THE IMPACT OF COMMERCIAL BANKS COST EFFICIENCY ON BANK PERFORMANCE IN NIGERIA

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Abstract
The study examined the impact of commercial banks cost efficiency on banks performance Nigeria. Annual data were employed and sourced from Central Bank of Nigeria Statistical Bulletin Various Issues and bank' annual financial statement of account. The data covered the period 2002-2019. The study used panel analytical techniques, such as panel descriptive statistic, panel correlation, panel unit root analysis, and panel regression. The empirical findings revealed that the constant term of FEM is significant, thereby rejecting the hypothesis that the banks are homogeneous. The fourteen banks are heterogeneous in terms of their performance. This heterogeneity among the banks may be as a result of differences in managerial style and talents. In terms of bank efficiency, higher levels of net interest margins, in general, indicate lower levels of bank efficiency. The study found two of the explanatory variables i.e. Total cost to total asset (TCTA) and Net interest margin (NIM) are statistically significant and positively correlated with banks performance. It is therefore recommended that commercial banks need to reduce their operating expenses such as expensive headquarters, separate investment in software and hardware, heavy fixed costs such as providing energy plant and other operating expenses to improve efficiency and effectiveness in their operations; banks management can also operate joint venture more especially in the area of ICT and energy when there is close proximity. This can reduce cost in a way. Higher levels of net interest margins (NIM) in general, indicate lower levels of bank efficiency. Bank management should embark on policy that will bridge the gap between interest income (loans, securities, etc) and interest expense (deposits, borrowed funds etc).

Keywords: Cost, efficiency, commercial banks and performance

Jel Classifications: D23, D61, G21, G29

Introduction

In any economy, the financial sector is the catalyst that facilitates economic growth through efficient allocation of resources to productive units. Banks play vital roles in economic developments within different states. The efficient banking systems are leverage force for development. Consequently, commercial banks appear to receive specific attention. Agreeing to "the modern theory of financial intermediation", banks

exist to perform two functions: 1) create liquidity; 2) transform risks; and these are the most important roles in the economic system (Sahyouni and Wang, 2018).

According to Allen and Rai (1996), financial performance can be defined as a subjective measure of how well a firm can use assets from its primary mode of business and generate revenues. This term is also used as a general measure of a firm's overall financial health over a given period of time, and can be used to compare similar firms across the same industry or to compare industries or sectors in aggregation. The performance measurement concept indicates that employees can increase the value of the firm by; increasing the size of a firm's future cash flows, by accelerating the receipt of those cash flows, or by making them more certain or less risky. There are many different ways to measure financial performance, but all measures should be taken in aggregation. Some of the indicators of financial performance are return on equity, liquidity ratios, asset management ratios, profitability ratios, leverage ratios and market value ratios.

The concept of cost efficiency is rooted in the neoclassical 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. 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.

Cost efficiency of banks is a broad measure of bank performance that has frequently been utilized in empirical banking literature over the last two decades. It measures the ability of a bank to operate at lower cost by comparing its cost structure to that of a best-practice bank. A vast literature on bank efficiency has focused on measuring the level and determinants of bank efficiency around the world, with the goal of improving the performance of financial institutions (Berger, Hasan and Zhou, 2009, Fuji, Managi and Matousek 2014, Goddard, Molyneux and Williams 2014).

Performance assessment of companies has been the subject of numerous studies, and several discussions in accounting and management have focused on the matter that which of the performance assessment criteria is more valid. Some people believe that there is no ideal criterion to measure the performance, but, by contrast, there are several assessment methods and each method has some major shortcomings. If such methods are applied to measure the performance and to determine the companies' value, they will not definitely be able to find out the real value of companies (Ngunyu, 2013).

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 role of banks whether in a developed or developing economy, consists of financial intermediation, provision of an efficient payments system and serving as conduit for the implementation of monetary policies. It has been postulated that if these functions are efficiently carried out, the economy will be able to mobilize meaningful level of savings and channel them in an efficient and effective manner to ensure that viable projects are not frustrated due to lack of funds.

