ROA	1	0.9152	0.6293	0.3421	-0.0231	0.1442	-0.322
ROE		1	0.3508	0.1921	-0.1879	0.0971	-0.1229
CAR			1	0.6231	0.4356	0.1641	-0.7113
CRISK				1	0.5213	0.4528	-0.5318
MGT					1	-0.1389	-0.6121
LIQ_RAT						1	0.1744
BANK_SIZE							1

Correlation matrix above is used to assess the degree0of0relationship between each of the variables, most especially the independent variables, under study. The result shows that most of the variables are not highly correlated with each other. However, a few such as bank size and capital0adequacy ratio; credit risk and capital0adequacy ratio; and bank size and management have a correlation that is above average.

Test for multicollinearity using Variance Inflation Factors

Diagnostics: using n = 5 cross-sectional units

Table 3.2: Test for multicollinearity using Variance Inflation Factors

Variables	VIF
CAR	2.567
CRISK	3.11
MGT	1.961
LIQRAT	2.079
BANKSIZE	3.247
	2.5928

Table 3.2 above shows the testing of multicollinearity using VIF. There is serious case of multicollinearity whenever each VIF or the mean VIF is greater than 10. Hence, since the result of the test shows that no VIF was greater than 10 and the mean VIF is less than 10, we conclude that the model fitted does not suffer from the problem of multicollinearity.

3.1 Pooled Ordinary Least Square (OLS) Regression Model with ROA as dependent variable

Here we pool all observations together and run the regression model, neglecting the cross sections and time series nature of the data. By combining the commercial Banks and pooling the data, we deny the heterogeneity or individuality that may exist among the Banks. In other words, we assume that the five Banks are same.

Table3.3:Model 2: Pooled OLS, using 40 observations
Included 5 cross-sectional units
Time-series length = 8
Dependent variable: ROA

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	-2.92895	6.18757	-0.4734	0.63898	
CAR	26.7698	6.33202	4.2277	0.00017	***

CRISK	2.13311	2.23052	0.9563	0.34566	
MGT	-38.0696	14.951	-2.5463	0.01559	**
LIQ__RAT	-0.0156969	0.0169026	-0.9287	0.35961	
BANK_SIZE	0.221154	0.378657	0.584	0.56304	

R-squared=0.521 Adjusted R-squared = 0.451
F(5, 34) =7.397 P-value(F) = 0.0000

The predicted model for pooled cross-sectional model is given as

$$\boldsymbol{ROA_{it} = -2.928 + 26.769CAR + 2.133CRISK - 38.069MGT - 0.0156LIQ_{RAT} + 0.221BANK\_SIZE}$$

From table 3.3, the result obtained shows that *CAR* has a positive and significant effect on the ROA with p-value < 0.05 while the *CRISK*has a positive but insignificant effect on the ROA with a p-value greater than both 0.05 and 0.01. The MGT has negative but a significant effect on the ROA while the LIQ-RAT has a negative but insignificant effect on the ROA. The effect of the bank size was also observed from this Table to be positive but insignificant. The Table also revealed that about 52% of variation in the ROA of these banks was accounted for by this pooled OLS model. Hence, the model is adequate for predicting ROA. The F(5, 34) = 7.397 with p-value = 0.000 reveals that the model estimated was extremely significant.

Table3.4: Model 3: Pooled OLS, using 40 observations
Included 5 cross-sectional units
Time-series length = 8
Dependent variable: ROE

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	-3.38247	41.7323	-0.0811	0.93588	
CAR	94.2079	42.7066	2.2059	0.03425	**
CRISK	19.2032	15.0439	1.2765	0.21044	
MGT	-268.328	100.838	-2.661	0.01181	**
LIQ__RAT	-0.125465	0.114	-1.1006	0.27882	
BANK_SIZE	1.2023	2.55387	0.4708	0.64081	

R-squared=0.302 Adjusted R-squared = 0.200
F(5, 34) =2.952 P-value(F) = 0.0255

The predicted model for pooled cross-sectional model is given as

$$\boldsymbol{ROA_{it} = -3.382 + 94.207CAR + 19.203CRISK - 268.328MGT - 0.125LIQ_{RAT} + 1.202BANK\_SIZE}$$

