Research Paper

The Effect of Bank Efficiency on Bank Performance in Deposit Money Banks in Nigeria

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ABSTRACT

Purpose: This study explored the effect of bank efficiency on bank performance. This study looks at transactional, operational, and profit efficiency in relation to bank performance using the DuPont analysis

Design/Methodology/Approach: An expo-facto research design was employed. Fifteen (15) deposit money banks were sampled. Data analyzed was through a secondary medium from bank financial statements. The Data envelopment analysis and structural equation model were used in data analysis.

Findings: The result reveals that international banks (DEA Mean = 74.131) are more transactional efficient compared to National banks (DEA Mean = 69.546) and Regional banks (DEA Mean = 61.181). It further reveals that international banks (DEA Mean = 86.211) are more efficient in terms of operational efficiency compared to national banks (DEA Mean = 81.011) and regional banks (DEA Mean = 79.233). The international banks are more profit efficient (DEA mean= 71.612) compared to national banks (DEA Mean = 70.128) and regional banks (DEA Mean = 56.114).

Research limitations: The study was conducted in the banking industry a sub section of the financial sector. It is envisaged that the result may vary if the whole sector analysis is conducted.

Practical implications: The result reveals that international banks were more efficient than national and regional banks in terms of transactional, operational, and profit efficiency. The result also shows that operational efficiency is the most significant determinant of bank efficiency. This study recommends that DMBs should explore ways to be more operationally efficient. DMBs should also move towards new distribution platforms.

Originality/Value: This study addresses issues of efficiency in the banking industry using the transactional, operational, and profit approaches as measures of bank efficiency while using Dupont analysis as a measure of performance. To the best of the researchers' knowledge, there has been no study conducted in this direction.

Keywords: Efficiency; Bank Performance; Data Envelopment Analysis

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1. Introduction

Banking activities in sub-Sahara Africa have grown by leaps and bounds in the last decade. The advent of technology and improved managerial knowledge and styles responsible for improved efficiency and impressive performance of banks nowadays. Specifically, Nigerian banks have improved in terms of an input-output ratio of production. Worimegbe, Abosede, and Worimegbe (2018) argue that Nigerian banks on the average are cost-efficient in terms of short-term loans and bank deposits. Banks in Nigeria thrive under different economic realities, environment, and changes in technology which have made some banks more profitable than others. Beck, Cull, and Jerome (2005) posit that banking operations have gone through strategic changes in the past decades which have brought about increased capacity utilization, trans-border banking, better regulations, and better technological applications.

Efficiency in commercial banks in Nigeria is relative to their operating environment. There have been different studies on bank efficiency in different continents such as Asia, the European Union and the United States (Usman & Fadipe, 2014 and Berger & Humprey, 1997), but there is dearth of literature on the comparative analysis study inefficiency of banks in Nigeria in relation to technical efficiency and allocative efficiency. Farrel (1957), opined that the efficiency of an organization could be viewed from technical efficiency and allocative efficiency. Allocative efficiency deals with how a firm maximizes input at a given price while technical efficiency deals with the optimal output achieved by a firm given a set of inputs available at a given period.

In the past decades, various studies and analyses have been done on productivity and efficiency in the banking industry. Most studies investigated the technical, cost and profit efficiency applying non-parametric methods such as the data envelopment analysis (DEA) and parametric methods such as the stochastic frontier approach (SFA) to evaluate the various efficiency methods. These studies have been carried out in various countries in the world without much been said about the cross border and continental analysis. Since most studies focus on the banking industries relating to their specific countries and developed European markets and emerging Asian regions, there is a limitation of comparative analysis in Nigeria due to lack of data, political-economic crisis, uneven development of the financial systems among various states in Nigeria.

Worimegbe et al. (2018) observed that there is a need to ascertain the most efficient class of bank in Nigeria, considering the level of restructuring and new bank policy on recapitalization and performance in Nigeria. They also posit that there is a need to establish other approaches such as the intermediation approach in measuring bank efficiency in deposit money banks in Nigeria. The study, therefore, employs transactional, operational, and profit approaches in measuring bank efficiency. According to Portela and Thanassoulis (2005), these measures are suitable and take into account transactional activities, and how they could be performed on alternative channels, sales activities in bank branches, they reflect the intermediation approach, and they incorporate service quality dimensions which lead to profit generation in relation to cost. In terms of measuring banks performance, most studies have used financial metrics as the basis for investigated banks' performance (Tanko, 2008; Olaoseibikan, 2009 and Obafemi, 2012) with a dart of literature on using leverage, liquidity and cash flow (Dupont Analysis). Worimegbe (2019) is of the opinion that using the Dupont as a measure of performance will help in revealing the value added by the firm over time. Hence, this study addresses issues of the banking industry's efficiency using the transactional, operational, and profit approaches as measures of bank efficiency while using Dupont analysis as a measure of

performance. This study, therefore, examines the effect of bank efficiency on bank performance.

