

Determinants of Banks Profitability: Evidence from Nigeria Banking Industry

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Received: August 27, 2024; Accepted: September 02, 2024; Published: September 06, 2024

ABSTRACT

The study, investigated determinants of banks profitability in Nigeria. Other studies in this area concentrated on other profitability notions, this study incorporated Economic Value Added (EVA). Due to the presence of endogeneity problems inherent in most panel data sets of this nature we employed a two-step system GMM estimator to produce a robust estimation and account for the endogeneity problem in the data. The study revealed that bank size has a positive and significant impact on all measures of bank profitability with the exception of Net Interest Margin (NIM). This result remained consistent after macroeconomic factors were introduced in the model. The outcome also indicated that capital adequacy significantly explains bank profitability in Nigeria, with a sign change in the case of Economic Value Added (EVA) only. It was also evident that financial structure (FS) has a positive and significant impact on Return on Assets (ROA), NIM, and EVA but no evidence of significant relationship was found with ROE. The result indicated that liquidity risk (LR) has a negative and significant impact on ROA and EVA but failed to provide a significant impact on ROE and NIM. The result of the macroeconomic factors included in the model indicated that Gross Domestic Product (GDP) has a positive and significant impact on NIM and EVA while no significant relationship was found when related to ROA and ROE. Inflation as a macroeconomic variable showed a significant relationship with ROA and ROE with no evidence of significant relationship with NIM and EVA. It was concluded that the impact of firm specific factors and macroeconomic variables on the profitability of the Nigerian banking sector differ according to the profitability measure employed.

Keywords: Net Interest Margin (NIM), Economic Value Added (EVA), Return on Asset (ROA), Liquidity Risk (LR), Return on Equity (ROE), Gross Domestic Product (GDP), Financial Structure (FS)

Introduction

Profitability is the ability to realize a stable and sustainable return on sales and investment over a period of time. Maximization of shareholders wealth is one of the objectives of financial management and profitability is a causal factor of firms' performance and shareholders' value [1]. Stakeholders rely heavily on firms' profitability to make informed, economic and investment decisions which to the shareholders indicate that the resources they provided and entrusted to the management have been effectively and efficiently utilized. For the employees it is a means of bargaining for more wages and better condition of service, for the customers it is a source of assurance for constant and steady supply of goods and services at affordable prices, for the suppliers it is a source of guarantee on the firms' ability to meet payment of her maturing short term obligations as they fall due, for the government it is a source of more tax revenue and for the competitors it is an indication to re-strategize on how to

re-capture a greater proportion of the market share at the expense of the reporting entity.

Hasan et al. states that the strength of the financial sector of any country drives economic stability and the banking industry as a subset of the financial sector must be up and doing in terms of her performance to sustain economic growth and development [2]. This clearly shows that bank profitability matters for financial stability. Profits are the first line of defense against losses from credit impairment. Retained earnings which are a function of accumulated profits over time strengthen the capital base thereby acting as a buffer in absorbing any future losses. These buffers ensure that banks are able to carry out and maintain their intermediation role even in times of serious economic setbacks.

In a highly competitive environment the existence, success and survival of any bank is a function of profitability. Lack of profitability exposes the banking institution to the risk of depleting their capital base thereby compromising their primary function of intermediating between the surplus and deficit units of the economy [3]. As the life blood of modern businesses, the banking sector must be sound and profitable enough to stimulate

economic growth and development. This is because economies with a profitable banking sector are in a better position to offer strong resistance to negative shocks and contribute in the stability of the financial system [4].

A lot of studies have been carried out on the determinants of banks' performance by capitalizing on the use of traditional accounting profits measures such as Net Interest Margin (NIM), Return on Equity (ROE) and Return on Asset (ROA) as proxies for profitability [3,5-23]. One part of the literature, report the use of Net Interest Margin (NIM) (which represents the difference between the interest incomes generated by banks from their lending to customers and the interest expense paid to customers on their deposit) in relation to interest earning assets [5,6]. The major drawback observed with the use of NIM was that, it does not take into consideration operating expenses. The second group used Return on Equity (ROE) which measures the efficiency of management in utilization of her equity financing in generating profit even though ROE does not consider leverage nor cost of equity [7]. The third group used Return on Asset (ROA) as proxies for profitability which measures the amount of profits generated by banks for every unit of investment in assets [8-10]. Even though the ROA considers financial leverage, it fails to account for the cost of equity. The fourth group are proponents of a combination of either two or three of the traditional accounting profits measures (e.g., profit after interest and taxation, earnings per share, to mention but a few) on banks' performance [3,11-19,21-23].

A good performance measure should be able to evaluate how well an organization is performing in other to achieve its set goals and objectives. Maximization of shareholders wealth is mostly seen as the main objective of business organizations and a good performance measure should be able to evaluate this. The use of traditional accounting profits measures by previous studies tends to ignore the cost of equity capital because the calculation of profits does not take into consideration the cost of equity finance. Banks can only create wealth/value when they generate a return in excess of the return required by providers of fund-both equity and debt. In spite of the numerous literatures on the determinants of banks profitability, none of the studies expressed profitability in terms of Economic Value Added (EVA) more especially in Nigeria. EVA is a measure of a firm's true economic profit or the value/wealth created in excess of the return required by providers of capital. Stewart states that, EVA captures true economic profit of a firm than any other performance measure and it is the performance measure which is most directly linked to the shareholders' value over time. EVA addresses the weaknesses of the traditional accounting profit measures because it accounts for the full cost of capital (Cost of equity and debt).