From table 3.4, the result obtained shows that *CAR* has a positive and significant effect on the ROE with p-value < 0.05 while the *CRISK* has a positive but insignificant effect on the ROE with a p-value greater than both 0.05 and 0.01. The MGT has negative but a significant effect on the ROE while the LIQ-RAT has a negative but insignificant effect on the ROE. The effect of the bank size was also observed from this Table to be positive but insignificant. The Table also revealed that only about 30% of variation in the ROE of these banks was accounted for by this pooled OLS model. Hence, the model is inadequate for predicting ROE. The F(5, 34) = 2.952 with p-value = 0.0255 reveals that the model estimated was not too good.

3.2 The Fixed Effect LSDV Model Estimates

Using LSDV method, the fixed effects model estimates for ROA and ROE as dependent variablesare presented respectively below.

Table3.5: Fixed Effects LSDV Model Estimates with ***ROA*** as the dependent variable

Term	Coef	SE_Coef	T-Value	P-value
Const	-8.37	5.11	-1.64	0.112
ZENITH	0.317	0.427	0.74	0.464^ns
FIRST	-0.533	0.395	-1.35	0.187^ns
UBA	-0.319	0.469	-0.68	0.502^ns
GTB	2.08	0.33	6.31	0.000**
CAR	13.88	5.85	2.37	0.024*
CRISK	5.22	1.63	3.19	0.003**
MGT	-15.7	11.6	-1.35	0.187^ns
	-			
LIQ_RAT	0.0423	0.0143	-2.95	0.006**
BANK_SIZE	0.642	0.326	1.97	0.058*

Model Summary: S = 0.606113, R-sq =83.12%, R-sq(adj) = 78.05%, R-sq(pred)=72.66%

The predicted fixed effects LSDV model is given as

$$ROA_{it} = -8.37 + 0.317ZENITH_{BANK} - 0.533FIRST_{BANK} - 0.319UBA + 2.08GTB + 13.88CAR + 5.22CRISK - 15.7MGT - 0.0423LIQ_{RAT} + 0.642BANK\_SIZE$$

From table 3.5 above, the effects of cash adequacy ratio (CAR), credit risk (CRISK), and liquidity ratio (LIQ.RAT) were observed to be highly significant at both 1% and 5% significance levels with the given p-values while BANK-SIZE was slightly significant at 5% level. The MGT effect was not significant. The fitted LSDV model accounted for over 83% of the total variation in the ROA, which indicates that the estimated model fits the data well.

The estimated ROA model for each of the banks are:

ACCESS BANK:

$$ROA_{it} = -8.37 + 13.88\,CAR + 5.22\,CRISK - 15.7\,MGT - 0.0423\,LIQ.\,RAT + 0.642\,BANK\,SIZE$$

GTB:

$$ROA_{it} = -6.29 + 13.88\,CAR + 5.22\,CRISK - 15.7\,MGT - 0.0423\,LIQ.\,RAT + 0.642\,BANK\,SIZE$$

UBA

$$ROA_{it} = -8.69 + 13.88\,CAR + 5.22\,CRISK - 15.7\,MGT - 0.0423\,LIQ.\,RAT + 0.642\,BANK\,SIZE$$

FIRST BANK

$$ROA_{it} = -8.90 + 13.88\,CAR + 5.22\,CRISK - 15.7\,MGT - 0.0423\,LIQ.\,RAT + 0.642\,BANK\,SIZE$$

ZENITH BANK

$$ROA_{it} = -8.05 + 13.88\,CAR + 5.22\,CRISK - 15.7\,MGT - 0.0423\,LIQ.\,RAT + 0.642\,BANK\,SIZE$$

Table3.6:Fixed Effects LSDV Model Estimates with ***ROE*** as the dependent variable

Term	Coef	SE_Coef	T-Value	P-value
Const	-29.2	38.6	-0.76	0.455
ZENITH	3.92	3.22	1.22	0.233
FIRST	-4.92	2.98	-1.65	0.109
UBA	-2.02	3.54	-0.57	0.573
GTB	12.47	2.49	5.01	0.000
CAR	-9.9	44.2	-0.22	0.824
CRISK	42.9	12.3	3.48	0.002