Research Questions:

i.   Which of the deposit money banks in Nigeria is most efficient?

ii.   To what extent does efficiency affect bank performance?

2. Literature Review

2.1 Bank Efficiency

Different methods, such as parametric and non-parametric methods have been used in analyzing banks efficiency and productivity. Portela and Thanassoulis (2005) viewed that productivity and efficiency in the banking industry can be measured from the point view of profit, transaction, and operations while Farrel (1957) considered productivity efficiency from the standpoint of technical and allocative of resources. Bank efficiency can also be measured in terms of cost and profit efficiency, as established by Thaguna and Poudel (2013). The main goals and objectives of bank managers are to seek ways of generating high profit despite the competition, increase customers deposits and sales via increasing value-added operations. Portela and Thanassolious (2005) argued that bank managers concentrate their resources and operation on sales increase, profit maximization, increase customer base, and create new channels of effective distribution of bank products.

For the measurement of performance and efficiency in this study, the profit efficiency, operational efficiency, and transactional efficiency would be used because efficiency is at the core of banking industry goals. The profit efficiency measure is intended to reveal the degree to which a bank maximizes profit, the transactional efficiency is the degree at which a bank moves general transactions to alternative means of distribution while the cost efficiency measures the degree to which banks cost is approximate to benchmarked bank for a given level of output (Usman & Fadipe, 2014 and Portela & Thanassolious (2005).

2.2 Input and Output Specification

As obtained in different productivity and efficiency studies, it is of great importance to define and establish inputs and outputs of the baking industry in order to effectively measure bank performance. Ofori-Sasu, Abor and Mensah (2019) are of the opinion that the manufacturing firms are explicit when choosing the input and output items while the financial institutions exhibit various operation processes when selecting input and output processes. Usman and Fadipe (2014) identified four approaches that are mostly used in input and output determination because of bank deposits vary from one study to another in determining input and output specification. The four approaches used are the intermediation approach, value-added approach, dual approach, and the production approach. The intermediation approach views banks as an entity which accepts deposits and uses such deposits for loan distribution and other assets. The deposits are treated as inputs, while loans are treated as output. The production approach views banks as production entities which are involved in the production and creation of services. The production approach treats deposits as outputs and the cost of managing those deposits as

inputs. Berger and Humphrey (1997) posit that the dual approach views deposits as both input and output while the value-added approach views any balance sheet item as input if it does not absorb a relevant share of labour and capital, otherwise it is considered an output. The value-added approach also considers deposits as output because it implies the creation of value. Portela and Thanassoulis (2005) are of the opinion that transactional, operational and profit approach to measuring efficiency should be used in employed as they take into account transactional activities and how they could be performed on alternative channels, sales activities in bank branches and they incorporate service quality dimensions which lead to profit generation in relation to cost. They further established that these measures of efficiency help the banks to manage their product mix in such a way that it creates high profitability, without reducing service quality associated with their products and services. This study adopts the transactional, operational, and profit efficiency as measures of bank efficiency since they reflect the true nature and objectives of the Nigerian deposit banks.

2.3 Transactional Efficiency

Since the transactional efficiency measures banks productivity in the form of new distribution channel, the input and output variables would focus on the unit of analysis which persuades customers to use the distribution channels. The transactional efficiency inputs tend to measure the resources that enable the bank to make use of alternative distribution channel. The alternative distribution channels are ATMs and electronic banking platforms. According to Portela and Thanassolious (2005), electronic banking platforms such as ATMs, mobile banking, internet banking, and POS provides new distribution channels for banking operations. The Transactional efficiency output measures the degree of usage of the new distribution platforms and income generated from them. This study employs those inputs whose probability of been used by bank customers is higher since the transactional efficiency measures bank-client performance without the interference of the bank personnel. Portela and Thanassolious (2005) explain that this method is limited because banks could have a large number of E-banking platforms and still need a lot of staff members.

