

## Influence of Cost Efficiency on Performance of Nigerian Listed Deposit Money Banks

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**Abstract:** Cost efficiency is very important in this new age since profitability continue to shrink and new business is becoming almost impossible. Therefore, this study is to examine impact of cost efficiency on financial performance of Nigeria deposit money banks. The specific objectives of the study were to; (i) test the effects of efficiency in Fueling and maintenance costs on the performance of Nigerian deposit money banks; (ii) to examine the impact of efficiency in General Administrative expenses on the Performance of Nigerian deposit money banks. Secondary data were collected from annual financial statements of the selected banks. Fixed-effect and random-effect regression analysis method were used to analyze the data from a sample of 13 listed Nigerian deposit money banks covering period of 2010 to 2019. The results showed that cost efficiency have significant impact on financial performance of Nigerian deposit money banks. Implying that bank managements tend to increase profitability by increasing power-running cost efficiency, and by reducing general administrative cost efficiency. The study recommends that; Bank management need to tap into alternative source of energy and holistic approach to monitor wastages and theft of fuel to reduce power running cost for performance increasement. The board of directors should ensure that good business administration is their focus, by employing efficient control on administrative expenses to improve bank performance.

**Keywords:** Cost Efficiency, Bank Performance, Fueling and maintenance costs, General Administrative expenses

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### 1.0 INTRODUCTION

#### Background of the Study

Deposit Money Banks (DMBs) otherwise known as Commercial banks are financial institutions established to collect savings from the surplus units of an economy in form of deposits from individuals and corporate entities while investing those deposits to the deficit units of the same economy in the form of loans to individuals and businesses (Goldenweiser, 1938).

In Europe, United States of America, Asia and other developed countries of the world, the significance and impact of deposit money banks on the economic growth over the years cannot be underestimated. The deposit money banks in these advanced economies lend various financial services and supports to individuals, Small and Medium Enterprises and large corporate entities to create an enabling economic environment which guarantees economic growth and stability. However, in Nigeria the deposit money banks have for decades been playing very significant role in the economic development of the Africa's largest economy just like its counterparts from other parts of the world. Over the years, these banks have been faced with financial performance challenges with its consequent effect on other sectors.

Thus, increasing awareness on cost efficiency is needed for deposit money banks in Nigeria to cope with economic reality of increasing operating costs without higher revenue if they must remain in business and also compete favorably with their counterparts from other parts of the world in-terms of financial performance, development and stability.

#### Statement of the Problem

Despite various reforms in the Nigerian banking sector, the recent being the recapitalization of banks from ₦2billion to ₦25billion between 2004-2005, the number of listed Nigerian deposit money banks has consistently decrease from 2004 to 22 in 2019, with Skye bank and Diamond bank being the latest victim of acquisitions due to erosion of profitability. The prompted continuous studies on determinants of banks' profitability in Nigeria to rescue the once vibrant industry.

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In other to rescue Nigerian deposit money banks from a total collapse, different studies have been carried out on cost efficiency and its impact on the financial performance of these banks. Expectedly, these studies have produced divergent opinions on the relationship between cost efficiency and financial performance. While many argued that cost efficiency leads to improved profitability of a firm, others argued that cost efficiency often leads to reduction in output and ultimately low profitability. It is worthy to note that cost efficiency in Nigeria is as important to the banking sector just as it is to every other sector of the country's economy because of the peculiar nature of the country's business environment.

Several studies have been carried out in other countries to evaluate the effect of cost efficiency on financial performance of banks. Some of the studies include Kosmidou, Tanna, and Pasiouras (2008); Aliyu and Yusuf (2016). These studies were carried out in foreign countries with different culture, language, legislation and business environments. Therefore, findings from previous studies proved insufficient to gain insight into the impact of cost efficiency on the financial performance of Nigerian deposit money banks. Hence, the interest in carrying out this study

### **Research Objectives**

Based on trend analysis from the financial statements of deposit money banks in Nigeria, Personnel, General Administrative and Fueling and maintenance costs constitute an average of 35%, 45% and 11% of total operating costs respectively. In view of this, this current study will examine the impact of cost efficiency in these costs on the financial performance of deposit money banks in Nigeria with the following specific objectives:

- To test the effects of efficiency in Fueling and maintenance costs on the performance of Nigerian deposit money banks
- To examine the impact of efficiency in General Administrative expenses on the Performance of Nigerian deposit money banks

### **Research Questions**

Previous studies on costs efficiency have focused on and attempted to answer questions that are related to such variables as capital adequacy, loan loss provision, credit risk, labor costs among others, as they may affect financial performance of deposit money banks. Not many of these previous studies have considered general administrative costs as well as fueling and maintenance costs as variables. Even in Nigeria where fueling and maintenance costs have for years constitute a significant component of operating costs of business entities due to the epileptic nature of the Power sector, yet it has not been prominently considered as a single variable by previous studies on costs efficiency. However, this current study is expected to empirically address the following two questions:

- RQ1: Does Fueling and maintenance costs significantly affect performance of Nigerian deposit money banks?
- RQ2: To what extent do General Administrative costs impact on performance of Nigerian deposit money banks?