MGT	-124.9	87.8	-1.42	0.165
LIQ_RAT	-0.263	0.108	-2.43	0.021
BANK_SIZE	3.24	2.46	1.31	0.199

Model Summary: S =4.5755; R-sq = 69.21%; R-sq(adj)=59.97%; R-sq(pred)47.27%

The predicted fixed effects LSDV model is given as

$$ROE_{it} = -29.2 + 3.92ZENITH_{BANK} - 4.92FIRST_{BANK} - 2.02UBA + 12.47GTB - 9.9CAR$$
$$+ 42.9CRISK - 124.9MGT - 0.263LIQ_{RAT} + 3.24BANK\_SIZE$$

From table 3.6 above, it is only the effects of credit risk (CRISK) and liquidity ratio (LIQ.RAT) that were observed to be highly significant at both 1% and 5% significance levels with the given p-values, the other factor effects were not significant. The fitted LSDV model accounted for about 69% of the total variation in the ROE, which indicates that the estimated model fits the data well.However, when compared with that of the estimated ROA model above, the proportion of the total variability accounted for by this model is less than that of the ROA model.

For each of the banks, we have the estimated ROE models below.

ACCESS BANK:

$$ROE_{it} = -29.2 - 9.9\,CAR + 42.9\,CRISK - 124.9\,MGT - 0.263\,LIQ.\,RAT$$
$$+ 3.24\,BANK\,SIZE$$

GTB:

$$ROE_{it} = -16.7 - 9.9\,CAR + 42.9\,CRISK - 124.9\,MGT - 0.263\,LIQ.\,RAT$$
$$+ 3.24\,BANK\,SIZE$$

UBA

$$ROE_{it} = -31.2 - 9.9\,CAR + 42.9\,CRISK - 124.9\,MGT - 0.263\,LIQ.\,RAT$$
$$+ 3.24\,BANK\,SIZE$$

FIRST BANK

$$ROE_{it} = -34.1 - 9.9\,CAR + 42.9\,CRISK - 124.9\,MGT - 0.263\,LIQ.\,RAT$$
$$+ 3.24\,BANK\,SIZE$$

ZENITH BANK

$$ROE_{it} = -25.3 - 9.9\,CAR + 42.9\,CRISK - 124.9\,MGT - 0.263\,LIQ.\,RAT$$
$$+ 3.24\,BANK\,SIZE$$

3.3 Diagnostic plots

Figure 3.1 below gives the normal probability plot of the residuals, which indicates whether the residuals follow a normal distribution. From this plot, nearly all the points fall on the straight line. This indicates that, to some extent, the residuals were normally distributed. Thus there are no problems with our data.

