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Determinants of Commercial Banks Cost Efficiency in Nigeria

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Abstract

The study examined the determinants of commercial banks cost efficiency in Nigeria. Annual data were employed and sourced from Central Bank of Nigeria Statistical Bulletin and bank's annual financial statement of account. The data covered the period 2002-2019. The study used panel analytical techniques, such as panel unit root analysis, and panel regression. The empirical findings revealed that total revenue, other earning asset, total deposit, interest expenses, and equity were significant factors influencing the cost of the bank. The result of banks efficiency ratio indicate that Diamond bank, First bank, GTB, Stanbic-IBTC, UBA, Union bank, and Zenith bank are cost efficient while Access bank, Fidelity bank, Skybank, Sterling bank, Unity bank and Wema bank were cost inefficient. Cost (operating expenses) was found to be considerably high for all the banks under consideration, the increases in cost could be associated with expensive headquarters, separate investment in software and hardware, heavy fixed costs such as providing energy plant and other operating expenses. It is therefore recommended that, banks management can operate joint venture more especially in the area of ICT and energy when there is close proximity. This can reduce cost in a way.

Keywords: *Cost, Efficiency, Commercial Banks, Intermediation and Panel Regression*
JEL Code: D23, D61, G21, G29 and C33

Contribution/Originality to Knowledge:
The banking sector in any economy is strategically important to the growth and development of all other sectors in the economy hence, the continuous desire for the banking sector cost efficiency through satisfactory performance is inevitable. Cost, is one of the major determinants of efficiency and performance. This paper therefore provides empirical evidence on the factors that determines commercial banks cost efficiency in Nigeria such as; total revenue, other earning asset, total deposit, interest expenses, and equity were found to be the factors influencing the cost of the banks. The paper however provides evidence that; high cost may not imply that a particular bank is not cost efficient. For example, GTB has the highest cost but is cost efficient because the bank (GTB) efficiency score falls within the industry average efficiency score of **0.112** despite its high cost of operation.

1.0 Introduction

An efficient credit market is characterized by competition and easy access to a wide range of capital markets. According to BBC English Dictionary (1992), efficiency as a concept is the quality of being able to do a task successfully and without wasting time or energy. Efficiency also refers to the difference between the amount of energy a machine needs to make it work, and the amount it produces. In the light of the above definition, efficiency can be defined as the ratio of input and output to generate a given level of output in a given time. Orji (1990), "defined banking efficiency as a measure or ratio of total credit granted in the form of loans and advances to the total sum of money and capital received by the banking system (deposit liabilities)". Two central features have been ascribed to an efficient credit system, namely competition and access to broader capital markets. These features are essential because lack of one or both of them may subject borrowers to uncompetitive interest rates, insufficient credit or both. **Drabenstott** (1995) has argued that the most successful credit programmes, whether

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aimed at agriculture or at any other sector of the economy have focused on enhancing market efficiency while avoiding credit subsidies.

The banking systems in most countries have been negatively affected by the global financial crisis. In view of this, the efficiency and cost optimization have become essential for commercial banks. Moreover, in Nigeria, the existence of a solid and efficient banking system is a crucial condition for a sustainable economic growth. The banking systems in Nigeria have experienced, in the last few decades, similar phases in their way towards a market economy. The liberalization, the reform of the legislative framework and the privatization were the main factors that have influenced the banking activity at the beginning of the 1990s. The end of the century depicted how these banking systems were dealing with transition-specific problems: growth of inflation, negative interest rates and bankrupt banks (Mihai and Cristi, 2014).

Cost is one of the indices used to measure the efficiency of the bank. It includes cost of materials, vehicles, office structures and so on. The success of a government in achieving broad-based economic growth depends largely on the ability to efficiently utilize the available resources. (Ikhide, 2008). The implication of commercial banks efficiency is that a more efficient banking system benefits the real economy by allowing higher expected returns for savers with a financial surplus, and lower borrowing costs for investing in new projects that need external finance.

There are at least three reasons for focusing on cost efficiency of banks as an indication of progress. First, greater relative cost efficiency may be associated with the changes in incentives and constraints in banking associated with structural and institutional reforms and with the more efficient provision of public services by the state, such as the rule of law. Second, efficiency gains reduce the resources associated with operation of payments systems and with intermediation of savings into investments. Like productivity gains in other economic sectors, greater cost efficiency in banking contributes directly to overall economic development. Third, cost efficiency may be associated with other dimensions of bank performance that contribute to overall development, such as the making of more productive loans, but that cannot be directly measured with available bank-level data. This association may exist if factors that contribute to greater cost efficiency also promote improvement in other aspects of banking performance. (Fries & Taci, 2005).