## **2.0 LITERATURE REVIEW**

### **Theory or Concept**

#### **Efficient-Structure Theory**

The efficient-structure theory is predicated on the premise that more efficient banks incur lower costs, which may lead directly to higher performance. Punt and Rooij (2001) postulated that the efficient-structure theory was proposed using two hypotheses which are the efficient-structure-X-efficiency (ESX) and efficient-structure-scale-efficiency (ESS) hypotheses. ESX hypothesis states that banks with higher cost efficiency will have higher profits and larger market share. Also, ESS hypothesis states that the difference in profitability between banks is mainly caused by differences in the level of scale efficiency at which individual banks operates. The ESS hypothesis emphasizes that firms producing at more efficient scales achieve lower unit costs and higher unit profits. Berger (1995) identified that only the market share and X-efficiency variables are positively and significantly related to bank profits.

$$\pi_i = f(EFF_i, Z_{im}) + \epsilon_{im}$$

In view of the foregoing, this current study will adopt the Efficiency Theory due to its relevance to evaluating the relationship between profitability and cost efficiency of Nigerian commercial banks. The commercial banks in Nigeria like every other entity around the world seek to efficiently minimize their costs with the ultimate objective of maximizing their profitability. The end result of this will be an efficient banking sector and improved economy.

### **Empirical Literature**

#### **Cost Efficiency**

Cost efficiency is a measure of how close a bank's cost is to the best practice bank's cost for producing a certain level of output with given input prices and technology (Adjei-Frimpong, Gan and Hu, 2014; Isik and Hassan, 2002). Following the same line of

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argument, in a study on cost management and its impact on performance of manufacturing companies listed on Nairobi Stock Exchange, Gichuki (2014) argued that a major strategy to achieve improved performance by manufacturing companies is through efficient allocation of resources, cost management and elimination of non-value added activities. Similarly, Ikpefan, Okorie, Agwu and Achugamonu (2014) opined that cost efficiency by banks which focus on efficient allocation of resources that eliminates wastage will lead to improved profitability given a constant level of income.

There have been divergent findings by previous studies on the relationship which exists between cost efficiency and financial performance of banks. Cost efficient banks are at advantage of translating their efficiency into either reduced service pricing and or increased profitability, the former being to improve competitive advantage aimed at increasing financial performance (Bikker, 2010; Tobias and Themba, 2011). Similarly, a strong and positive relationship exists between cost management and profitability of listed banks in Nigeria and the whole of Economic Community of West African States (ECOWAS) Sub-region (Ozili and Uadiale, 2017; Adelopo, Lloydking and Tauringana, 2018). Ivan et al. (2018) further argued that bank size is found to have significant positive relationship with commercial banks' profitability in Malaysia.

Cost efficiency has been identified as a key determinant of profitability in the banking sector by various studies, with competition as a moderator between the two in some cases. This assertion was corroborated by findings in the successive studies by Alin (2011) who suggested that cost efficiency in Central and East European countries from 2004-2008 may be due to increased competition upon European Union accession and entry of foreign banks. Similarly, Ajisafe and Akinlo (2014) revealed that competition in the Nigerian banking sector has led to greater cost efficiency in the industry with improved profitability. Mustahsan and Bilal (2017) also concluded that cost efficiency gives a financial institution the flexibility to explore and try new markets or products, reward its shareholders in-terms of dividends as a result of improved financial performance and an edge over its competitor's in-terms of optimal pricing. In contrast, Almomani (2013) found that increased competition resulted to cost inefficiency among deposit money banks in Jordan. They argued that competition among Jordanian deposit money banks led to increase costs (cost inefficiency) with a significant negative impact on profitability.

A different scenario seems to exist in relatively uncompetitive markets where banks enjoy market power, banks may be cost inefficient yet highly profitable. In a study on cost efficiency by commercial banks in Barbados, Howard and Haynes (2001) through their findings argued that Barbadian banks have maintained high costs and high profits by maintaining wide interest spread to increase their fee income. They attributed this position to the oligopolistic nature of the banking industry in the country. In a similar opinion, Almazari (2013) found a positive correlation between high operating costs and profitability in a study of Commercial banks in Saudi Arabia, this he ascribed to higher lending rates charged on loans.

Comparative studies have also been carried out to investigate the effect of cost efficiency on profitability of multinational banks and those operating in a single country. While reporting their findings, Izah, Nor and Sudin (2010) using stochastic frontier approach found that domestic commercial banks are more cost efficient than foreign banks in Malaysia but surprisingly, foreign banks with less cost efficiency rate, recorded improved profitability when compared with domestic banks. Using accounting-based ratios, the results suggest that foreign banks are more cost efficient with higher profitability than domestic banks. This finding was supported by Said and Masoud (2014) who also found that domestic commercial banks are more cost efficient but less profitable when compared with foreign banks that are less cost efficient but highly profitable in Tanzania.