Efficiency has become an essential emphasis in today's highly competitive financial business environment. It is against this background that this study aimed at analyzing the impact of commercial banks cost efficiency on bank performance in Nigeria over the past 18 years.

Contribution/Originality to knowledge:
Efficiency measurement is one aspect of investigating a firm's performance. Efficiency can be measured in three ways; maximization of output, minimization of cost, and maximization of profits. Financial variables have been applied to measure efficiency and performance of the banks. Cost, is one of the major determinants of efficiency and performance of banks. This paper therefore provides empirical evidence that there exists a significant relationship between cost and profit efficiency for the listed commercial banks. Cost efficiency influence stock returns of banks since poor cost management lowers banks' profits.

Empirical Literature Review
The evaluation of commercial bank efficiency/ performance has been approached from a variety of dimensions. Efficiency/performance evaluation of banks has used a variant of ratio analysis among several banks using a number of financial ratios (e.g. return on assets, return on investments). Basically, financial ratios can measure the overall financial soundness of a bank and the operating efficiency of its management. These ratios promise to provide valuable information about a bank's financial performance when compared with previous periods and for peer ranking. The main weakness of ratio analysis is that there is a lack of agreement on the relative importance of various types of input or output. A bank may appear to be performing well even if it is poorly managed on certain of these dimensions, as long as it compensates by performing particularly well on other dimensions (Sherman and Gold, 1985).

A commonly used ratio that bankers use to measure the overall cost effectiveness (or the operational efficiency) of an organization is the cost/income ratio (expense/income ratio or, as often termed in the US, the efficiency ratio). This is a measure that broadly expresses the total operating costs incurred by an organization as a percentage of its operating income. The costs of keeping the bank the same would include maintenance of existing systems or operational methods that are often of no incremental value to an organization so these should be commoditized and kept as low as possible to increase efficiency. The costs of changing the bank could include costs for new products, or new delivery channels for existing ones, and these costs can be linked to the income that they generate. Kenyan banks are presently under intense competition to improve efficiency and transform banking service delivery into networks encompassing traditional branches, automated tellers, telephone banking and the Internet. Because no template exists to guide this transformation, they have experimented by process reengineering, closing underperforming branches and introducing new and cheaper ways of banking (Kumbhakar, and Lovell, 2003).

A number of studies on Spanish banks also focused on efficiency and performance during the deregulation period. Among others are Grifell-Tatje and Lovell (1997), and Lozano (1997, 1998). The most important finding that is worth highlighting is that the efficiency and productivity of Spanish banks have not improved during the deregulated phase. Worse still, after the deregulation phase, the studies showed a reduced efficiency among Spanish savings banks (Khumbakar et al., 2001). The findings tend to suggest that the Spanish banks performed badly in terms of efficiency because the banks found it difficult to adjust themselves to the increased competition as a result of the deregulation.

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).

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 hence better performance.

Ncube (2009) examines the South African banking sector efficiency. The paper focused on cost and profit efficiency of banks in South Africa. Applying stochastic frontier model, the paper examined cost and profit efficiency of four small and four large banks. Results indicated that over the study period (2000-2005) South African banks significantly improved their cost efficiencies and no significant gains on profitability fronts. The results also indicate that there is a weak positive correlation between cost and profit efficiency of South African Banks. In addition, most cost efficient banks were also most profit efficient. A regression analysis of cost efficiency and bank size suggests a negative relationship with cost efficiency declining with increasing bank size.

Bisher (2011) examined the relationship between size and financial performance of commercial banks in Kenya. The objective of the study was to determine the relationship between Bank size and financial performance of commercial banks in Kenya. The study specifically aimed at determining the relationship between bank size factors, namely, total deposits, total loans, and total assets, and financial performance, and went further to investigate the relationship between branch network size and financial performance. The study adopted the descriptive design. correlation analysis, and multiple and simple linear regressions were applied to secondary data collected from available financial statements of all the 43 commercial banks in existence in Kenya as at 31st December, 2011.