Bank operating expenses should be considered as a determinant and prerequisite for improving bank performance, since expenditures are controllable expenses and if efficiently managed can contribute positively to the performance of commercial banks. It is against this background that this study examines the determinants of cost efficiency of commercial banks in Nigeria banking sector. This paper is organized as follows. The first section presents the introduction to the study. Section two reviews literature on cost efficiency in the banking industry. Section three presents research methodology. Section four presents the findings from the estimation results and section five concludes and provides policy implications of the study.

2.0 Review of Literature

2.1 Theoretical Review: Cost efficiency;

The concept of cost efficiency is rooted in the neo-classical microeconomic theory, which focuses on resource allocation and utilization. It advocates non-wastage of resources by emphasizing cost reduction while producing the maximum possible level of output for a given technology and available inputs

(Cohen and Cyert (1975). Thus, a firm that is economically efficient may possess competitive advantage over other rival firms' which produces less efficiently in the same industry. The main driving force behind cost efficiency is value creation (Cohen and Cyert, 1975).

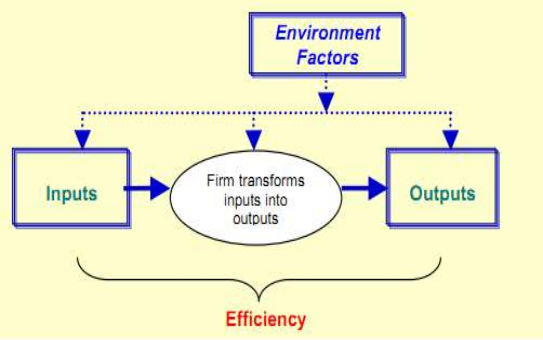
Cost efficiency measures how close a bank's cost is to the minimal cost for producing a certain level of output with given input prices and technology. The structural approach usually relies on the economics of cost minimization or profit maximization, where the performance equation denotes a cost function or a profit function. Occasionally, the structural performance equation denotes a production function. While estimating a production function might tell us if the firm is technically efficient, i.e., if managers organize production so that the firm maximizes the amount of output produced with a given amount of inputs (so that the firm is operating on its production frontier), we are more interested in economic efficiency, i.e., whether the firm is correctly responding to relative prices in choosing its inputs and outputs, which subsumes technical efficiency.

Cost inefficiency measures the change in a bank's variable cost adjusted for random error, relative to the estimated cost needed to produce an output bundle as efficiently as the best-practice bank in a sample facing the same exogenous variables. These include variable input prices, variable output quantities and fixed net puts (inputs and outputs). It arises due to technical inefficiency, which results in the use of an excess or sub-optimal mix of inputs given input prices and output quantities. The value of cost inefficiency can be equal to or greater than one. It is equal to one for the best-practice commercial bank within the given sample. If it is greater than one, then the bank is thought of as wasting a certain proportion of its resources relative to a best practice bank facing the same condition. Thus, the higher the value of the cost inefficiency, the greater the inefficiency. The reasons why cost efficiency is important, is basically based on the efficiency concept by Farrel (1957) that a bank seeks cost minimization. As bank managers tend to be cost minimizers, cost efficiency should be regarded as important.

The cost efficiency ratio (TCTA) is an indicator of banking efficiency, it measures the overhead cost relative to total assets. According to Kiyota (2009), the value of cost inefficiency can be equal to or greater than one. It is equal to one for the best practice commercial bank within the given sample. If it is greater than one, then the bank is thought of as wasting a certain proportion of its resources relative to a best practice bank facing the same condition. Thus, the higher the value of the cost inefficiency, the greater the inefficiency.

In general, the efficiency analysis of a production or service unit refers to the comparison between the outputs and inputs used in the process of producing a product or services. For lucidity, the process is shown in Figure 1.

Fig.1 Efficiency Analysis Framework



Source: Adapted from Chu & Lim (1998); Ahmad Mokhtar, Abdullah & Alhabshi (2005).