The inclusion of the EVA which is a stronger measure of profitability in our model is one of the novelties provided by the study. Majority of the ex-ante empirical studies relied mainly on the traditional accounting measures of profitability which mostly ignore the full cost of capital and hence will not present an infallible result in any empirical investigation. Similarly, we included macroeconomic variable in the model to account for the external economic factors that impact on bank profitability. Finally, a large number of studies employed a pooled panel linear model in investigating the determinants of bank profitability,

hence failing to address the endogeneity problems inherent in such model. The presence of endogeneity problem increases the probability of false positive result and to address this we adopted a dynamic two step system GMM which produces a more robust and reliable result.

The remaining part of this study is organized as follows: Section 2 review of related literatures on banks profitability determinants. Section 3 data and methodology. Section 4 discussions of the results. Section 5 conclusions and recommendations

Literature Review

Numerous studies have been carried out on the determinants of bank performance both at the local and international levels using different proxies for profitability. This section of the paper therefore reviews literatures that have similar features with our study.

Khalfaoui and Ben-saada investigated the determinants of the performances of 11 Tunisian banks covering a period of 2000 to 2013 [5]. Employing a panel data model, they concluded that credit risk management, liquidity, size and disclosure of credit information are the main determinants of banking performance (NIM) in Tunisia. They also opined that financial structure and inflation rate do not drive banking performance. Nasserinia et al. used a dynamic panel data model (GMM) in examining the determinants of German banking sector performance over a period of 11 years to 2012 [6]. The empirical evidence from their study reveals that while capital adequacy and liquidity risk have positive effect on bank performance (NIM), credit risk, income diversification and size have significant negative effect. They also concluded that concentration effect and macroeconomic variables on banking performance (NIM) are found to be statistically weak and insignificant. Almazari carried out a comparative study between Saudi Arabia and Jordan in determining the impact of internal factors on bank profitability [8]. Using a sample of 23 Saudi and Jordanian banks for a coverage period of 2005 to 2011, he reported that while total investment to total asset ratio, total equity to total asset ratio and liquidity risk have positive and significant effect on the profitability (ROA) of Saudi banks, this was not the case for net credit facilities to total asset ratio, net credit facilities to total deposit ratio, cost to income ratio and size as they revealed a negative and significant correlation with Saudi banks profitability. They also concluded on the other hand that the profitability (ROA) of Jordanian banks has a positive and significant correlation with liquidity risk, net credit facilities to total asset ratio, total equity to total asset ratio and net credit facilities to total deposit ratio but a negative and significant correlation with cost to income ratio, total investment to total asset ratio and size.

Yenesew employed the OLS estimation method in examining the effect of internal and external determinants on financial performance of microfinance institutions in Ethiopia over a 9 year period from 2003 to 2011 [9]. By selecting a sample of 13 microfinance institutions for the study and employing the multiple linear regression of OLS and panel data technique. He opined that operational efficiency, GDP and size have positive and significant effect on financial performance even though age has a positive and insignificant effect. On the other hand, other explanatory variables like portfolio quality, market

concentration, gearing ratio and capital to asset ratio have a negative and insignificant effect on financial performance (ROA) of microfinance institutions in Ethiopia. He recommended that utmost attention by management should be directed at minimizing operational cost and embarks on efficient credit risk management policy. Yuksel et al. studied the determinants of bank profitability in 13 post-soviet countries [7]. The study covered a period of 1996 to 2016 employing fixed effect panel regression and GMM. They found that while non-interest income and economic growth (GDP) showed a positive relationship with bank profitability (ROE) of post-soviet countries, loan amount negatively influences bank profitability. They opined that a higher non-interest income and GDP would give rise to higher bank profits while decline in bank profitability is driven by a higher loan amount. They however recommended that banks in post-soviet countries should be risk averse when lending to customers as well as not rely only on increasing interest income but non-interest income.

Nouaili et al. examined the determinants of bank performance in Tunisia using regression analysis and panel data technique [11]. Net interest margin, liquidity, ROA and ROE were used as proxies for bank performance. They concluded that while capitalization, privatization, quotation and GDP positively influence bank performance, size, concentration index, efficiency and inflation rate influence bank performance negatively. In Palestine, Abugamea investigated the determinants of banking sector profitability (NIM, ROE and ROA) over a period of 1995 to 2015 employing the OLS technique [12]. The study reveals that size and capital positively affect ROE and ROA respectively while deposits showed a negative relationship with both ROE and ROA. Even though neither the internal nor the external factors have any significant effect on NIM, loan has a positive relationship with both ROE and ROA. The author recommended that for banks to increase profitability they should ensure that customer deposits are channeled into profitable investments while maintaining a considerable level of lending activities.