The main findings of the study established strong correlations between all the studied factors of Bank Size. Total Deposits, Total Loans, Total Assets and Branch Network Size were all found to be correlated. The relationship between three of the size variables, namely, Total Loans, Total Deposits, and Total Assets and the Financial Performance of commercial banks were all found to be weak but statistically significant. Total Deposits and Total Assets had relatively stronger effects on Financial Performance compared to Total Loans. Number of relationship was found between Branch Network Size and Financial Performance for commercial banks in Kenya. The recommendations from the study include the need for bank policies that give greater importance to the determination and monitoring of individual branch and head office unit financial performance. Further studies that incorporate other performance factors, including branch cost efficiency is

recommended to give a clearer picture on the effects of this key factor in addition to the factors considered in this study (Ngunyu, 2013)

According to several studies, (Berger and Mester (2003), Kasman and Carvallo (2013)), the efficiency, measured by ratios (ratio of costs on outcome or ratio of overheads on assets) or estimated by parametric methods (SFA) and non-parametric (DEA), improves the performance of banks. Athanasoglou et al. (2008) proved a positive relationship in the case of Greek banks (1985-2001) and explained that a more effective bank is more capable of the best use of its resources and reduce its costs, which generate a better performance. This reasoning was picked up by Liu et al. (2010), in their analysis of the Japanese banks from 2000 to 2007, suggesting that regardless of the variable used to measure the performance (return on assets [ROA], return on equity [ROE] or net interest margin [NIM]), the cost efficiency has a positive impact on the performance. The study of Guillen et al. (2014) on the determinants of banking profitability, covering 12 South American countries, has concluded that cost-efficiency measured by DEA approach has a positive and significant effect on the performance measured by the ROE.

Obamuyi (2013) used panel secondary data (cross-sectional and time-series data) for studying 20 Nigerian commercial banks during the period 2006-2012, finding same key determinants of bank profitability. Ongore & Kusa (2013) study examined the effects of bank specific factors and macroeconomic factors on the performance of commercial banks in Kenya during the period from 2001 to 2010. They analyzed ten years panel data for 37 commercial banks, using linear multiple regression model. The study of Frederic (2014) examined the factors responsible for determining the performance of domestic commercial banks in Uganda. The study used linear multiple regression analysis over the period 2000-2011 to analyze the data of all licensed domestic and foreign commercial banks. The study found that, management efficiency; asset quality; interest income; capital adequacy and inflation influence on the bank's performance in Uganda.

Samina (2013) investigated the influence of some bank specific and macroeconomic indicators on the profitability and performance of commercial banks in Pakistan. She used ROE and ROA as measures of profitability. Her regression results show that credit risk, interest rate, total assets, and total debt to total assets ratios have significant impact on ROE. The results also show that credit risk and interest rate have significant impact on ROA. The variations in results according to the researcher were caused by differences in sizes of Pakistani banks.

Obamuyi (2013) examined the relationships between bank capital, size, interest income, expense management, the economic condition, and banks' profitability in Nigeria. He employed the fixed effects econometric model on a panel data of 20 banks for the period 2006 to 2012. His study findings confirm that the efficiency of bank capital, interest rate, expenses management and the economic situation of the country have a statistically significant influence on banks' profitability.

Durguti et al. (2014) used time series data during the period 2006 2013 to empirically investigate the determinants of banking system profitability in Kosovo. They used linear regression model to analyze the data of the three bank profitability measures (ROA, ROE and NIM). They examined the impact of capital adequacy, total loans to total assets, provision for loan losses to net interest income ratio, noninterest income to total income ratio and managerial efficiency. The study found that all these ratios are having strong influence on the profitability of Kosovo banks.

The study of Frederic (2014) examined the factors responsible for determining the performance of domestic commercial banks in Uganda. The study used linear multiple regression analysis over the period 2000-2011 to analyze the data of all licensed domestic and foreign commercial banks. The study found that, management efficiency; asset quality; interest income; capital adequacy and inflation influence on the bank's performance in Uganda. Moreover, there is empirical evidence that the level of operational efficiency, which is measured by the cost-income ratio or overhead costs over total assets, positively affects bank profitability (Athanasoglou et al., 2008; Goddard et al., 2009).