Efficiency measurement is one aspect of a firm's performance. Efficiency can be measured with respect to maximization of output, minimization of cost or maximization of profits. In general, efficiency is divided into two components (Kumbhakar & Lovell, 2003). A firm is regarded as technically efficient if it is able to obtain maximum outputs from given inputs or minimize inputs used in the production of given outputs. The objective of producers here is to avoid waste. According to Koopmans (1951), "a producer is considered technically efficient if, and only if, it is impossible to produce more of any output without producing less of some other output or using more of some input".

Figures 1 explain the cost economic production theory to the behaviour of a banking firm, regards the bank as using a combination of inputs to produce one or more outputs. Essentially, banks are seen as attracting deposits and incurring interest expenses, salary expenses, premises and fixed assets as well as other non-interest expenses (as inputs) to generate loans and investments/earning assets and total interest income (as outputs).

2.2 Empirical Review

Kumbhakar and Sarkar (2005) used the stochastic cost frontier analysis to examine the efficiency of the Indian banking system using panel data for the period 1986-2000. They used a translog specification of the cost frontier to estimate the efficiency of the individual banks. The data set related to 27 public sector banks and 23 private sector banks. Their results indicated that Indian banks, on average, do exhibit the presence of cost inefficiency in their operations. However, there is a tendency for inefficiencies to decline over time. Further, they found that deregulation in the Indian banking sector resulted in an increase in the cost inefficiency of the Indian banks and a decline in the rate of inefficiency reduction.

Bonin et al. (2005) examined the effects of ownership on bank efficiency for eleven transition countries over the period 1996 to 2000, using SFA. Their findings revealed that foreign banks are more cost-efficient than other banks. Moreover, bank size was found to be negatively correlated with efficiency. Fries and Taci (2005) investigated cost efficiency of banks in 15 East European countries over the period 1994 to 2001. The results showed that private banks are more efficient than state-owned banks. The authors underlined the non-linear association between a country`s progress in banking reform and cost efficiency.

Bank operating expenses should be considered as a determinant and prerequisite for improving bank performance, since expenditures are controllable expenses and if efficiently managed can contribute positively to the performance of commercial banks. The experience from South Eastern Europe banks is that SEE banks lacked substantial competence in expenses management to the extent of failing to pass over the increased costs to customers so that banks maintain their profits (Athanasoglou et al., 2008). In addition, Interest expenses are part of bank expenses which implies that the higher the interest costs, the lower the rate of return on equity, which means that interest expenses are bank expenses which should be managed efficiently to improve on bank profitability. The inference from the reviewed literature shows that deposits constitute a cheap and stable financial source of funding compared to other alternatives such as equity capital and borrowed capital (Bank of Uganda, 2010). The implication is that higher funding costs have a negative impact on bank profitability. Consequently, capital structure is among the main determinants of bank performance (Molyneux and Thornton, 1992; and Goddard et al., 2004).

Weill (2006b) analyzes the evolution of cost efficiency of 93 French banks, over the period 1992-2000. The author uses two parametric approaches to calculate the cost efficiency scores: the Stochastic

Frontier Approach (SFA) and a system of equations composed of a Fourier-flexible cost function and its associated input cost share equations derived using the Sheppard's lemma. The results show an increase in cost efficiency between 1992 and 2000, the average scores going from 77.20% to 83.98%. According to the Rosse-Panzar test of competition, the increase in efficiency is not related to the increase in competition.

Applying standard econometrics frontier approach, Ikhide (2008) examines cost efficiency of commercial banks in Namibia. The cost structure of the banks was estimated using loans as output of the three input factors: labour, capital and deposit. Results of the study indicate that efficiency of commercial banks can be improved by increasing their scale of operations. In other words, there are substantial economies of scale to be exploited to enhance sector‘s efficiency. The findings suggest that more efficient combination of inputs will reduce operating costs and stimulate efficiency in the Namibian commercial banking sector.

Aikaeli (2008) investigates efficiency of commercial banks in Tanzania. Utilizing secondary time series data of the Tanzanian banking sector, the paper examines technical, scale and cost efficiency of banks. Data Envelopment Analysis (DEA) model was applied to derive efficiency estimates of banks. Results of the study suggest that overall bank efficiency was fair, and there was room for marked improvements on all the three aspects of efficiency examined. Foreign banks ranked highest in terms of technical inefficiencies. Cost inefficiencies of banks was attributed to inadequate fixed capital, poor labour compensation, less management capacity as banks expanded and accumulated excess liquid assets.