Abel and Le Roux analyzed the determinants of banking sector profitability in Zimbabwe employing the fixed effect panel regression model [3]. The results from the study reveal that banks profitability is a function of high amount of liquid assets, high capital base, efficient expense management and low levels of non-performing loans. They opined that banking sector profitability (ROE and ROA) in Zimbabwe can be improved by increase in asset quality, efficient expense management and maintaining a good level of liquidity. According to the authors, bank size, capital adequacy, inflation, credit risk and expense management show a negative and significant relationship with profitability (ROA) except for liquidity risk that shows positive and significant relationship. On the other hand, liquidity risk and credit risk are positively and negatively influencing profitability (ROE) significantly respectively while other variables were not significant at 5% level of significance.

Ameur and Mhiri employed bank specific (size, capital adequacy, non-performing loan, cost-income ratio, growth deposit, ownership), industry specific (Concentration, size bank systems) and macro-economic (GDP and inflation) factors in examining Tunisian banking performance (ROA, ROE and MIM) [13]. The study was carried out on a sample of 10

commercial Tunisian banks over a period of 14 years from 1998 to 2011 using the GMM estimation technique. The empirical results indicate that capital adequacy and cost to income ratio are significant influence on bank performance implying that highly capitalized banks with efficient expense management policies tend to be more profitable. Ownership and size have significant positive and negative effect respectively on performance. They recommended for the privatization of state-owned banks in other to boost profitability while bank size should be maintained at an optimal level. Also, while concentration and size bank system show negative and significant relationship with ROA, the macro-economic variables have no significant influence on ROA.

Kosmidou et al. investigated the determinants of profitability of domestic UK commercial banks over a period of 1995 to 2002 employing the panel regression model [14]. Using the performance measures of ROA and NIM as proxies for profitability, their empirical results reveal that both liquidity and loan loss reserve show a mixed finding on ROA and NIM. Liquidity shows a significant and positive impact on ROA but with a negative impact on NIM while the reverse was the case for loan loss reserve. External factors (GDP, inflation, concentration and stock market capitalization) individually show a positive and significant effect on ROA and NIM but with a little impact on the overall explanatory power of the regression. However, capital has a positive and significant influence on both ROA and NIM indicating that highly capitalized banks are less prone to high cost of external financing which helps in reducing costs and boosting profitability. Cost to income ratio and size are found to have negative and significant relationship with ROA and NIM. Sufian examined the determinants of 29 Korean commercial banks profitability (ROA and ROE) over a period of 1992 to 2003 by employing a fixed effect panel regression technique [15]. The author concluded that diversification to non-interest income sources with low level of liquidity drives profitability though with credit risk and overhead costs having a negative influence on profitability. Bank concentration has a positive and significant effect on profitability while inflation being a macroeconomic variable displayed a substantial pro-cyclical impact on profitability.

From the Indonesian banking sector, Jumono investigated the determinants of profitability from 2001 to 2014 using a sample of 97 Indonesian banks by employing the dynamic panel GMM technique [16]. He recommended that regulations and policy planning of national banking industry should be channeled to boosting profitability without depending on market power or high interest margin to get higher profits. Profitability proxies in this paper are basic earning power (BEP) and return on equity (ROE) and the empirical results suggest that capital, debt to equity ratio, credit risk (non-performing loan), and inflation do not significantly affect profitability despite being positively related with capital. Meanwhile overhead which represent expense management efficiency shows a negative and significant effect on profitability. Liquidity ratios (loan to deposit ratio, loan to asset ratio and statutory reserve) all have significant impact on profitability. Micro-economic variables (internet usage index and money supply) on the other hand except for GNI which negatively influence profitability show a positive and significant relationship with profitability. Selecting a sample of 10 Pakistani banks over a 5-year period ranging from 2010

to 2014, Beenishameer examined the effect of bank specific and macro-economic factors on banking sector performance in Pakistan [17]. The study utilized the correlation and multiple regression technique. However, the econometric results reveal that profitability (ROA and ROE) has significant and positive relationship with size, capital, loan, deposits and foreign direct investment but negative relationship with expenses, credit risk and inflation. On the other hand, liquidity and GDP was found to have no significant impact on profitability.

Gemechu employed return on asset and net interest margin as dependent variables and capital adequacy, loans and advances, efficiency and productivity, credit risk, liquidity risk, expense management, regulation, market concentration, economic growth, interest rate, and exchange rate as independent variables in examining the determinants of commercial banks in Ethiopia [18]. The results show a direct relationship between return on asset and capital adequacy, efficiency and productivity, exchange rate, economic growth, interest rate, loans & advances and liquidity risk with all these independent variables except economic growth and interest rate exerting significant impact on return on asset. Credit risk, expense management, market concentration and regulation have an inverse relationship with return on assets. The net interest margin on the other hand indicates a positive and significant relationship with efficiency and productivity, economic growth, interest rate, loans and advances, market concentration, and regulations. Capital adequacy, exchange rate and liquidity risk though have a direct relationship with net interest margin but are statistically insignificant. Also, while expense management was statistically significant with negative impact on net interest margin, credit risk has a negative and insignificant effect on net interest margin.

From a cross country analysis perspective, Adelopo et al. examined the determinants of bank profitability before, during and after the financial crisis [19]. By employing a panel data technique and using a sample of 123 commercial banks from the Economic Community of West African State (ECOWAS), their results indicate a significant relationship between bank specific determinants (size, cost management and liquidity) and bank profitability (ROA) before, during and after the financial crisis. However, the relationship between other bank specific and macro-economic determinants (capital strength, credit risk, market power, GDP and inflation) is sensitive to both the three period of analysis and profitability (ROA or NIM).