Table 1 – Input and Output Measures in Transactional efficiency

Inputs Measures	Output measures
1. Number of ETMs (ATMS and CATs) (t)	New registrations for internet use (t)
2. Rent (Number of branches) (t)	N. Transactions in CATs (t)

The input measures of transactional efficiency account for the resources that enhance the bank in channeling their operations to alternative means. The Electronic Teller Machines (ETMs) are the sum of the automated teller machines (ATMs) and cheque dispenser machines (CAT's). The rent variable is a proxy for the number of branches owned by the banks, and it does not imply if the building owned or purchased by the bank. In the output measures, new registration stands for a number of customers registered on yearly bases who use the electronic services. Transactions in CATs is used to capture the degree of usage of electronic platforms. There is no a priori expectation to believe that the input and output measures are proportional.

2.4 Operational Efficiency

The operational efficiency measure assesses bank performance and productivity in terms of sales. It deals with all operations that go into banking activities. It considers value-added models (sales-oriented). Like the transactional efficiency, the operational efficiency looks into bank-client activities and also considers personnel. The more a bank moves towards new distribution platforms, the more personnel that will be needed to perform value-added services. Portela and Thanassolious (2005) established that operational efficiency is higher with those banks that show higher transactional efficiency. The essence of the transactional efficiency is to capture the productivity of banks in making the bank customers switch to new distribution platforms. The inputs and output variables used in operational efficiency are those that involve value-added services. The operational efficiency captures the efficiency and productivity of bank staffs employed in the performing of value-added services.

Table 2 – Input and Output Measures in Operational efficiency

Inputs Measures	Output measures
1. Number of Employees (t)	Total number of Customers (t)
2. Rent (Number of branches) (t)	Value of deposits (t)
	Sales (t)

The input measures reflect the resources involved in the operations of the bank. The rent variable indicates the internal environment conditions and investment in employees training. The number of employees has the capacity to increase the number of customers and increase the sales value for the bank services and products. The output measures (total number of customers, values of deposit, and sales) reflect the operational objectives (increase sales of the various products and services offered by the bank and increase the customers base).

2.5 Profit Efficiency

The profit efficiency assessment captures the degree to which a bank maximizes profit. Profit efficiency shows how a bank performs in relation to other banks operating in the same period of time. Nyong (2005) discovered that profit efficiency is quite superior to any other efficiency measurement. The profit efficiency measure is consistent with the intermediation approach. The intermediation approach takes into account the asset transformation function. It assumes that the bank uses all type of deposits at its disposal as well as other inputs to produce different types of bank assets such as loans and investments, measured by their monetary values. Profit efficiency takes into account revenue maximization, loan management performance, input minimization, and tax effect. The inputs and out variables used in this study are consistent with the studies done by other researchers (Portela and Thanassoulis, 2005 and Tanko,2008).

Table 3 – Input and Output Measures in Profit efficiency

Inputs Measures	Output measures
1. Staff salaries (t)	The total value of deposits (t)
2. Supply cost (t)	Net interest revenue (t)
	Commissions and fees (t)

The input and output measures are consistent with the intermediation approach and are good measures of the short term returns of the bank. Ofori-Sasu et al. (2019) are of the

opinion that the intermediation approach employs purchased input to produce different bank assets while the output variables measure objectives in terms of monetary values.

2.6 Bank Performance

The concept of performance and its measurement is difficult because of its many meaning and ways of assessment. The concept of organizational performance is viewed on the idea that an organization is the voluntary association and management of all productive assets utilized in an organization. The interpretation of performance depends on the perspective of the stakeholder, and each group of organization stakeholder will have a different view of organizational performance making it imperative for a researcher to select a perspective of performance that agrees to the phenomena of interest. Value is the perception of the beholder. Each organizational stakeholder will have a different perspective of what is "valuable" based upon their purpose for associating with the organization. Passive investors have different perspectives on value creation than do active investors. Creditors may perceive the value to be created by the organization's ability to generate positive cash flow and preserve the worth of collateral. Conversely, equity investors may perceive value in expanding company resources to create future opportunities, even if it diminishes cash flow and tangible company assets in the short term. The most important thing is matching the existing circumstances with the appropriate model of organizational performance (Robert, 2004).

There are different views and measures of performance. Fauzi (2009) argues that there are methods of measuring bank performance, and these are the accounting-based, market-based, and corporate social performance-based. Omankhanlen, (2013) posits that there are eight methods of performance measure which are accounting approach, market-based, risk rating, interest spread and margins, monetary aggregate, minimum reserve, performance per employees hours and frontier analysis. Robert (2004) established that there are accounting measures, economic value measure, market-based, efficiency measure, survival measure, operational measure, leverage, liquidity, and cash flow measure, growth measure, and profitability measure. This study would adopt the leverage, liquidity, and cash flow measure.