Poghosyan and Poghosyan (2010) conducted an empirical study across 11 Central and Eastern European countries to examine the impact of ownership on the cost efficiency of banks-a cross-countries over the period 1992-2006 using SFA. The finding of the study indicated that Foreign Greenfield banks are characterized by superior cost efficiency, compared to domestic and foreign acquired banks.

Rama et, al (2012) carried out a study to examine the relationship between cost efficiency and ownership structure of commercial banks in Ethiopia using data envelopment analysis (DEA). Moreover, the study made an attempt to explore the key factors that affect the cost efficiency of the commercial banks using the Tobit model. In measuring the cost efficiency of the commercial banks the study used the input-oriented BCC model. The study found that the average cost efficiency of state-owned commercial banks over the period 2000-2009 is 0.69 while that of the private commercial banks is 0.74. The aggregate cost efficiency of Ethiopian commercial banks is found to be 0.73. The Kruskal-Wallis (K-W) non-parametric test indicates that the difference between the cost efficiency of the state-owned and private commercial banks is statistically insignificant. The study found little statistical evidence to conclude that the state-owned commercial banks are less cost efficient than the private commercial banks. Thus, ownership structure has no significance influence on the cost efficiency of commercial banks in Ethiopia. In addition, the study has identified bank size, loan loss reserve to total assets, market share, market concentration, capital adequacy, and return on average assets as the key factors that influence the cost efficiency of the commercial banks.

Pancurova and Lyocsa (2013) estimate the cost efficiency and their determinants for a sample of 11 central and Eastern European countries over the 2005-2008 periods by using data envelopment analysis. They found evidence that the size and financial capitalization of banks are positively associated with cost efficiency but the loans to asset ratio was negatively associated with cost efficiency.

Using Kenyan commercial banks sample, Odunga (2016) studied the determinants of bank operating efficiency, and found bank capital adequacy as one of the most significant factors which affect bank operating efficiency. According to Odunga (2016), for banks to manage their operating cost, they need to increase their capital. Another study by Odunga (2016) on determinant of bank liquidity also found capital adequacy as the important determinant of liquidity, which means that banks with more capital are more operationally stable and can easily survive financial down turns.

In a recent study that uses data for 16 listed banks in Thailand over the 1997–2016 period, Tran and Vo (2018) examine the causal effect of IC performance on bank financial performance. With respect to the components of IC, the study shows that bank profitability is mainly influenced by capital employed efficiency. The study finds furthermore that human capital efficiency marginally decreases bank profitability in the period under consideration while it has positive effects on future profitability.

Eferakeya and Erhijakpor (2020), carry out a study to examine the determinants of operating efficiency of Nigeria's banking sector for the period 2002 to 2019. It employed the Data Envelopment Analysis (DEA) model and Tobit Regression model. Descriptive statistics were employed where the Jarque-Bera statistic was used to confirm normality and the Likelihood ratio to confirm the existence of no panel level effects The relatively low robust standard errors confirmed no existence of heteroscedasticity problem. The results from the DEA for the dependent variable (operating efficiency) showed that the Nigerian banking sector was both efficient and inefficient during the period. The Tobit regression estimation results show that bank size and intermediation ratio were positive and significant in determining banking sector operating efficiency while overhead cost ratio, credit risk and inflation rate were negatively significant in determining operating efficiency.

3.0 Methodology

3.1 Nature and source of data

Secondary data were used in this study. The variables used include: the dependent variable (Total cost/Total Assets (TCTA)) annual figure for the ratio of all the interest expenses and other operating expenses total assets as measured by banks' cost. The independent variables employed are total revenue (Interest and discount income) to total assets, the ratio of total loan to total assets, other earning assets to total assets, total deposit to total assets, interest expenses to total deposit, personnel expenses to total assets, other operating expenses to fixed assets and equity to total assets. The data were sourced from Central Bank of Nigeria Statistical Bulletin and bank' annual financial statement of account. The data covered the period 2002-2019

3.2 Model Specification

The model specified to suit the objective of this study is to satisfactorily capture the impacts of cost determinants on cost efficiency of commercial banks in Nigeria. The model for this study is specified in the following functional form.

$$TCTA = f\left(TRTA, TLTA, OEATA, TDTA, IETD, PETA, OOEFA, ETA\right) \quad (1)$$