Ishmael and Benjamin (2015) conducted a study to investigate the relationship between profitability and a set of bank specific characteristics and macroeconomic factors on banks in Ghana for the period 1999-2010. The study confirmed that cost management has an inverse relationship with profitability, whereas bank size and liquidity have positive association with profitability of foreign and local banks. Their research results suggest that bankers should pay attention to cost maintenance, and prudent risk management to deliver profitability and performance.

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.

Ojo and Somoye, (2017) reviews the impact of commercial banks non-performing loans on financial development in Nigeria from 1981 to 2012. The authors employ unit root, causality, and co-integration tests and subsequently develop the Error Correction Models (ECM) econometric techniques to measure the impact of non-performing loans on the level of financial development in Nigeria. Also utilized time series data covering 1981-2012. The results show that non-performing loans, commercial bank interest rate, liquidity ratio and inflation exert long-run relationship and significant influence on financial development and banks performance.

Ogboru, (2019) investigates the relationship between asset quality and deposit money banks performance in Nigeria over a period of 30 years ranging from 1986 to 2016, utilizing time series data collected from the Nigeria deposit insurance corporation annual reports and accounts, CBN financial stability report and CBN statistical bulletin for various years. The variables of study include return on asset (ROA) proxy for Deposit Money Bank performance in Nigeria, ratio of non-performing loan to total loan (PLN), ratio of liquid assets to total assets (LAT) and ratio of liquid assets to short term liabilities (LAS) as a measures of asset quality. The study utilizes both the descriptive and econometric techniques to analyze the time series data. The result shows that there is short run relationship between asset quality and deposit money bank performance in Nigeria. Also, the co-integration result reveals the presence of a long run relationship between asset quality and deposit money bank performance in Nigeria while the granger causality result shows evidence of causality between asset quality and deposit money bank performance in Nigeria.

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/performance 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.

However, empirical results are mixed and inconclusive. Whereas some studies have reported a negative and significant effect of cost efficiency on profitability (Sufian, 2009a, b; Sufian, 2012; Ahmad and Matemilola, 2013; Dietrich and Wanzenried, 2014; Capraru and Ihnatov, 2015; Pervan et al., 2015), others have reported a negative but insignificant impact (Athanasoglou, et al., 2008; Medeiros et al., 2016).

Methodology

Nature and source of data

Secondary data were used in this study. The variables used include: the dependent variable: annual figure for the ratio of profit after tax divided by total assets as measured by banks' profit. The explanatory variables employed are total cost (includes both interest and operating expenses) divided by total assets, net interest margin, is the difference between interest income (loans, securities etc.) and interest expense (deposits, borrowed funds, etc.) of bank, and the interest rate margin. The data were sourced from Central Bank of Nigeria Statistical Bulletin Various Issues and bank' annual financial statement of account. The data covered the period 2002-2019.

Model Specification

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

$$PAT = f(TCTA, NIM, IRM) \text{----------(1)}$$

Transforming this functional representation into linear equation or explicit form:

$$PAT = \alpha_0 + \alpha_1 \log TCTA_{it} + \alpha_2 \log NIM_{it} + \alpha_3 \log IRM_{it} + \mu_{it} \text{ - - - -(2)}$$

α_0- α_3 are the coefficient of elasticities/parameters to be estimated.

μ_t is the stochastic error term

Where:

PAT = profit after tax divided by total assets.

TCTA = total cost (includes both interest and operating expenses) divided by total assets.

NIM = net interest margin, is the difference between interest income (loans, securities etc.) and interest expense (deposits, borrowed funds, etc.) of bank j in period t;

IRM_{jt} = the interest rate margin of the jth bank in period t,

Estimation technique

Because of the characteristics of the data which is panel in nature that is there are 14 sampled licensed 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.

Empirical results and discussion

This section deals with the model estimation and interpretation. The estimation starts from descriptive statistic, correlation, unit root analysis and panel regression.