Many factors may be responsible for this scenario, while the current study is not ruling-out the possibility that efficiency is negatively related to profitability in Malaysia and Tanzania, it could be that foreign banks are able to leverage on their scale efficiency to monopolize international transactions hence, charging high fees and interests on these transactions. It is also possible that more efficient foreign banks are more profitable than less efficient foreign banks if likes were compared with likes. Size difference between foreign and domestic deposit money banks in Malaysia and Tanzania is another factor among others which may have been responsible for the findings of the studies.

Expressing a contrary view, studies of domestic and foreign commercial banks operating in France indicates that domestic banks are less cost efficient with low level of profitability while foreign banks that are operating in the country were found to be highly cost efficient with higher profitability (Raoudha, 2011). Just as in the cases of Malaysia and Tanzania, many factors may be responsible for this finding. Difference in sizes and scale efficiency could be among the factors which made foreign banks in France more cost efficient with better performance when compared with domestic commercial banks. In contrast to this line of thought on size factor, Adjei-Frimpong et al. (2014) found that bank size has no influence while GDP growth rate has negative effect on cost efficiency of deposit money banks in Ghana. The findings revealed that well capitalized banks in Ghana are less cost efficient and have no cost advantage over their smaller counterparts.

Attempts have also been made by some studies to examine the cross-sectional cost efficiency on profitability of Sharia-based and conventional commercial banks. Bellal (2017) found that conventional banks are highly cost efficient and profitable compared

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with Sharia-based banks in Bangladesh. The studies concluded that, superior branch network with higher number of products and services by conventional banks may be responsible for this as they are able to spread their huge costs over a wide base of operational networks given constant revenue. This is consistent with the findings of Samir (2010) who also argued that traditional commercial banks in the Gulf Region are more cost efficient and profitable than the Sharia-based banks in the region. Contrarily, while investigating the determinants of profitability, Curak, Poposki and Pepur (2012) found that operating cost efficiency have a significant positive effect on the profitability of banks. This is consistent with the finding in Kosmidou, Tanna and Pasiouras (2008) who argued that efficiency in expenses management have a significant positive and dominant influence on profitability of commercial banks.

Mehta and Bhavani (2017) investigated the determinants of banks' profitability and found that cost efficiency is among the bank-specific variables with most significant relationship with profitability. The finding is consistent with the result in Maredza (2014) who identified that cost inefficiency negatively impacts on bank profitability. Similarly, Aktham (2004) also argued that there exists a significant positive relationship between profitability and cost efficiency in a study conducted on Jordanian banks. The findings further suggest that larger banks with larger economies of scale are found to be more costs efficient with improved profitability compared to small banks with considerably low economies of scale.

To investigate efficiency in a multi-dimensional way, Maudos, Pastor, Perez and Quesada (2002) analysed bank efficiency in the European Union for the period 1993-1996 using both cost and profit efficiency. They argued that high level of cost efficiency existed in the sampled banks than profit efficiency, and that positive relationship exists between cost efficiency and profit efficiency.

However, cost efficiency from the context of this current study will be proxied by Personnel costs, Power-running costs (cost of diesel) and General Administrative costs. The study will test for the effect of efficiency in these costs on profitability of deposit money banks in Nigeria. These costs were carefully selected based on their peculiarities to the Nigerian business environment.

### **Research Hypotheses**

In view of the foregoing, the following hypotheses are posited:

#### **Hypothesis 1**

**H<sub>1</sub>:** Efficiency in Power-running cost has impact on the financial performance of Nigerian deposit money banks

#### **Hypothesis 2**

**H<sub>1</sub>:** Efficiency in General Administrative cost have impact on the financial performance of Nigerian deposit money banks

### **Fueling and Maintenance (Power-running) Costs**

Adequate power supply is an unavoidable prerequisite to any nation's development, and electricity generation, transmission as well as distribution are capital-intensive activities requiring huge investment. In the prevailing circumstances in Nigeria where funds availability is progressively dwindling, power generation and distribution has become a perpetual challenge affecting every sector of the economy (Sambo, Garba, Zarma and Gaji, 2010). Advanced economies, have developed in generation and transmission of electricity and are already migrating to renewable sources of energy, while Nigeria is still being grappled with the severe effect of inadequate generation and insufficient transmission of electricity to support her economic activities. According to Knoema (2020), the population of Nigeria grew substantially from 56 million in 1969 to about 200 million people in 2019 with an average of 2.6% growth annually. In spite of the population and the size of its economy, the country has been unable to provide adequate electricity supply for both household and business consumptions.

In his report, Olowosejeje (2019) opined that the country's epileptic power supply and the costs of running the main alternative source of power which is diesel-powered generators has been identified as the second biggest obstacle to doing business in Nigeria, after a lack of access to finance. It is worthy of note that costs of diesel and frequent maintenance of generators as a result of daily usage for business purposes have since become a serious burden on profitability of banks and other businesses in Nigeria.

According to Adewuyi and Emmanuel (2018) in their studies on electricity outages and firm performance across the six geo-political zones in Nigeria, they concluded that due to persistent power outage, firms have resulted to alternative sources of power through self-generation which has negative effect on firms' financial performance in the North-West, South-West and South-South geo-political zones. They also argued that it is more profitable for firms in the North-Central, North-East and South-East geo-political zones to rely on self-generating power the reason for this has opened up the need for further studies.