The above literatures revealed empirical evidences from other countries other than Nigeria except for Adelopo et al. that looked at bank profitability determinants of commercial banks in West Africa of which Nigeria is a part [19]. However, in Nigeria, Aremu et al. x-rayed the determinants of banks' profitability in Nigeria over a 31 years period covering 1980 to 2010 [20]. The authors employed regression analysis technique (co-integration and error correction model) on only one sampled bank (First Bank of Nigeria) while they used ROA, ROE and NIM as proxies for profitability. They concluded that macro-economic variables (money supply, GDP and inflation) are all statistically insignificant with the exception of money supply that positively and significantly influence ROE only. Credit risk shows a significant and inverse relationship with profitability (ROA, ROE and NIM) whereas cost management

was negatively insignificant for both ROA and ROE but with positive and significant relationship with NIM. Capital adequacy on the other hand was significant and inversely related to the three profitability measures except for ROA that was statistically insignificant. Negative and insignificant relationship was found between Profitability (ROA, ROE and NIM) and liquidity risk. Bank size was positive but do not have any significant influence on profitability. Using First Bank alone in this study is not a sufficient sample size for drawing inferences on bank profitability determinants in Nigeria. Obamuyi evaluated the effects of capital, size, expense management, interest rate and economic growth (GDP) on banks' profitability (ROA) in Nigeria over a 7 years period ranging from 2006 to 2012 [10]. The econometric results revealed that higher bank performance in Nigeria is driven by improved bank capital and interest income, efficient expenses management and favourable economic growth. Ani et al. investigated the determinants of banks' profitability (ROA) over a 10 years period from 2001 to 2010 on a sample of 15 deposit money banks (DMB) [24]. Their econometric results revealed that capital adequacy and bank composition are major drivers of banks' profitability in Nigeria. However, while bank size shows an inverse relationship with insignificant effect on profitability, capital adequacy and bank composition were both significant as well as being negatively and positively related to profitability respectively.

Similarly, Fanen et al. recommended that for banks to withstand any economic shock that may arise, policies should be channeled at improving the efficiency and resilience of Nigerian deposit money banks [25]. They examined the determinants of bank profitability (ROA) over a 7 years period covering 2012 to 2018 by employing a panel data regression model. The authors concluded that, while capital efficiency ratio, operational efficiency and GDP have a direct and significant relationship with profitability, bank size and liquidity are statistically insignificant even though they show a negative and positive relationship with profitability respectively. Also, credit risk has an inverse relationship but statistically significant. John and Oke used earnings per share (EPS) and profit after tax (PAT) as proxies for profitability in their examination of capital adequacy before and after the banks capitalization policy in Nigeria [26].

Obilikwu studied the impact of capital, concentration, size and liquidity on banking industry performance in Nigeria [27]. By employing the Vector Error Correction Model, he found that except for the control variables (GDP and inflation) that do not have any significant impact on profitability (ROE), concentration, size and liquidity have an inverse relationship with profitability. Capital adequacy on the other hand significantly and positively influences bank profitability in Nigeria. The author recommended that the Central Bank of Nigeria should ensure that the capital adequacy ratio for banks is constantly regulated to boost continuous bank performance. Akinkunmi examined the determinants of banks' profitability in Nigeria for periods covering 2001 to 2015 [21]. He employed the OLS and GMM techniques and found out that efficiency ratio, capital adequacy and credit risk are key determinants of banks' profitability (ROA, ROE & NIM) but with capital adequacy having significant influence only on profitability in the long run while GDP and market concentration significantly influence profitability in the short run.

Chidozie and Ayadi in their evaluation of macro-economy and banks profitability in Nigeria using data sets covering 2005 to 2014 found that macro-economic variables (GDP and inflation) do not have any significant impact on profitability (ROA and ROE) other than crude oil prices that show a significant and inverse relationship with profitability [22]. They also opined that banks specific determinants (concentration, expense management and size) are statistically significant with profitability even though they all except for size show an inverse relationship. They recommended that banks' exposure to the oil and gas sector should be properly managed to avoid any negative impact of crude oil price fluctuation on banks' profitability. Aminu from his investigation of banks' profitability determinants concluded that only management efficiency drives profitability (ROA and ROE) [28]. Other explanatory variables (liquidity, capital adequacy, asset quality and inflation) with the exception of GDP do not have any significant impact on profitability.

Shuaib studied the effects of credit risk, market power and exchange rate on banks' profitability (ROA and ROE) in Nigeria [23]. The econometric results revealed that while market power has a direct and significant relationship with profitability (ROA and ROE), credit risk do not have any significant effect on profitability (ROA and ROE) despite its inverse relationship. On the other hand, exchange rate has positive but insignificant effect on ROA and a significant but inverse effect on ROE. On this premise, the author recommended that to boost profitability, banks management should continue to increase their market share (market power) and ensure that exchange rate fluctuations are adequately anticipated. Soyemi et al. from their study of the determining factors influencing profitability (NIM and ROE) of deposit money banks (DMB) in Nigeria, concluded that bank size, capital adequacy and loan significantly influence bank profitability even though they are inversely related to profitability [29]. Other explanatory variables (Deposits and management expenses) and macro-economic variables (GDP and stock market capitalization) do not have any significant influence on profitability.