2.7 Leverage, Liquidity and Cashflow Measures (Dupont Analysis)

Leverage measure reveals the financial structure of the organization in terms of debt to asset, debt to equity, and time interest rate earned. Penman (2001) posits that financial leverage is the degree to which operating assets are financed by debt against debt-financed by equity. Liquidity measures show the ability of banks to easily convert the asset to cash by assessing quick ratio, current ratio, and interval of measure. It is the ability of a firm to a firm to meet its financial obligation in a timely manner (Robert, 2004). The cash flow measure shows the volume of cash generated by an organization and the source of the cash relative the demand of cash in an organization and this can be evaluated using cash flow to equity and cash flow to an asset.

2.8 Empirical Review

Ofori-Sasu, Abor, and Mensah (2019) looked into the effect of funding structure on the technical efficiency of banks in Ghana using the random effect and the truncated panel

data for 25 banks. There study revealed that Ghanaian banks are less efficient and that there is a significant relationship between funding structure and bank efficiency.

Sameh and Jamel (2013) investigated bank size efficiency in developing countries using the DEA with intermediate and value-added approach on 402 commercials banks from 15 developing countries and concluded that the banks suffer from technical inefficiency which has brought about an average waste exceeding 46% of their actual operations.

Portela and Thanassoulis (2005) examined the comparative analysis of Portuguese banks branches to ascertain their performance and efficiency level in terms of new channels of distribution, customers and sales base increase, and their efficiency level in profit generation and maximization. The study concluded that there is a relation between transactional, operational, and profit efficiency.

3. Methodology

The study employs an expo facto research design. Deposit Money Banks (DMBs) were divided into three groups based on the Central Bank of Nigeria (CBN, 2018) classification. International Banks (8 DMB), National Banks (10 DMBs) and Regional Banks (2 DMB). Data to calculate financial performance and efficiency were taken from the annual reports for each financial institution, and only 15 of the DMBs qualify for the analysis. In measuring efficiency, secondary data were sourced from annual financial reports of the 15 selected deposit money banks. These banks were chosen because they have been in operations for over 5 years period and their stocks are quoted on the floor of the Nigerian Stock Exchange as at June 2019. Structural equation models (SEM) and particularly Linear Structural Equations (LISREL) software were used to test whether there is a measurable relationship between efficiency and bank performance.

Data envelopment analysis (DEA) was used in ascertaining operational efficiency, transactional efficiency, and profit efficiency. Banker, Charnes, and Cooper (BCC) Model in Decision-Making Units (DMU) was used. The input-oriented BCC Model proposed by Banker Charnes and Cooper in 1984 and it evaluated the efficiency of DMU by solving the following linear program

$$\text{Max } e^0 = \sum_{r=1}^{S} U_r Y_{rj} - U_0$$

Subject to

$$\sum_{i=1}^{M} W_r X_{i0} = 1$$

$$\sum_{r=1}^{S} U_r Y_{rj} - U_0 - \sum_{i=1}^{M} W_i X_{ij} \leq 0$$

Where X_{ij} and Y_{rj} (all non-negative) are the inputs and outputs of the jth Decision-Making Units, W_i and U_r are the input and output weights which are also called multipliers). X_{i0} and Yro are the inputs and outputs of DMU. Also, e is non-Archimedean infinitesimal value for forestalling weights to be equal to zero. Since data envelopment analysis models identify more than one DMU as efficient units, finding the most efficient DMU is an issue (Worimegbe et al., 2018).

3.1 Model Specification

$$BANKPERF = f(TRAE, OPE, PRE)$$

$$BANKPERF = \beta_0 + \beta_1(TRAE) + \beta_2(OPE) + \beta_3(PRE) + \mu$$

Where;

BANKPERF= Bank Performance

TRAE= Transactional Efficiency

OPE= Operational Efficiency

PRE= Profit Efficiency

β_0 is the constant term

$\beta_1, \beta_2, \beta_3$ are the coefficient estimators

Where μ is the error term

A Priori Expectation

Based on the study of Portella and Thanassolious (2005), all the measures of efficiency (transactional, operational and profit) are expected to reflect a positive relationship with bank performance; hence there will be a directly proportionate relationship between efficiency and bank performance in the above model. .i.e. $\beta_1, \beta_2, \beta_3, > 0$.