The effect of the epileptic nature of electricity as well as the consequent costs of fueling and maintaining generators in Nigeria has over the years been felt on the profitability of every sector of the country's economy. Surprisingly, not many studies on determinants of banks' profitability in Nigeria have considered this phenomenon. Muhammad, Abdulraheem and Yusuf (2017)

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argued that electricity service is significantly and positively related with financial performance. They found that the quality of electricity service in Nigeria is a major determinant of both financial and non-financial performance in the Small and Medium Enterprises manufacturing sector. Their finding is consistent with the findings of previous studies where quality of electricity service was found to have a significant effect on the financial and non-financial performance of Small and Medium Enterprises (Adenikinju, 2005; Gado and Nmadu, 2012; Doe and Asamoah, 2014; Forkuoh and Li, 2015).

Evaluating the epileptic nature of power sector and the burden effect it has on profitability of banks in Nigeria cannot be over emphasized. Nigerian commercial banks can significantly improve their profitability through cost efficiency which focuses on power-running cost (diesel) for lighting purposes in the day-to-day business activities of their branch network, which have been found to have negative effect on financial performance and competitiveness (Yahaya, Farouk, Yahaya, Yusuf and Dania, 2015).

Several studies have revealed that this phenomenon is not peculiar to Nigeria. Poor quality of electricity distribution service has been identified as a major obstacle to achieving economic development in most developing economies of the world. Nyangwaria and Munene (2019) argued that power related expenses have significant negative relationship with financial performance of manufacturing companies in Kenya.

Considering the huge amount being spent annually by banks in Nigeria on alternative source of power, cost efficiency programme is unavoidable by these banks and other companies if they must continue to remain in business. Due to inadequate power supply situation in Nigeria, banks and other major businesses spend an average of \$14 billion annually on generators, maintenance and fuelling in order to keep their business running (Obioji, 2019). These businesses would have saved and retained about 67% of this amount as part of their profits if the electricity supply from the national grid had been reliable, as Nigerians are spending almost three times the cost of electricity on alternative sources of power (NOIPolls, 2018).

### **General Administrative Costs**

General Administrative costs are those expenses with generally indirect relationship with the production of goods and services of an entity. They may include such costs as adoption of new information technology, depreciation, auditing and legal fees, marketing expenses and other non-recurring costs which may be related to restructuring (Staikouras, Mamatzakis and Koutsomanoli-Filippaki, 2007). Staikouras et al. (2007) argued that general administrative costs constitute the highest proportion of total operating expenses of the banking sector in South Eastern Europe with personnel expenses a distant second. This element of cost has in the past received little attention when issues of cost efficiency are being raised by deposit money banks just as in the case with many organizations in other sectors.

Quite several studies have attempted to investigate the effect that General Administrative costs may have on the financial performance of an entities. Tuna and Yildiz (2016) through their study found that, a significant adverse relationship exists between general administrative expenditures and financial performance of companies in the Technology sector in Turkey. This is not consistent with the findings in the study of Cifci, Doganay and Gulsen (2010) where they found that a positive relationship exists between general administrative expenditures and financial performance of listed companies in Istanbul. Similarly, positive relationship identified between general administrative expenses and profitability in the US Pharmaceutical and Nigerian Brewery industries respectively (Leahy 2012; Okwo, Ugwunta and Agu 2012).

In an attempt to advising policy makers in the Nigerian manufacturing sector, Olayinka (2019) argued that administrative expenses exert a significant negative impact on profitability of firms in five conglomerate manufacturing companies in the food and beverage sub-sector. He suggested cost efficiency implementation program to curtail the growing effect of administrative expenses on firms' profitability. This is consistent with the findings of Oluwagbemiga, Olugbenga and Zaccheaus (2014) who found that profitability is negatively correlated with general administrative costs in a study on listed manufacturing companies in Nigeria.

### **Financial Performance**

Financial performance is an indication of how well an organization has utilized its resources with the main objective of maximizing shareholder's wealth by way of profitability (Naz, Ijaz and Naqvi, 2016). It is a reflection of the financial health of an entity over a period of time, culminating from its operating activities and decision-making competences of the management and board of directors. It involves such indicators as profitability, liquidity, capital adequacy, solvency, among others.

Profitability which is synonymous with financial performance has been proxied by different variables including Return on Assets (ROA), Return on Equity (ROE) and Return on Sales (ROS) (Batchimeg, 2017). This important measure of financial stability of an entity can also be represented by Return on Investment (ROI), Operating Profit (OPR) and Net Income (NI). An entity's financial health may be assessed to be optimal when any of these ratios is at par or above the industry average. A cost-efficient company would record a high profitability ratio compared to those that are cost inefficient.

According to Khan, Nouman and Imran (2015), financial performance measures the actualization or otherwise of the economic goals of an entity. The going concern of a business is a function of a healthy financial performance. Therefore, efforts should be

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geared towards ensuring that policies are in place to continuously review the effectiveness of the determinants of profitability one of which is being considered by this study.