Table 1: Banks performance descriptive statistic

	PAT	TCTA	NIM	IRM
Mean	12482.56	0.095778	36815.06	7.754417
Median	3587.000	0.105500	21807.50	7.777500
Maximum	47375.00	0.143000	108536.0	11.06400
Minimum	-16385.00	0.052000	1603.000	3.509000
Std. Dev.	18256.85	0.024421	35150.33	1.927681
Skewness	0.847717	-0.231954	0.492928	-0.219274
Kurtosis	2.531791	2.329059	1.794120	2.773992
Jarque-Bera	4.640574	0.998059	3.639091	0.365106
Probability	0.098245	0.607119	0.162099	0.833140
Observations	252	252	252	252
Cross sections	14	14	14	14

The Jarque-Bera normality test was carried out to ascertain whether the computed values of skewness and kurtosis of the series depart from the norms of zero (0) for skewness and three (3) for kurtosis. The results obtained from Jarque-Bera normality test from table 4.14 indicates that the skewness for the series are not consistent with the norms of zero (0) for skewness, that is, not normally distributed as most values of these indices are negatively skewed and positively skewed. In the same manner, kurtosis as a measure of the peakness of the probability distribution of the variables indicates that most values of the variables for banks efficiency indices are greater than three (>3) leptokurtic distribution and less than three (<3) platykurtic distribution. This implies that the results obtained are not consistent with the norms of K=3 for normal distribution, meaning that the series are not normally distributed.

Table 2: Bank performance Correlations Matrix

	PAT	TC	NIM	IRM
PAT	1			
TC	-0.028	1		
NIM	0.264	-0.242	1	
IRM	-0.628	0.071	-0.243	1

The correlation matrix shows the degree of the correlation between dependent and independent variables. We expect a high correlation between dependent and independent variables, and weak correlation among the explanatory variables, because high correlation among the independent variables may result to multicollinearity. Based on the low values of the explanatory variables; therefore, there is no multicollinearity among the variables.

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 the variables are stationary at first difference and thus follow an I(1) process.

Table 3: Panel Unit Root Test Results banks performance indices Null Hypothesis Ho: Series has Unit Root at Level

Variable	Level					
	L,L&C	**Prob.**	**ADF-F Chi**	**Prob.**	**PP-F Ch**	**Prob.**
PAT	-0.86	0.1939	2.27	0.3214	2.71	0.2583
TCTA	-0.91	0.1821	1.65	0.4377	1.26	0.5337
NIM	-0.20	0.4190	0.44	0.8023	0.34	0.8449
IRM	-2.57	0.0050*	5.65	0.0591**	5.19	0.0747***
First difference						
PAT	-1.75	0.0401**	7.01	0.0300**	19.46	0.0001*
TCTA	-2.82	0.0024*	6.81	0.0332**	11.09	0.0039*
NIM	-2.47	0.0006*	7.06	0.0292**	11.07	0.0039*
IRM	-3.76	0.0001*	10.52	0.0052*	19.50	0.0001*

****** indicates stationary at 10 percent, ** stationary at 5 percent and * stationary at 1 percent.***

Regression Analysis

The main objective of this study is to examine the impact of commercial cost efficiency on banks performance in Nigeria. To carry out this objective, a multiple regression analysis using panel regression was conducted and the result is as presented in table 4 below.

Table 4: Banks performance model estimation

MODEL 4:DETERMINANTS OF COMMERCIAL BANKS PERFORMANCE INDICES				
Statistics	**Parameters**	**Pooled Effect**	**Fixed Effect**	**Random Effect**
Coefficient		-0.130061	-0.210157	-0.160711
Prob.	Constant	**0.0090**	**0.0004**	**0.0073**
Coefficient		-9.611834	5.555332	-2.534103
Prob.	TCTA	**0.0023**	**0.0046**	**0.0011**
Coefficient		1.579007	0.128820	3.870240
Prob.	NIM	**0.0013**	**0.0001**	**0.0001**
Coefficient		0.223498	0.274432	0.209963
Prob.	1RM	**0.2141**	**0.1247**	**0.3051**
Coefficient		0.933830	0.810696	0.745830
Prob.	PAT(-1))	**0.0000**	**0.0000**	**0.0000**
R-squared				
Adj. R-squared		0.580995	0.624956	0.538777
F-Statistic		0.571385	0.592026	0.530859
Prob.		60.45614	18.97795	68.04465
Durbin-Watson		**0.000000**	**0.000000**	**0.000000**
stat		2.216401	2.196404	2.445808
Husman Test(Chi Sq. and (p-value)	**Cross-section random**			**29.177589 (0.0000)**
Likelihood Ratio (Chi Sq. and (p-value)	**Cross-section F**			**1.848404 (0.0380)**
	Cross-section Chi-square			**24.828099 (0.0243)**

Source: Author Computation (2019) using E-views 10

The results from table 4 show that, total cost to total asset (TCTA) net interest margin (NIM), and profit after tax (PAT) are statistically significant while interest rate margins is not.