Transforming this functional representation into linear equation or explicit form:

$$\begin{aligned} TCTA = {} & \alpha_0 + \alpha_1 \log TRTA_{it} + \alpha_2 \log TLTA_{it} + \alpha_3 \log OEATA_{it} + \\ & \alpha_4 \log TDTA_{it} + \alpha_5 \log IETD_{it} + \alpha_6 \log PETA_{it} + \alpha_7 \log OOEFA_{it} + \alpha_8 \log ETA + \mu_{it} \end{aligned} \quad (2)$$

Where:

TCTA= Total cost to total assets

TRTA= Total revenue to total assets

TLTA= Total loan to total assets

OEATA= Other earning assets to total assets

TDTA= Total deposit to total assets

IETD= Interest expenses to total deposit

PETA= Personnel expenses to total assets

OOEFA= Other operating expenses to fixed assets

ETA= Equity to total assets

α_0- α_8 are the coefficient of elasticities/parameters to be estimated.

μ_t is the stochastic error term

3.3 Estimation Technique

Fourteen (14) commercial banks (Access, Diamond, Fcmb, Fidelity, First bank, GTB, Sky bank, Stanbic-IBTC, Sterling, UBA, Union, Unity, Wema, and Zenith) were selected using purposive sampling technique. Because of the characteristics of the data which is panel in nature that is there are 14 commercial banks from 2002 to 2019 which gives rise to 252 pooled data points. The study used panel analytical techniques, such as panel unit root analysis, and panel regression.

3.4 Empirical Results and Discussion

This section deals with the model estimation and interpretation. The estimation starts from unit root analysis, panel regression and cost efficiency ratio.

3.4.1 Unit Root Test

Most time series variables are usually non-stationary and using non-stationary variables in the model might lead to spurious regressions Granger and Newbold, (1977) or in Yule (1926) term 'nonsense' regression. The first or second difference terms of most variables will usually be stationary Ramathan, (1992). Hence the variables were tested at levels, first and second difference for stationarity. For common unit root, we use Levin, Lin and Chu panel unit root test and for individual unit root process, we use the ADF-Fisher Chi-square test, and the PP-Fisher Chi-square panel unit root test. As shown in table 1 below. In this section, the analyses continue with a test of unit root to avoid "spurious" or "nonsense" regression results. The results of Levin Lin and Chu test, ADF-Fisher Chi-square test, and PP-Fisher Chi-square test indicates that most of the variables are stationary at first difference and thus follow an I(1) process.

Table 1: Panel Unit Root Test Cost Indices Null Hypothesis Ho: Series has Unit Root at Level

Variable	Level I(0)					
	L,L&C	Prob.	ADF-F Chi	Prob.	PP-F Ch	Prob.
TCTA	-0.91	0.1821	1.65	0.4377	1.26	0.5337
TRTA	-0.36	0.3596	1.34	0.5116	2.00	0.3681
TLTA	-0.64	0.2619	0.90	0.6363	0.92	0.6343

OEATA	-0.92	0.1793	1.97	0.3738	2.18	0.3369
TDTA	-2.17	0.0151**	3.88	0.1435	4.50	0.1056
IETD	-2.50	0.0061*	8.73	0.0127**	3.24	0.1979
PETA	-2.06	0.0196**	5.06	0.0798***	10.01	0.0067*
OOEFA	-0.48	0.3172	2.47	0.2903	2.63	0.2681
ETA	-3.48	0.0002*	9.57	0.0084*	3.75	0.1536
First difference I(1)						
TCTA	-2.82	0.0024*	6.81	0.0332**	11.10	0.0039*
TRTA	0.54	0.7057	6.85	0.0326**	26.29	0.0000*
TLTA	-0.48	0.3146	8.59	0.0136**	263.39	0.0000*
OEATA	-2.92	0.0018*	9.02	0.0110**	11.57	0.0031*
TDTA	-2.00	0.0225**	4.01	0.1347	2.74	0.2539
IETD	-3.75	0.0001*	9.72	0.0078*	3.46	0.1777
PETA	-3.01	0.0013*	12.88	0.0016*	178.71	0.0000*
OOEFA	0.52	0.6975	2.56	0.2782	8.91	0.0116**
ETA	-1.64	0.0509**	13.17	0.0014*	0.12	0.9425
Second difference I(2)						
TRTA	0.12	0.5489	-	-	-	-
TDTA	-	-	8.97	0.0113**	15.40	0.0005*
IETD	-	-	-	-	10.96	0.0041*
OOEFA	-	-	5.12	0.0773***	-	-
ETA	-	-	-	-	4.37	0.1127

Levin Lin and Chu Test: Assumes common unit root process
ADF-Fisher Chi-square: Assumes individual unit root process
PP-Fisher Chi-square: Assumes individual unit root process
** Probabilities for Fisher tests are computed using an asymptotic chi-square distribution
Exogenous variables individual effects, individual linear trend
Automatic lag length selection based on SIC Balanced observation for each test
*** indicates stationary at 10 percent, ** stationary at 5 percent and * stationary at 1percent.