### 3.0 RESEARCH METHODOLOGY

#### Research Design and Paradigm

This study is based on quantitative design with a positivist epistemology research philosophy in focus. The quantitative design will be deductive in nature while adopting archival research strategy. This study also used causal research design by specifically adopting Fixed and Random Effect regression model. Causal research analyses the effect of one or more variables on another.

#### Population, Sample and Sources of Data Collection.

The population for this study is the twenty-two (22) deposit money banks in Nigeria, while sample consist of thirteen (13) listed deposit money banks for this purpose of this study. The period of study covered 2010-2019. This study used secondary data which were collected from published audited financial statements, World Bank fact sheet and Nigerian Stock Exchange fact book in Nigeria.

#### Econometric Model

The model formulated for this study is an expanded of profit model stated below:

$$Y_{it} = \alpha + a^p C_{it}^p + b^p Size_{it} C_{it}^p + c^p GDPPC_{it} C_{it}^p + d^p Inflr_{it} C_{it}^p + a^f C_{it}^f + b^f Size_{it} C_{it}^f + c^f GDPPC_{it} C_{it}^f + d^f Inflr_{it} C_{it}^f + \alpha^a C_{it}^a + b^a Size_{it} C_{it}^a + c^a GDPPC_{it} C_{it}^a + d^a Inflr_{it} C_{it}^a + \varepsilon_{it}$$

**Table 3.1 Variables measurement units**

Type of variable	Variables	Indicators	Measurement	Hypothesized relationship with profitability
Independent variables	Personnel Costs Efficiency	$C_{it}^p$	Total Personnel costs for the year	+
	Fueling and maintenance Costs Efficiency	$C_{it}^f$	Power-running costs for the year	+
	General Administrative Costs Efficiency	$C_{it}^a$	Administrative costs for the year	+
Control variables	Bank size	Size	Natural logarithm of the bank's total assets	+
	Inflation	$Inflr$	Inflation rate of the country	+/-
	Gross Domestic Product Per Capital	$GDPPC$	Year percentage change of the country GDP per capita	+/-
<b>Dependent Variable</b>	Operating profit before tax	OPR	Operating profit before tax / Gross Revenue	N/A

#### Definition of Variables

##### Operating Profit (OPR)

Operating profit is a measure of profitability. It indicates how much of each Naira (₦) of revenues is left over after both costs of goods sold and operating expenses are recognized (Manglik and Goyal, 2016)

##### Personnel Costs

This is the total amount paid to employees which include wages, salaries, commissions, employer's pension contribution, medical insurance as well as costs of all other fringe benefits with respect to services rendered over a period of time (BusinessDictionary, 2018).

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### Fueling and Maintenance (Power-running) Costs

This represents the total costs incurred towards the day to day running and maintenance of Generators by banks and other business entities as an alternative to epileptic electricity supply from the national grid.

### General Administrative Costs

These are costs are with generally indirect relationship with the production of goods and services of an entity, they may include such costs as adoption of new information technology, depreciation, auditing and legal fees, marketing expenses and other non-recurring costs which may be related to restructuring (Staikouras et al., 2007).

### Bank Size (Size)

Natural logarithm of book value of total assets is used as a proxy to measure bank size and this proxy is able to capture the possible cost advantages related with the size (Sufian and Chong, 2008). Bank size was found to have significant positive effect on commercial banks profitability (Almanaseer, 2014).

### Inflation rate (Inflr)

Inflation is the general increase in price level of goods and services within an economy over a period of time. There exists a significant positive relationship between inflation and commercial banks' profitability (Kutsienyo, 2011; Hooshiyari and Moghanloo, 2015). In contrary finding, Muraina (2018) argued that inflation does not have significant effect on banks' profitability.

### GDP per capita (GDPPC)

The gross domestic product per capita is an economic indicator which measures the standard of living of people living in a country relative to the GDP of the country. Al-Harbi (2019) argued that a positive relationship exists between economic growth per capita and financial sector profitability. This is consistent with the finding in Klein and Weill (2018).

## 4.0 DATA ANALYSIS AND RESULT INTERPRETATION

### Data Analysis

#### Descriptive Statistic Summary

The dependent variables used were return on assets and operating profit, both were used to measure profitability of the banks while explanatory variables were gross domestic product per capita, inflation rate, personnel costs, fueling and maintenance (power-running) costs, general administrative costs, and bank size (total assets). Table 4.1 reports the mean, maximum, minimum, standard deviation and number of observations for each variable used in this study.