Total cost to total asset (TCTA) has positive relationship with profit after tax (PAT) and is statistically significant. The result implies that a 1% increase in total cost to total asset (TCTA) will lead to a significant increase in banks performance (PAT) by 5.56 million naira on average.

Net interest margin (NIM) has positive relationship with profit after tax (PAT) and is statistically significant. The result implies that a 1% increase in net interest margin (NIM) will lead to a significant increase in banks performance (PAT) by 0.13 million naira on average. NIM is regarded as a good baseline measurement of the profitability of a bank's core lending and borrowing business; higher margins can be a sign of great management among banks in similar lines of business. On the other hand, it could lead to riskier lending policies. That is, narrower margins can suggest trouble on the deposit side and a higher cost of funds. However, in terms of bank efficiency, higher levels of net interest margins, in general, indicate lower levels of bank efficiency.

When the banks performance are regressed against profit after tax, one year lagged PAT, (PAT(-1)) has a positive and significant relationship on the current level of banks performance, indicating that a rise in the variable would have increasing effect on PAT.

In terms of bank efficiency, higher levels of net interest margins, in general, indicate lower levels of bank efficiency. The study found two of the explanatory variables i.e. Total cost to total asset and Net interest margin (NIM) are statistically significant and positively correlated with banks performance. The result of the study is consistent with the findings of Frederick (2014) that found positive relationship between Net interest margin (NIM) and banks performance.

R-squared (R^2) is 0.62. 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 62% of the variations in cost efficiency banks performance. The F- statistic for the entire model is significant at 1%. Therefore, the empirical model adopted in the study for describing the impact of commercial banks cost efficiency on bank performance 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 banks. This is as shown by the FEM 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 1 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.

Conclusion and recommendations

The study examined the impact of commercial banks cost efficiency on bank performance 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 the variables are statistically significant and are stationary at first difference and thus follow an I(1) process. The panel regression result show that the constant term of FEM is significant, thereby rejecting the hypothesis that the banks are homogeneous. The fourteen banks are heterogeneous in terms of their performance. This heterogeneity among the banks may be as a result of differences in managerial style and talents. In terms of bank efficiency, higher levels of net interest margins, in general, indicate lower levels of bank efficiency.

The study found two of the explanatory variables i.e. total cost to total asset and Net interest margin (NIM) are statistically significant and positively correlated with banks performance. The result of the study is consistent with the findings of Frederick (2014) that found positive relationship between Net interest margin (NIM) and banks performance. It is concluded that, in as much as cost, profit, net interest margin, and interest rate and are the major determinants of efficiency and performance, caution has to be taken in analyzing how these variables affect efficiency. This is because for instance, high cost may not be attributed to low efficiency and low cost may not strictly be attributed to high efficiency. The issue of interest seems to defy business norms when it comes to bank operation in Nigeria. The interest rate margin is so wide with deposit rate that discourages savers and lending rate that scares borrowers, consequently it becomes difficulty to align interest rate to bank efficiency. Net interest margin was found to be positively correlated to bank profitability as a measure of performance. Higher levels of net interest margins, in general, indicate lower levels of bank efficiency. Bank management should embark on policy that will bridge the gap between interest income (loans, securities, etc) and interest expense (deposits, borrowed funds, etc). 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. Regulatory authority should embark on a policy that will bridge the gap between deposits-lending rates (IRM). The wider the gap between deposit-lending rate, the higher the banks inefficiency and cost of intermediation and the lower the gap, the higher the banks efficiency and performance. Bank management should embark on policy that will bridge the gap between interest income (loans, securities, etc) and interest expense (deposits, borrowed funds, etc).

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