3.4.2 Regression Analysis

The main objective of this study is to examine the determinants of cost efficiency of commercial banks in Nigeria. To carry out this objective, a multiple regression analysis using panel regression was conducted and the result is as presented in table 2 below.

Table 2: Cost model estimation

DETERMINANTS OF TOTAL COST (TC) EFFICIENCY INDICES				
Statistics	**Parameters**	**Pooled Effect**	**Fixed Effect**	**Random Effect**
Coefficient		-0.356256	-1.497900	-1.000613
Prob.	Constant	**0.0023**	**0.0004**	**0.0043**
Coefficient		0.227925	0.264983	0.361386
Prob.	TRTA	**0.0063**	**0.0010**	**0.0000**
Coefficient		-0.153725	-0.196134	-0.015829
Prob.	TLTA	**0.2537**	**0.1342**	**0.8884**
Coefficient		0.060891	0.094179	0.093521
Prob.	OEATA	**0.2488**	**0.0812**	**0.0442**
Coefficient		-0.276894	-0.362653	-0.277467
Prob.	TDTA	**0.0193**	**0.0030**	**0.0155**
Coefficient		0.210758	0.244461	0.181537
Prob.	IETD	**0.0103**	**0.0043**	**0.0112**
Coefficient		0.103468	0.070721	0.094421
Prob.	PETA	**0.2500**	**0.4393**	**0.2385**
Coefficient		0.016692	0.005639	-0.089497
Prob.	OOEFA	**0.7681**	**0.9186**	**0.0819**
Coefficient		-0.055742	-0.116582	-0.099045
Prob.	ETA	**0.2530**	**0.0249**	**0.0167**
Coefficient		1.212441	1.115373	0.710904
Prob.	TCTA(-1)	**0.0001**	**0.0000**	**0.0000**
R-squared				
Adj. R-squared		0.480770	0.563292	0.441780
F-Statistic		0.454678	0.509291	0.418303
Prob.		18.42600	10.43105	18.81792
Durbin-Watson stat		**0.000000**	**0.000000**	**0.000000**
		1.758380	1.814198	1.375479
Husman Test (Chi Sq. and (p-value)	**Cross-section random**		**19.980419 (0.0180)**	
Likelihood Ratio (Chi Sq. and (p value)	**Cross-section F**		**2.703639 (0.0016)**	
	Cross-section Chi-square		**36.347292 (0.0005)**	

Source: Authors' Computation (2019) using E-views 10

The result in table 2 shows that, Total Revenue was found to be positively related to cost; this is in agreement to a priori expectation. Since the regressors in the model are in percentages, therefore, a 1% increase in Total Revenue will lead to a significant increase in cost efficiency of the banks by 0.26 on the average. This means that the reform policies geared towards improving the revenue by the regulators had a positive impact on cost.

Other Earnings Assets was found to be positively related to cost and is statistically significant. The positive relationship conformed to a priori expectation. The result indicates that a 1% increase in Other Earning Asset will lead to a significant in increase cost efficiency by 0.09.

Total Deposits was found to be negatively related to cost and is statistically significant. The negative relationship does not conform to a priori expectation. This means that a 1% increase in Total Deposits will lead to a significant reduction in cost efficiency by 0.36.

Interest Expenses was found to be positively related to cost and statistically significant. The positive relationship does not conform to a priori expectation. This implies that a 1% increase in IETD will result to an increase in cost of operation by 0.24 therefore, lowering cost efficiency.

Equity was found to be negatively related to cost and is statistically significant. A negative relationship implies that more efficient banks use less equity and less efficient banks hold more equity. The result therefore implies that a 1% increases in ETA will lead to a significant reduction in cost efficiency by 0.11

One year lagged TCTA (TCTA (-1)) has a positive and significant relationship on cost of the banks, indicating that a rise in the previous value of TCTA would have increasing effect on TCTA.