4. Research Findings

4.1 Comparative Analysis of Efficiency among Deposit Money Banks in Nigeria

Table 4 – Showing Comparative Analysis of Efficiency among Deposit Money Banks in Nigeria

Measure	International Bank Means	National Banks Means	Regional Banks Means	Combined F between groups	Sig *p*
Transactional Efficiency	74.131	69.546	61.181	25.119	0.002
Operational Efficiency	86.211	81.011	79.233	41.016	0.031
Profit Efficiency	71.652	70.128	56.114	38.101	.000

Table 1 shows the comparative means for each efficiency measure for the three groups of deposit money banks in Nigeria and shows that the means for the three groups of deposit money banks are significantly different for transactional efficiency, operational efficiency, and profit efficiency. The international banks clearly have the highest overall transactional efficiency, operational efficiency, and profit efficiency scores. ANOVA results confirm that these differences are significant. The result reveals that international banks (DEA Mean = 74.131) are more transactional efficient compared to National banks (DEA Mean = 69.546) and Regional banks (DEA Mean = 61.181). It further reveals that international banks (DEA Mean = 86.211) are more efficient in terms of operational efficiency compared to national banks (.DEA Mean = 81.011) and regional banks (DEA

Mean = 79.233). The international banks are more profit efficient (DEA mean= 71.612) compared to national banks (.DEA Mean = 70.128) and regional banks (DEA Mean = 56.114). The result corroborates the findings of Tank (2008)) and Portella and Thanassolious (2005),) that there is a high level of scale efficiency among larger banks.

4.2 Examining Research Models

Hypothesis 1: Bank efficiency significantly affects bank performance

Table 5 – Regression Estimates

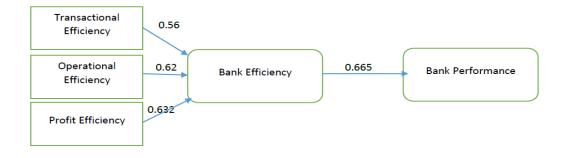| | Bank Performance | | | |
	Std. Error	B	Z value	P**
Constant	0.661	2.311	4.181	0.000
Transactional Efficiency	0.015	0.567	1.321	0.009
Operational Efficiency	0.112	0.451	2.003	0.002
Profit Efficiency	0.70	0.612	1.106	0.000
Error Variance	0.302			
R² = 0.665	0.665			

BANKPERF =   2.311 +0.567*TRAE +0.451*OPE + 0.612*PRE

From the Z-values associated with the coefficients, there is empirical evidence for rejecting the statistical hypotheses of nullity of the coefficients associated with the relationships between transactional efficiency (Z=1.321, p=0.009), operational efficiency (Z=2.003,   p=0.002) profit efficiency (Z= 1.106, p=0.000) of bank efficiency. Therefore, we can confirm the existence of these relationships and must, therefore, reject the null hypothesis and Accept HA. The R2, which is the coefficient of determination shows 0.665, and this indicates that 66.5% variation in bank performance is caused by bank efficiency. The P-values of all the variables measured show that transactional efficiency, operational efficiency, and profit efficiency are significant to the model.

4.3 Test of Goodness of Fit

All of the paths were freely estimated, and error variances were constrained to one, which is the program default. The proposed structural equation model achieved a good fit ($\chi 2$ = 967, df = 112, p < 0.00; GFI = 0.91, IFI = 0.92, CFI = 0.98, RMSEA = 0.083).

Figure 1 – Estimated Structural Equation Model

The estimated values of the coefficients of the structural equations provide relevant information about the ways efficiency affects bank performance. The result reveals operational efficiency is the main cause of bank performance.

5. Conclusion and recommendation

This study provides evidence on the effect of bank efficiency on bank performance in Nigeria. The result shows that larger banks are more efficient in terms of all the dimensions of bank efficiency. As banks become larger, they become more efficient. From the empirical evidence, we concluded that with respect to hypothesis H1 there was enough empirical evidence available to reject the statistical hypothesis of nullity of the coefficients associated with the causal relationships of bank efficiency banks financial. The result shows that transactional efficiency, operational efficiency, and profit efficiency all affect deposit money bank performance.

The estimation of SEM, which relates the dimensions of efficiency, and there observed measure to performance, provides a number of interesting conclusions. Bank performance primarily depends on the efficiency and to a large extent on operational efficiency. It is, therefore, of utmost importance to conclude that the bank plays a pivotal role in deposit money bank financial performance.

This conclusion has important implications because it suggests that deposit money banks should concentrate effort firstly on operational efficiency. Based on the results of the study, the study recommends that DMBs should explore ways to be more operationally efficient. DMBs should move towards new distribution platforms. More personnel should be employed to perform value-added services.

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