Figure 3.1: Normal Probability plot of Residuals for the ROA LSDV Model

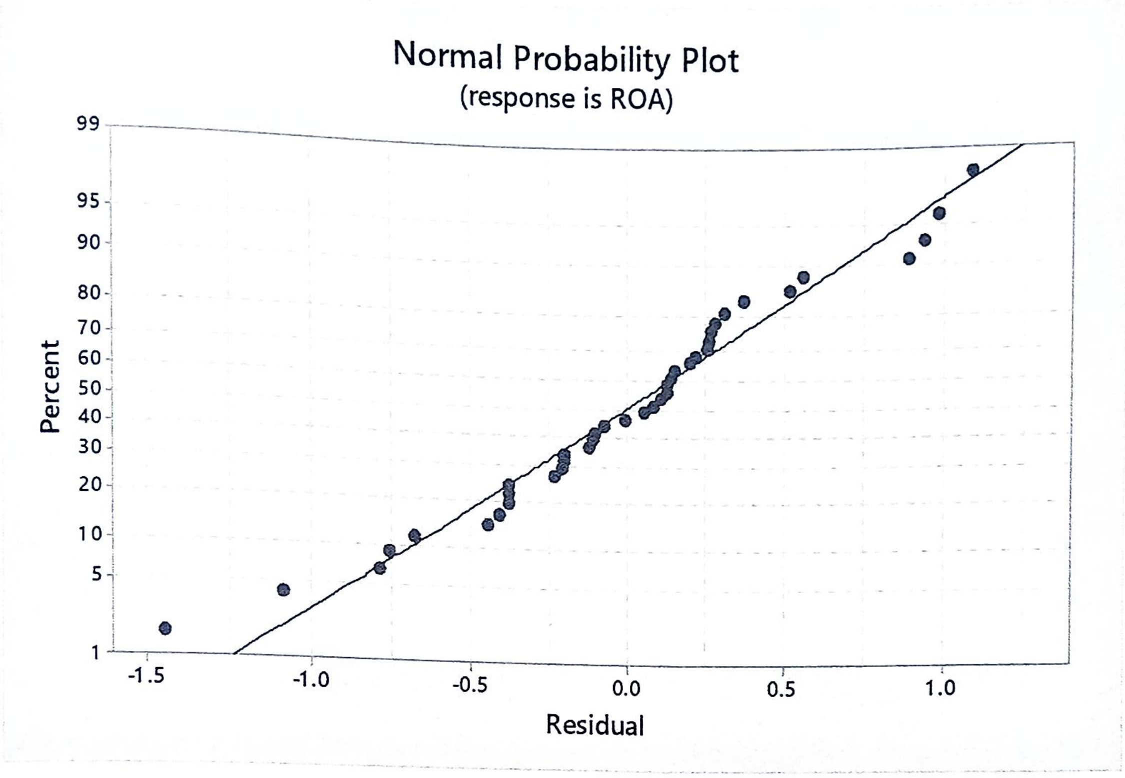
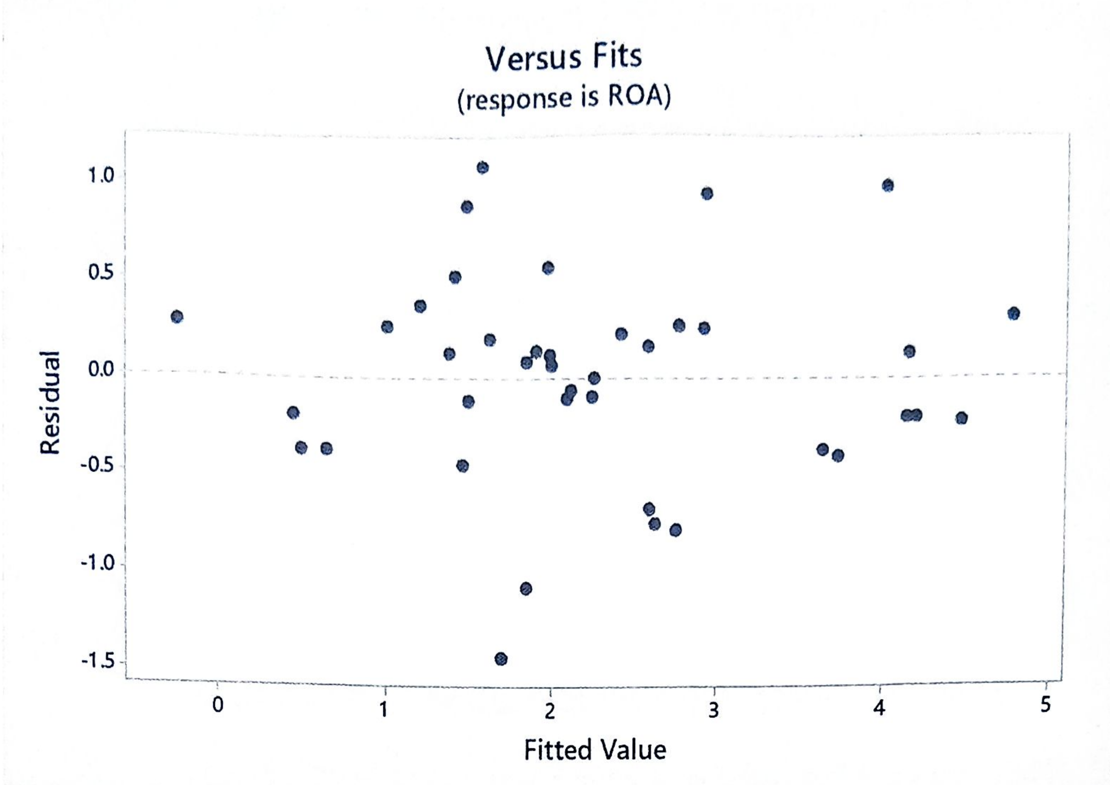