R-squared (R^2) is 0.56. Deductively, the rate of ICT compliance, corporate governance such as differences in management style or managerial talent, and qualities that focus on efficiency through cost initiative that can reduce banks operational cost, adherence to prudential guideline by the apex bank are responsible for 56% of the variations in cost efficiency of the banks. The F- statistic for the entire model is significant at 1%. Therefore, the empirical model adopted in the study for describing the determinants of commercial banks efficiency is statistically significant.

One way to take into account the "individuality" of each bank or each cross-sectional unit is to let the intercept vary for each bank but still assume that the slope coefficients are constant across firms. This is as shown by the FEM or LSDV result. This indicates that the fourteen commercial banks are heterogeneous and the pool regression may not be appropriate. This difference in the intercepts may be due to unique features of each bank, such as differences in management style or managerial talent. Comparing the results of fixed-effect and random effect regressions, it is obvious that there are substantial differences between the two. The important question now is: which results is reliable? Or put it differently, which should be the choice between the two models? To solve this, the ***Hausman test*** was applied to shed light on this question. The null hypothesis underlying the Hausman test is that the FEM and ECM estimators do not differ substantially. The test statistic developed by Hausman, (1978) has an asymptotic Chi-square (χ^2) distribution. If the null hypothesis is rejected, the conclusion is that ECM is not appropriate and that we may be better off using FEM.

From the Hausman test result above; since the Chi-square value is statistically significant at 5 percent level of significance, we reject the hypothesis that there is no significant difference in the estimated coefficients of the two models (FEM and REM). Meaning the FEM is appropriate. This signifies that the commercial banks though from the same population have different individual characteristics.

3.4.3 Bank efficiency cost ratio

Appendix 1 indicates the banks cost efficiency score in ratio of overhead cost to total assets and their mean score indicating the industry average efficiency score for the banks under consideration. Any ratio less than the industry cost efficiency score is efficient, while any ratios above the industry cost

efficiency score is inefficient. The highest average industry efficiency score was **0.112** during the period under study, only Diamond, First bank, GTB, Stanbic-IBTC, UBA, Union bank, and Zenith bank are cost efficient while Access bank, Fidelity bank, Skybank, Sterling bank, Unity bank and Wema bank were cost inefficient.

4.0 Discussion

The study found five of the explanatory variables (Total Revenue, Other Earning Assets, Total Deposit, Interest Expenses, and Equity) to have significant influence on the cost of the banks. The result of the study is consistent with the findings of Chuling (2009), Rama and Tekeste (2012) who found significant and positive association between capital adequacy and cost efficiency of banks. The positive correlation between interest expenses and cost, Personnel expenses and cost, other operating expenses and cost are consistent with the finding of Kiyota et al (2007), Isik and Hassan (2002), and Frimpong (2010) who found positive correlation between inputs prices of commercial banks and cost. The positive relationship between total assets and cost efficiency of the banks is consistent with the findings of Pancurova and Lyocsa (2013) who found that the size and financial capitalization of banks are positively associated with cost efficiency but the loans to asset ratio was negatively associated with cost efficiency. By implication, commercial banks are less cost efficient as the coefficient of prices of inputs is positively correlated with cost efficiency indices.

5.0 Conclusion and Recommendations

The study examined the determinants of commercial banks cost efficiency in Nigeria. The unit root test revealed that using the Levin Lin and Chu test, ADF-Fisher Chi-square test, and PP-Fisher Chi-square test result indicates that when tested for stationarity at first difference, the results of Levin Lin and Chu test, ADF-Fisher Chi-square test, and PP-Fisher Chi-square test indicates that most of the variables are stationary at first difference and thus follow an I(1) process. The panel regression result show that total revenue, other earning asset, total deposit, interest expenses, and equity were significant factors influencing the cost of the bank. The result of banks efficiency ratio indicate that Diamond bank, First bank, GTB, Stanbic-IBTC, UBA, Union bank, and Zenith bank are cost efficient while Access bank, Fidelity bank, Skybank, Sterling bank, Unity bank and Wema bank were cost inefficient. Cost (operating expenses) was found to be considerably high for all the banks under consideration, the increases in cost could be associated with expensive headquarters, separate investment in software and hardware, heavy fixed costs such as providing energy plant and other operating expenses. It is recommended that, banks management can operate joint venture more especially in the area of ICT and energy when there is close proximity. This can reduce cost in a way

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