**Table 4.1: Summary Statistics of Variables**

Variables	Obs	Mean	Std. Dev.	Min	Max
OPR	130	3.63E+07	4.90E+07	-1.03E+08	2.00E+08
Inflr	130	11.791	2.757137	8	16.5
Gadmc	130	4.55E+07	3.50E+07	7105061	1.98E+08
Fuamtc	130	4810121	4087030	201000	1.89E+07
Psnlc	130	3.01E+07	1.96E+07	4386680	9.94E+07
GDPPC	130	2491.818	402.2998	1968.56	3222.69
Total Assets	130	1.74E+09	1.39E+09	1.35E+08	6.31E+09

*OPR: Operating Profit; Inflr: Inflation rate; Gadmc: General administrative cost; Fuamtc: Fueling and maintenance costs (power-running cost); Psnlc: Personnel costs; GDPPC: Gross Domestic Product Per Capita; Size: Total Assets.*

Table 4.1 shows the summary statistic of the variables of the models. These variables include return bank size (total assets), operating profit, inflation rate, personnel costs, power-running costs, administrative costs, and gross domestic product per capita. Personnel costs averaged 3.01 billion naira with standard deviation of about 1.96 billion naira, while the firm with the lowest personnel cost during the period had 4.386 billion naira and the bank with the highest personnel cost during the period has 99.4 billion naira. The result presented in Table 4.1 also shows that on the average, the country's inflation rate was about 11.79 percent, with standard deviation of about 2.75 percent, the minimum inflation rate was 8 percent, while the maximum inflation rate was 16.5 percent. The average power-running cost was 4.81 billion naira during the period observed, with standard deviation of 4.08 billion naira, and the minimum power-running cost was 201 million naira, while the bank with maximum power-running cost had 18.9 billion naira during this period. As to the country's statistics regarding her GDP per capita, average GDP during the study

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period was about \$2,491.8 per capita with average spread of \$402.3. The lowest GDP per capita was \$1,968.5 during the period under review, while the highest GDP per capita during this period was about \$3,222 per capita.

General administrative costs averaged 4.55 billion naira with standard deviation of about 3.50 billion naira, while the firm with the lowest administrative costs during the period had 7.105 billion naira and the bank with the highest administrative cost during the period reported 198.3 billion naira. As regard to the level of bank size (measured as total assets), an average bank in the sample is as big as about 1.74 trillion Naira, having a sample spread of about 1.39 trillion Naira, while a bank at a point have as low as 135 billion Naira as total assets, a bank has as high as 6.31 trillion Naira as total assets. On the average, banks in this sample have operating profit of 3.63 billion naira with standard deviation of 4.9 billion naira and the bank have as low as -103 billion operating profit, while banks have as high as 200 billion naira operating profit.

### Correlation Analysis

Correlation analysis was carried out to examine multicollinearity effect among explanatory variables.

**Table 4.2 Correlation analysis among independent variables**

	Opr	Size	GDPPC	Gadmc	Fuamtc	Inflr
Opr						
Inflr	0.061					
Size	0.349	-0.164				
GDPPC	0.081	-0.735	0.306			
Gadmc	-0.279	-0.113	0.196	0.101		
Fuamtc	0.239	0.091	0.189	-0.039	0.007	
Psnlc	-0.000	-0.114	0.379	0.310	0.283	0.309

*OPR: Operating Profit; Inflr: Inflation rate; Gadmc: General administrative cost; Fuamtc: Fueling and maintenance costs (power-running cost); Psnlc: Personnel costs; GDPPC: Gross Domestic Product Per Capita; Size: Total Assets.*

The correlation results in table 4.2 shows that none of the variables have multicollinearity issue since the highest correlation results among the explanatory variables was 0.3 which is lesser than 0.8 threshold. The correlation results showed no evidence of multicollinearity using the variables in the models.

### Inferential Analysis

To establish the impact of cost efficiency on performance of Nigerian listed deposit money banks, a panel fixed and random effects models was conducted with heteroskedasticity-robust estimates of standard errors. The results for all the models are presented in tables 4.3

#### Results of Costs Efficiency on OPR

The fixed and random effects model results presented in Table 4.3 shows the effect of cost efficiency on operating profit. The study is a panel study comprises of 13 listed deposit money banks, examined over a period of 10 years. This implies that models that capture heterogeneous panel such as the fixed and random effects are also required in this case. Hausman test was also presented in Table 4.3 to make appropriate choice between the fixed and random effects models. The Hausman test shows a Chi-squared value of 1.88 and p-value of 0.999 indicating that the statistic is not significant. This indicates that the null hypothesis that the difference in both models is not systematic is not rejected. This implies that the random effects model is more appropriate in this case. The results of random effects model exhibit first-order autocorrelation. This is evident from the Wooldridge test of first-order autocorrelation which shows a value of 7.632 and p-value of 0.017 indicating it is statistically significant. Its significance implies rejection of null hypothesis of no first-order autocorrelation; hence, there is presence of autocorrelation in the model. This prompted an estimation of the model based on the autocorrelation-corrected random effects which accommodates first-order serially correlated disturbances.

The AR(1) random effects model shows that personnel cost efficiency have statistical significant negative impact on operating profit, while power-running cost efficiency have statistical significant positive effect on operating profit and general administrative costs efficiency have statistical significant negative impact on operating profit. Size has significant positive relationship with personnel cost and administrative cost efficiencies, but significant negative relationship with power-running cost efficiency. Gross domestic product per capita have non-significant positive relationship with personnel cost; significant positive effect on power-



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running cost and non-significant negative effect on administrative cost. Inflation has non-significant positive relationship with personnel cost and administrative cost, but negative non-significant relationship with power-running cost.