Figure 3.2 is a visual check for the assumption of constant variance. As can be directly seen, this plot is a random scatter with a consistent top to bottom range of residuals across the predictions on the X axis. Thus we can conclude here that our model satisfied the constant variance assumption.

Figure 3.2: Plot of Residuals versus the Fitted values for the ROA LSDV Model



4.0 CONCLUSION AND RECOMMENDATIONS

Conclusion

Based on the findings from the preceding chapter, it can be0concluded that0capital structure has a relationship0with banks'0performance. It can also be concluded that there are other factors, aside the explanatory variables used in the analysis of this research work, that have a significant effect on the performance0of the banking0institution in0Nigeria. These may include the level of advertising, marketing strategies being implemented by the commercial banks, services being introduced into the market etc. These factors should be included into further studies relating to the performance of banks in0Nigeria.

Recommendations

Following the findings from the study, the following recommendations are made;

i. Capital structure should be0well0managed to ensure0that the firm0remains in operation0and is0able to finance its projects

ii. To improve0banks' performance, the banks need a good0regulatory environment that will0enable0expand their scope0of business. With a good regulation, the banks will be able to regulate unnecessary expenses.

REFERENCE

Abor, J. (2005). *The Effect of Capital Structure on Profitability: Empirical Analysis of Listed Firms in Ghana. Journal of Risk Finance, 6(5), 438 – 445.*

Ammar, A.G., (2013). *Impact of capital structure on banking performance: a case study of Pakistan. Interdisciplinary Journal of contemporary research in business, 4(10), 393 – 403.*

Anarfo, E.B. (2015). *Capital structure and bank performance: Evidence from Sub-Sahara Africa. European Journal of Accounting, Auditing and Finance Research, 3(3), 1 – 20.*

Burkhardt, J.H. & Wheeler, J.C. (2013). *Examining Financial Performance Indicators for Acute Care Hospitals. Journal of Health Care Finance, 39(3), 1 – 13.*

Chowdhury, A. & Chowdhury, P.S., (2010). *Impact of capital structure on firms' value: evidence from Bangladesh. Peer reviewed and open access Journal, 3(3) 111 – 115.*

Diamond, D. &Rajan, R. (2000). *A Theory of Bank Capital. Journal of Finance (55), 2431 – 2465.*

Ebaid, E.I (2009). *The Impact of Capital-structure Choice on Firm Performance: Empirical Evidence from Egypt. The Journal of Risk Finance, 10(5) 477 – 487.*

European Central Bank (2010). *Beyond ROE, how to Measure Bank Performance*

Fitch Rating, a subsidiary of Fitch Group, London and New York. (accessed from www.fitchratings.com)

Imala, O.I., (2005). *Challenges of banking sector reforms & bank consolidation in Nigeria. CBN bullion, 29(2).*

Kolapo, T.F., Ayeni, R.K., &Oke, M.O., (2012). *Credit risk and commercial banks' performance in Nigeria. European Journal of Economics, Finance and Administrative Sciences, 11.*

Modigliani, F & Miller, M (1958). *The cost of capital, corporation, finance and the theory of investment. The America Economic Review, 48(3), 261 – 297.*

Ogebe, P. & Joseph, O.O., (2013). *The impact of capital structure on firms' performance in Nigeria. MPRA paper No. 46173*

Oke, O.O., &Afolabi, B., (2008). *Capital structure and industrial performance in Nigeria: an empirical investigation. AAU Journal of management sciences, 1(1), 43 – 52.*

Saunders, A. & Cornett, M.M., (2007). *Financial institutions management: a risk management approach. The McGraw-Hill Edition, 2007, 6th Edition.*

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www.gtbank.com

www.irfbnholdings.com

www.ubagroup.com

www.zenithbank.com