The review of the above literatures indicates that the use of different proxies for profitability on the determinants of banks' profitability remains in-exhaustive and these mixed findings create a research gap which this study intends to fill. However, evidence from extant research on the subject matter suggests that no study on banks' profitability determinants in Nigeria has attempted to employ Economic Value Added (EVA) as a profitability measure. EVA addresses the weaknesses of the traditional accounting profit (NIM, ROA, ROE, EPS, PAT) measures because it accounts for the full cost of capital (Cost of equity and debt).

Data and Methodology

The research adopted the ex-post facto research design. This design avoid manipulation of data. The data used in this study were secondary data obtained from published financial statements of banks quoted on the Nigeria Exchange Group (NGX), National Bureau of Statistics (NBS) and the World Bank. The study examines the determinants of banks' profitability in the Nigerian banking sector. The panel data covers a period of 15 years from 2006 to 2020 amounting to a total of 197 observations. A total of 15 banks (see appendix) quoted on the

Nigeria Stock Exchange for the periods under review make up the entire population, hence fully utilize for the study.

Model Development

Ex ante empirical evidence has shown that the current year's level of banks profitability depends on the previous year's level [30]. This however, creates possible endogeneity problems in modeling the determinants of bank profitability. And so, to account for the problem of endogeneity that is inherent in panel data structure of this sort, we employed a dynamic panel data model. Enowbi Batuo, and Guidi, and Negeri and Halemariam estimated a dynamic panel model as shown below, which was adopted and modified to suit the present study [30].

$$Y_{i,t} = \phi_0 Y_{i,t-1} + \phi_1 X_{i,t} + \phi_2 \Pi_{2,t} + \phi_{1(t)} + \phi_{2(t)} + \epsilon_{i,t}$$

Where $Y_{i,t}$ represent proxies for profitability (ROA, ROE, NIM and EVA) of bank i , at time t . $Y_{i,t-1}$ is the lagged of the dependent variable (profitability), $X_{i,t}$ is a vector of micro(firm specific factors) that explains the profitability of banking sector, $\Pi_{2,t}$ is a vector of macroeconomic variables that explains profitability, $\phi_{1(t)}$ and $\phi_{2(t)}$ represent firm and time effects, $\epsilon_{i,t}$ is an idiosyncratic error term with $\epsilon_{i,t} = 0$ for firm i and time t . The difference GMM proposed by Arellano and Bond has some eminent issues, prominent among them is the small sample bias. However, Blundell and Bond proposed a system GMM which among other things addresses the problem of finite sample bias. And so, we will follow the Blundell and Bond System GMM in estimating our model. The additional orthogonality condition present in System GMM provides asymptotic efficiency gains. According to Roodman this asymptotic efficiency gain comes with costs. Prominent among the costs are the high chances of obtaining misleading results and false specification test results like Hansen J-test. However, to mitigate these costs, Roodman proposed estimating System GMM with a collapsed instrument matrix which was adhered to in this study.

Model Specification

Our study employed a strongly balanced panel data from 15 banks annual reports covering the period of 2006 to 2020. We therefore specify the modified model as below following Blundell and Bond.

The dependent variable which denotes Bank profitability is proxy by ROA, ROE, NIM and EVA, hence the econometric model below:

ROA model: Return on asset

$$ROA_{it} = \alpha ROA_{i,t-1} + \beta_1 SZ_{it} + \beta_2 CAR_{it} + \beta_3 FS_{it} + \beta_4 LR_{it} + \beta_5 INF_{it} + \beta_6 GDP_{it} + \sigma_i + \mu_t + \epsilon_{it}$$

ROE model: Return on equity

$$ROE_{it} = \alpha ROE_{i,t-1} + \beta_1 SZ_{it} + \beta_2 CAR_{it} + \beta_3 FS_{it} + \beta_4 LR_{it} + \beta_5 INF_{it} + \beta_6 GDP_{it} + \sigma_i + \mu_t + \epsilon_{it}$$

NIM model: Net interest margin

$$NIM_{it} = \alpha NIM_{i,t-1} + \beta_1 SZ_{it} + \beta_2 CAR_{it} + \beta_3 FS_{it} + \beta_4 LR_{it} + \beta_5 INF_{it} + \beta_6 GDP_{it} + \sigma_i + \mu_t + \epsilon_{it}$$

EVA model: Economic value added

$$EVA_{it} = \alpha EVA_{i,t-1} + \beta_1 SZ_{it} + \beta_2 CAR_{it} + \beta_3 FS_{it} + \beta_4 LR_{it} + \beta_5 INF_{it} + \beta_6 GDP_{it} + \sigma_i + \mu_t + \epsilon_{it}$$

Where:

$\beta_1 - \beta_6$ = coefficients for the respective explanatory variables

SZ = Bank size

CAR= Capital adequacy ratio

FS = Financial structure

LR= Liquidity risk

INF= Inflation

GDP= Gross domestic product

Measurement of Variables

The bank specific data used in the econometric analysis of this study is computed based on the formula as shown in Table 1.