Personnel cost efficiency is statistically significant at 0.05 level of significance, while power-running cost and administrative cost efficiencies are both statistically significant at 0.01 level of significance. This implies that personnel cost, power-running cost and administrative cost are important determinants of operating profit. Similarly, the relationship between size and; personnel cost, power-running cost as well as administrative costs are significant at 0.01, 0.01 and 0.05 level of significance respectively, which implies that size is a determinant factor for personnel cost, power-running cost and administrative cost. Gross domestic product per capita also has significant relationship with power-running cost which is significant at 0.05 level of significance. On the other hand, the gross domestic product has non-significant relationship with personnel cost and administrative cost, while inflation has non-significant relationship with personnel cost, power-running cost and administrative cost. This implies that size of Nigerian listed deposit money banks increases personnel cost, and administrative cost, while size of the firm decreases power-running cost. In the same vein, gross domestic product per capita increases power-running cost.

In this model, variables such as personnel cost and administrative cost have negative coefficients, indicating that they influence operating profit negatively, while power-running costs have positive effect on operating profit. In the same vein, size has positive relationship with personnel cost and administrative cost, but negatively related with power-running cost. Gross domestic product per capita has positive relationship with personnel cost and power-running cost, but negatively related with administrative cost. Inflation has positive relationship with personnel cost and administrative cost, but negatively related with power-running cost.

A percentage decrease in personnel cost efficiency will lead to increase in operating profit by about 9.10 percent, and vice versa, while a percentage decrease in general administrative cost efficiency will lead to an increase in operating profit by about 11.86 percent, and vice versa. Also, a percentage decrease in power-running cost efficiency will lead to decrease in operating profit by about 13.77 percent, and vice versa; a percentage increase in gross domestic product per capita will lead to an increase in return on assets by about 4.2 percent, and vice versa.

The Wald Chi-squared statistic presented for the AR (1) random effects model shows a value of 298.82 and p-value of 0.000 which indicates statistical significance of the model. This implies that the overall model is statistically significant at 1 percent level of significance. R-squared shows a value of 0.4017, indicating that 40.17 percent of variation in the operating profit is caused by efficiency in personnel cost, power-running expenses and general administrative cost as explained in the model.

The result suggests that the banks are expected to reduce their efficiency in general administrative costs to increase profitability measured as OPR. In Nigeria, advertisement is one of the major cost-item within general administrative costs of deposit money banks. Higher efficiency in advertisement expenses may lead to lower customers' patronage in a highly competitive Nigerian banking sector. This ultimately will lead to decrease in profitability. Finally, from this result, it is evident that Nigerian deposit money banks need to increase efficiency in power-running cost by adopting renewable sources of power such as solar to increase profitability.

**Table 4.3: Regression Results of effect of cost efficiency on Operating Profit.**

VARIABLES	-1			-2			-3		
	Fixed Effects			Random Effects			AR(1) Random Effects		
	Coefficient	Std. Err.	P-value	Coefficient	Std. Err.	P-value	Coefficient	Std. Err.	P-value
C <sup>p</sup>	-9.456	7.097	0.186	-9.104	6.382	0.154	-9.104**	4.291	0.034
Size×C <sup>p</sup>	1.777	0.320	0.000	1.726	0.299	0.000	1.726***	0.469	0.000
Gdppc×C <sup>p</sup>	2.089	78.607	0.979	1.004	68.263	0.988	1.004	53.558	0.985
Inflr×C <sup>p</sup>	2.897	2.781	0.300	1.883	2.337	0.420	1.883	1.656	0.255
C <sup>f</sup>	14.205	4.056	0.001	13.777	3.734	0.000	13.777***	4.694	0.003
Size×C <sup>f</sup>	-70.874	21.067	0.001	-69.920	19.239	0.000	-69.920***	25.591	0.006
Gdppc×C <sup>f</sup>	63.446	37.131	0.091	63.867	34.354	0.063	63.868	28.719	0.026
Inflr×C <sup>f</sup>	-0.674	1.425	0.637	-0.278	1.229	0.820	-0.279	1.215	0.818
C <sup>a</sup>	-11.333	5.059	0.028	-11.869	4.596	0.010	-11.869	4.658	0.011
Size×C <sup>a</sup>	47.009	22.184	0.037	40.309	20.443	0.049	40.309	19.361	0.037
Gdppc×C <sup>a</sup>	-39.894	59.198	0.502	-34.421	52.635	0.513	-34.421	44.185	0.436

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InflrxC <sup>a</sup>	1.614	2.136	0.452	1.636	1.845	0.375	1.636	2.154	0.447
_Cons	-1.715	1.086	0.118	-1.525	0.999	0.127	-1.525	0.804	0.058
Obs.	117			117			117		
R-Sq.	40.17								
No. of Panelid	13			13			13		
F/Wald Chi2	5.25***		0.000	68.47***		0.000	298.82***		0.000
F-test of Homogeneity	0.29		0.999						
Hausman Test	1.88		0.999						
Wooldridge AR Test	7.632**		0.017						