Table 1

Variables	Notation	Formula
Return on asset	ROA	profit after tax/ average total asset
Return on equity	ROE	profit after tax/ equity
Net interest margin	NIM	Net interest income /interest earning assets
Economic value added	EVA	[profit after tax -(total asset-current liabilities)x WACC]
Bank size	SZ	Total assets
Capital adequacy ratio	CAR	(tier 1 capital + tier 2 capital)/risk weighted assets
Financial structure	FS	Equity/ total assets
Liquidity risk	LR	Core deposit/ total assets

Estimation of Results and Discussions

The results of the estimated models are presented in table 2. First, we began the estimation by focusing on the firm specific determinants of bank profitability and progressed to controlling for other macroeconomic factors. The results in column 1 to 4 represent the estimation of only firm specific factors while column 5 to 8 represent the results of macro and micro determinants of bank profitability.

The result in column 1 indicates that bank size is a significant positive determinant of profitability proxied by ROA. This however, implies that the larger the size of a bank measured by total assets the higher the bank's ROA. The finding is consistent with the results of Enowbi Batuo, and Guidi, who reported a significant positive relationship between firm size and ROA among banks in the South-Eastern Europe region [30]. The result negates the findings of Fanen et al. who failed to establish a significant relationship between bank size and profitability. Similarly, our findings indicate that CAR has a positive and significant impact on the profitability of the banking sector in Nigeria. This result suggests that a firm with a high CAR tends to generate higher ROA. Our result partially corroborated the findings of Gemechu who reported a direct relationship between ROA and capital adequacy but failed to provide empirical evidence in support of a significant relationship between them [18]. We equally reported that FS has a positive and significant impact on firm performance proxied by ROA. This however suggests that the higher a firm's ratio of equity to total assets the higher the chances of generating a positive return on assets. On the other hand, LR from the result in column 1 indicates

a negative and significant relationship with ROA. This result implies that the higher the LR of the bank the lower the ROA. This result is consistent with liquidity trade-off theory which suggests that high liquid assets generate lower profit to the bank hence lowering the banks ROA.

The result from column 2 also indicates that bank size impacts positively and significantly on bank profitability proxied by ROE. The findings suggest that the higher the bank's total assets the higher the chances of generating higher ROE. Our result is consistent with the result of Enowbi Batuo, and Guidi, for large commercial banks in the South-Eastern Europe region and also with Obilikwu who came to a similar conclusion applying different methodology [27,30]. Empirical evidence from our result indicates that CAR has a positive and significant impact on firm performance proxied by ROE. It however implies that the higher the ratio of a firm's tier 1 and 2 capitals to its risk weighted assets the higher the chance of generating increased ROE. This result is consistent with the findings of Soyemi et al. who equally reported that CAR has a positive and significant impact on profitability proxied by ROE [29]. Our findings failed to provide empirical evidence in support of a positive and significant impact between FS, LR and ROE for the period under investigation. This study corroborates the findings of Gemechu who reported an insignificant relationship between liquidity and ROE [18].

The result from column 3 addresses the relationship between the various independent variables and NIM. However, Bank size revealed a positive and significant relationship with NIM which support the econometric analysis of Nouaili et al. and Abugamea, whereas LR is negatively and insignificantly related with NIM [11,12]. CAR shows a significant relationship with NIM and this corroborates the findings of Nasserinia et al., Adelopo et al. and Kosmidou et al. but inconsistent with the result of Gemechu where CAR is statistically insignificant with NIM [6,14,18,19]. Similarly, our findings also show that FS which measures the proportion of total assets that is financed by equity holders has a positive and significant relationship with NIM. This implies that the higher this ratio the higher the NIM and the lower the level of risk and cost of debt financing.

The results from column 4 show that all the firm specific determinants of bank profitability as proxied by EVA are significant drivers of bank performance (EVA) in Nigeria. Bank size which has remain consistent across the other three profitability measures (ROA, ROE & NIM) is still found to be positive and significant with EVA thus implying that the larger the bank the higher the economic value added. Our result is consistent with the results of Amene and Alemu for private banks in Ethiopia [31]. Also, FS followed a similar pattern as bank size with a direct and significant relationship with EVA. However, this is not the case for CAR that is statistically significant but inversely related with EVA. This indicates that the higher the ratio of a firm's tier 1 and 2 capitals to its risk weighted assets the lower the chance of generating increased EVA. Our finding also conforms to that of Amene and Alemu [31]. On the other hand, our result of LR is negative but significant with EVA which is in contrast to the result of Amene and Alemu [31].

The result from column 5 included the macroeconomic variables and is largely consistent with the result in column 1.

It indicates that bank size has a positive and significant impact on the profitability of banks proxied by ROA [32]. However, we witnessed a slight decrease in the absolute value of the coefficient of the independent variable from 0.00966 to 0.00824 while the level of statistical significance remained unchanged. This suggests that the positive impact of firm size on bank performance parameters is persistent. Similarly, the results also suggest that CAR positively and significantly contributes to the improved banking sector performance. It can also be observed that there is consistency on the results of column 1 and that of column 5 with a very little variation on the absolute value of the coefficient of the independent variable. On the other hand, the results of FS suggest a positive and significant effect on the performance of the banking sector proxied by ROA [33]. Just like the result of the reported variables we also observe consistency between the results in column 1 and that of column 5. The above reported results suggest that the improvement in these explanatory variables will result in a significant improvement on the performance of the Nigerian banking sector proxied by ROA. The results of the findings suggest that LR also maintained consistency with the result in column 1 by returning a negative and statistically significant effect on the performance of the banking sector proxied by ROA. Empirical report from the result indicates that GDP has a positive but statistically insignificant impact on the performance of the Nigerian banking sector proxied by ROA. Prior empirical studies have corroborated these findings by reporting a statistically insignificant relationship between GDP and ROA [34]. We also found that inflation has a positive and significant impact on the performance of the Nigerian banking sector proxied by ROA. Evidence from the result suggests that the effect of the macroeconomic variables differ according to the variables included.