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Dependent variable is OPR. The estimated model is as follows:

$$Y_{it} = \alpha + [a^p + b^p Size_{it} + c^p GDP_{it} + d^p Inf_{it}] C_{it}^p + [a^f + b^f Size_{it} + c^f GDP_{it} + d^f Inf_{it}] C_{it}^f + [a^a + b^a Size_{it} + c^a GDP_{it} + d^a Inf_{it}] C_{it}^a$$

## 5.0 STATEMENT AND TEST OF HYPOTHESES, SUMMARY OF FINDINGS, CONCLUSION, RECOMMENDATIONS, LIMITATIONS, IMPLICATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

### Statement and Test of Hypotheses

This part considers the two hypotheses formulated with a view to either accepting or not using fixed and random effect regression analysis method and the result is based on autocorrelation-corrected random effect models.

#### Hypothesis One

The hypothesis states that efficiency in power-running costs have impact on the financial performance of Nigerian deposit money banks. The hypothesis was tested with the use of fixed and random effects regression method. The result of the analysis is presented in Table 4.3. The result indicated that there is significant statistical impact of power-running cost efficiency on operating profit (P.value is 0.003, p< 0.01). Therefore, the null hypothesis is not accepted, while the alternate hypothesis is accepted.

#### Hypothesis Two

This hypothesis states that efficiency in general administrative costs have effect on the financial performance of Nigerian deposit money banks. The hypothesis was tested with the use of fixed and random effects regression method. The result of the analysis is presented in Table 4.3. The result indicated that there is statistically significant impact of administrative costs efficiency on operating profit (P.value is 0.01, p≤ 0.01). Therefore, the null hypothesis is not accepted, while the alternate hypothesis is accepted.

### Summary of Findings

Cost efficiency requires much attention in Africa considering the persistence increase in the cost of operations and activities across all sections of the continent. The relationship between cost efficiency and financial performance in Nigerian listed deposit money banks require much attention of researchers. Many studies such as Olanrewaju and Obalade (2015); Inua and Oziegbe (2018); Adewuyi and Emmanuel (2018); Tuna and Yildiz (2016); Cifci, Doganay and Gulsen (2010) have been carried out on the impact of some of the costs elements on performance but the studies have arrived at contradictory results.

The results of the study as showed in the correlation and regression results of impact of cost efficiency on performance of Nigerian deposit money banks, in related with independent variables like personnel cost, power-running costs, administrative costs.

### The Effect of Efficiency in Power-running costs on Financial Performance

The findings of this study using correlation and regression analysis as depicted in table 4.3 shows that power-running cost efficiency have significant positive effect on performance when performance is measured with operating profit and return on assets. This result means that power running cost efficiency have positive relationship with performance. Consequently, an efficient bank needs to increase a stable power supply for smooth operation of bank activities at lower cost to increase performance. Therefore, to achieve efficiency there is need to increase power-running cost efficiency through monitoring and wastage reduction to improve performance. This is so because of the epileptic nature of power-supply the national grid in Nigeria. Therefore, an efficient bank will need to increase its power-running cost efficiency by adopting alternative sources of power supply such as solar energy at lower cost to increase the level of their profitability. This finding agrees with the study of Yahaya, Farouk, Yahaya, Yusuf and Dania (2015); Nyangwaria and Munene (2019) who asserted that power-running cost have significant negative

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relationship with financial performance. This finding is contrary to the study of Muhammad, Abdurraheem and Yusuf (2017) that asserted positive significant positive effect of power-running cost on the financial and non-financial performance

### The Effect of Efficiency in Administrative costs on Financial Performance

In line with the regression result in this study, administrative costs efficiency has significant negative effect on performance of Nigerian deposit money banks when performance is measured as operating cost and return on assets. The result indicated that administrative costs efficiency has inverse relationship with performance of Nigeria deposit money banks. An increase general administrative costs efficiency will lead to reduction in financial performance, because poor administration in Nigerian banking sector may give room for fraud and enhance regulatory sanctions that will affect profitability negatively. This finding agrees with the study of Cifci, Doganay and Gulsen (2010); Leahy (2012); Okwo, Ugwunta and Agu (2012) who asserted significant positive relationship between administrative cost and financial performance. This finding is in contrary to the study of Tuna and Yildiz (2016); Olayinka (2019); Oluwagbemiga, Olugbenga and Zaccheaus (2014) who argued that there is significant negative relationship between administrative cost and financial performance

### Conclusion

Overall, the results showed that cost efficiency have significant impact on financial performance of Nigerian deposit money banks. Implying that bank managements tend to increase profitability by increasing power-running cost efficiency and general administrative cost efficiency.

The findings of this study validate the peculiar nature of the Nigerian business environment. It also reveals that general costs of administration of banking activities in Nigeria are high and somewhat necessary to survive the competitive environment. Finally, the findings suggest that higher efficiency in power-running cost significantly affects profitability due to the epileptic nature of electricity supply in Nigeria.

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