The result from column 6 which also include the macroeconomic variables is largely consistent with the result in column 2 except for the FS that moved from a positive and insignificant relationship with ROE to a negative and insignificant relationship with ROE. However, despite the marginal decrease in the absolute value of the coefficient from 0.0339 to 0.0267, bank size still maintained a positive and significant relationship with ROE. This suggests that the positive impact of firm size on bank performance parameters is persistent. Similarly, both CAR and LR maintained some level of consistency with the result in column 2 and column 6. While CAR positively and significantly contributes to the improved banking sector performance proxied by ROE even with a very little variation on the absolute value of the coefficient of the independent variable, LR positively and insignificantly contributes to the improved banking sector performance proxied by ROE. Empirical report from the result indicates that GDP has a positive but statistically insignificant impact on the performance of the Nigerian banking sector proxied by ROE which is consistent with the result of Ayanda et al. We also found that inflation has a negative and significant

impact on the performance of the Nigerian banking sector proxied by ROE.

The result from column 7 reveal that of all the four-bank specific independent variables, only LR is inconsistent with the result in column 3 and column 7. This is because, while column 3 states that LR is negative and insignificantly related with NIM, column 7 states that LR positively and insignificantly contributes to the improved banking sector performance proxied by NIM. On the other hand, bank size, CAR and FS are largely consistent with the results in column 3 and column 7. However, we witnessed a slight decrease in the absolute values of the coefficient of the independent variables (bank size and FS) from -0.0133 and 0.104 to -0.0201 and 0.0754 respectively while the level of statistical significance remained unchanged. CAR also maintained the same level of statistical significance but with a marginal increase in its absolute value of coefficient from 0.0601 to 0.0708. We also found that GDP has a positive and significant impact on the performance of the Nigerian banking sector proxied by NIM. Inflation on the other hand is negative and does not have any significant impact on the performance of the Nigerian banking sector proxied by NIM and this corroborates with the findings of Khalfaoui and Ben-saada and Nasserinia et al. [5,6].

The result from column 8 is largely consistent with the result in column 4. It indicates that bank size has a positive and significant impact on the profitability of banks proxied by EVA. However, we witnessed a significant increase in the absolute value of the coefficient of the independent variable from 0.0516 to 0.0848 while the level of statistical significance remained unchanged. This suggests that the positive impact of firm size on bank performance parameters is persistent. Similarly, the results also suggest that CAR negatively and significantly contributes to the banking sector performance. It can also be observed that there is consistency on the results of column 4 and that of column 8 with a very little variation on the absolute value of the coefficient of the independent variable. On the other hand, the results of FS suggest a positive and significant effect on the performance of the banking sector proxied by EVA. Just like the result of the reported variables we also observe consistency between the results in column 4 and that of column 8. The above reported results suggest that the improvement in these explanatory variables will result in a significant improvement on the performance of the Nigerian banking sector proxied by EVA. The results of the findings suggest that LR also maintained consistency with the result in column 4 by returning a negative and statistically significant effect on the performance of the banking sector proxied by EVA. Empirical report from the result indicates that GDP has a positive and statistically significant impact on the performance of the Nigerian banking sector proxied by EVA. This is not the case for inflation which shows a negative with no significant impact on the performance of the Nigerian banking sector proxied by EVA.

Table 2: Result of Two-Step-System-GMM

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ROA	ROE	NIM	EVA	ROA	ROE	NIM	EVA
L ROA	-0.203***				-0.163***			
	-0.0255				-0.0131			
Lnsz	0.00966***	0.0339***	-0.0133***	0.0516***	0.00824***	0.0267*	-0.0201***	0.0848***
	-0.00182	-0.00326	-0.00386	-0.0091	-0.00193	-0.0148	-0.00524	-0.0131
CAR	0.0490***	0.0759***	0.0601***	-0.825***	0.0409***	0.0887***	0.0708***	-0.868***
	-0.00789	-0.0164	-0.00826	-0.0182	-0.00653	-0.0277	-0.00928	-0.021
FS	0.0272**	0.0441	0.104***	1.158***	0.0211***	-0.011	0.0754***	1.034***
	-0.00994	-0.0518	-0.0253	-0.0625	-0.00942	-0.0545	-0.0283	-0.0799
LR	-0.0728***	0.094	-0.00924	-0.783***	-0.0595***	0.0224	0.0228	-0.883***
	-0.0117	-0.078	-0.0296	-0.079	-0.0114	-0.0877	-0.0413	-0.0874
L.ROE		0.126***				0.110***		
		-0.00292				-0.00795		
L.NIM			-0.181*				-0.131**	
			-0.0928				-0.0467	
L.eva				-0.445***				-0.456***
				-0.00714				-0.00987
Lngdp					0.000497	0.0127	0.0265**	0.132***
					-0.00264	-0.0275	-0.00902	-0.0305
INF					0.00132***	-0.00318**	-0.000148	-0.00042
					-0.000227	-0.00143	-0.000246	-0.00138
Constant	-0.0697**	-0.460***	0.267***	-0.179	-0.0786**	-0.51	-0.150*	1.855***
	-0.0254	-0.0774	-0.0645	-0.134	-0.0311	-0.297	-0.0801	-0.423
Observations	197	197	197	197	197	197	197	197
Number of ID	15	15	15	15	15	15	15	15
Hansen_test	7.402	9.103	12.84	11.67	9	8.14	13.2	10.58
Hansen Prob	0.192	0.765	0.0249	0.0396	0.109	0.834	0.0216	0.0603
AR(2)_test	-0.117	-0.94	0.303	1.053	-0.0653	-0.944	0.672	1.341
AR(2)_P-value	0.907	0.347	0.762	0.292	0.948	0.345	0.501	0.18

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Equation 1-4 did not control for Macro factors while Equation 5-8 controlled for macro factors

Robustness Test

Our study tested for the robustness of the result through the estimation of one-step system GMM to compare with the result of the baseline model which is the two-step system GMM and the result was found to be consistent across the methods. However, in the interest of space we reported the result of the two-step system GMM.

Diagnostic Test

Certain fundamental assumptions govern the application of the system GMM proposed by Blundell and Bond. And so, to ensure reliability, efficiency and consistency of our result, we performed various diagnostic tests. We presented the result of the autoregressive model of order 2 (AR (2)), which indicates the acceptance of the null hypothesis implying that there is no

serial correlation in the model at AR (2) and beyond. The result is consistent with the assumption that the moment conditions are invalid at AR (2). The result of Hansen test which tests for instrument over-identification restriction indicates that the probability value of the Hansen test is greater than 0.05 which suggest that we failed to reject the null hypothesis and conclude that the instrument as a group is endogenous, corroborating the assumption outlined by Blundell and Bond. Overall, the result of the diagnostic test suggests that the estimated result is consistent with the assumptions governing the two-step system GMM.

Conclusions

Given the numerous write up on determinants of banks' profitability using traditional accounting measures as proxies for profitability, none have made use of economic value added (EVA) as a measure of profitability most especially in Nigeria. The inclusion of the EVA which is a stronger measure of profitability in our model is one of the novelties provided by the study. Majority of the ex-ante empirical studies relied mainly on the traditional accounting measures of profitability which

mostly ignore the full cost of capital and hence will not present an infallible result in any empirical investigation. Similarly, we included macroeconomic variable in the model to account for the external economic factors that impact on bank profitability. Finally, a large number of studies employed a pooled panel linear model in investigating the determinants of bank profitability, hence failing to address the endogeneity problems inherent in such model. The presence of endogeneity problem increases the probability of false positive result and to address this we adopted a dynamic two step system GMM which produces a more robust and reliable result.

However, empirical evidence from the report indicates that firm size is a significant determinant of bank performance regardless of the performance measures employed. However, the dimension of the effect differs according to the performance proxies. The impact of size remained consistent after controlling for macroeconomic factors. Firm size was reported to have a negative effect on NIM suggesting that larger firms tends to exhibit declining NIM as more assets are acquired. Similarly, capital adequacy was shown to exert significant effect on all the performance parameters included in the study. This indicates that CAR is a significant driver of performance in the Nigerian banking sector. Although the effect appears to be negative on EVA, we can safely conclude that CAR is a significant promoter of performance in the Nigerian banking sector going by the popularity of the result. The result also showed that the effect of FS and LR on the banking sector differ according to the performance measure employed. The result of the analysis is consistent after controlling for macroeconomic variables. However, the macroeconomic variables included in the model were also shown to have different effect depending on the performance measure used. Overall, size, capital adequacy (CAR), financial structure (FS) and liquidity risk (LR) are significant drivers of banking performance in Nigeria as proxied by ROA and EVA than ROE and NIM.

In line with the evidence provided by our findings on the determinants of banks' profitability in Nigeria, we therefore recommend that for banks to increase profitability by generating high return on assets (ROA) as well as increasing shareholders wealth/value (EVA) they should continue to maintain a sound liquidity risk management framework that would guarantee sufficient liquidity at all times to meet maturing repayment obligations as they fall due. Also, since banks solvency (FS) is directly and significantly related with profitability (ROA and EVA), banks shareholders should increase their equity investment to finance banks assets as this would not only reduce the degree of risk and cost of debt financing but attract more investment from potential shareholders. For further research, the scope could be expanded to include other macro-economic variables like foreign direct investment (FDI), exchange rate volatility and money supply.

Appendix

S/N	List of quoted banks in Nigeria
1	Access Bank Plc
2	Diamond Bank Plc
3	Ecobank Plc
4	First Bank of Nigeria Plc
5	First City Monument Bank Plc
6	Fidelity Bank Plc
7	Guarantee Trust Bank Plc
8	Jaiz Bank Plc
9	Stanbic IbTC Holding Plc
10	Sterling Bank Plc
11	United Bank for Africa Plc
12	Union Bank Plc
13	Unity Bank Plc
14	Wema Bank Plc
15	Zenith Bank Plc

Source: Nigerian Stock Exchange

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