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Banking Reforms and Deposit Money Banks Profitability in Nigeria

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Abstract

The study carried out an investigation into how banking reforms have enhanced or inhibited Deposit Money Banks (DMB's) profitability in Nigeria. The data set comprising 12 of the 22 banks that have national and international authorisation was annual data that covered the period 2006 to 2018 and were analysed by adopting a dynamic GMM econometric methodology for the derived panel data. The conclusions from the study was that bank credit risk exposure, the inflation rate, and the exchange rate were significant indicators of profitability of DMB'S in Nigeria. The estimated results show that when bank credit risk exposure rise by 10%, the return on equity will drop by about 9%. It further shows that when inflation rises by 10%, return on equity will decrease by about 1.4% and that when the exchange rate appreciates by 10%, return on equity will rise by 0.06%. The result allows us to conclude that the banking reforms may have reduced the credit risk exposure of DMB's thereby increasing their profitability, whilst enhancing the benefits of recapitalisation of deposit money banks. The reforms seem to have enhanced market concentration as envisaged by the structure conduct performance (SCP)

hypothesis as well as efficiency as postulated by the efficiency structural hypotheses. The CBN should intensify efforts at tackling the exposure of DMB's to exchange rate volatility and spikes in the inflation rate due to increasing national indebtedness, falling foreign reserves and the falling value of the naira due drop in revenue from crude oil sales.

Keywords: GMM, DMB, Econometric methodology, Profitability, Banking, Reforms.

JEL: B41, C23, E58, G21.

1 Introduction

1.1 Background of study

The world can be considered as a global village due to technological advancement and its impact on the economy. Banking systems' in any given economy in the world carries out vital functions that facilitate growth and development of the economy, especially in market economies. The development strides made in science and technology have led to more cooperation and integration of countries all over the world. The closer economic integration of these countries is a practical manifestation of this advancement in science and technology. It is a fact that, macroeconomic variables fluctuate due to external shocks to which no country seem to claim immunity from (Gajic, 2012; Okotori, 2019). Through the process of intermediation, banks generally mobilize resources from those who have surpluses (units) and channel same to those who have deficits (units) for activities that are productive in a given economy (Akpansung & Gidigbi, 2014). The state of any country's economy to a great extent will rely on the vibrancy, sophistication and efficiency of its banking industry. The financial crisis in 2007/2008 had world-wide impact and it was a product of the sub-prime mortgage problems that occurred in the United States in 2007; this revealed the essential and intricate role played by the financial system (especially Banks) in a country's survival.

The World Bank (2020) observed that the 2007/2008 crises brought into focus significant limitations in market discipline, regulation, supervision and ushered in incisive policy debates on the regulation of the whole system of finance in any country. The crises led to a revert in focus to emphasis on a more effective regulation of the banking systems as well as on making the supervisory institution's toolkit to become efficient and thus enhance their ability to act far more

quickly when there are distresses in the system . This crisis led to intensification of the call for financial/banking reforms all over the world. Onodje (2009) observed that, the conclusion that can be drawn from the foregoing is that; those policy makers who held the position that Nigeria will be shielded from such crises as a result of its emerging market categorization which would have greatly limited the adverse effect of the crises on the performance of the economy; these have now started seeking for reforms in the banking sector as the belief they held earlier was invalidated by the crises.

Banks' can be said to constitute a major force within the financial system and the role they play is important for national and economic development. These banks gather savings and make them available for investment purposes which further generate growth and employment (CBN, 2011). The Central Bank of Nigeria sees reforms as being based on the sole purpose of enhancing the prevailing conditions in individual banks as well as the entire banking industry. The dynamic nature of the banking sector and its importance in the growth of the entire economy has made reforms to become necessary and needful. The platform via which the monetary authority is able to, eliminate breakdowns or deliberate wrongful actions, rectify, remould observed anomalies that may result to the failure of the entire financial system is called reforms (CBN, 2011).

Reforms are geared towards making the banks not only efficient, and stable but profitable in order to ensure continuous existence as well as expansion. According to Anarfi, Abakah, and Boateng (2016) a definite knowledge of the factors that impact on the ability of banks to make profit in a sustained way is very major in ensuring that there is stability in the economy. The ability of banks to generate profit in excess of cost indicates their profitability and this is seen as the capacity of a bank to earn revenue that exceeds cost, based on the size of the bank's equity capitalisation (Lartey & Samuel & Boadi ,2013; Anarfi et al., 2016). Hence, the impact of bank reforms on the profitability of DMB's in Nigeria can be seen through the impact of such reforms on the deposit money bank profitability. Aja (2020) noted that for the year 2019 the CBN was more assertive as it played a greater role in the economy; in exchange rate and price stability policy as well as its position on lending and international trade . The bank ensured that banned items did not get foreign exchange from the foreign exchange window in terms of access to US dollars. The commercial banks were mandated to aim at achieving a position that ensures their

loan-to-deposit ratio does not go below 60% or cash reserves that are higher (Aja, 2020). This was aimed at “encouraging” banks to make credit available to the real sector.

1.2 Statement of problem

The factors that impact on the profitability of banks' have been well researched, though variables adopted as a proxy for profitability evolves among studies, the variables considered do change due to the reforms of the banking industry. Finance literature is replete with many studies that have adopted measures of profitability such as; ROA, ROE, NIM, ROAA etc. The study thus attempts to examine the contribution of bank reforms; on the changes in the calibrated movement of these variables as well as macroeconomic factors movements, as regards bank profitability in Nigeria. There is a problem of ascertaining if the banking reforms have impacted on the profitability of DMB's in Nigeria; being one of the key goals of the reforms. Reforms cannot be a tool to achieve a 100 per cent distress free banking sector, but the reforms must at least reduce maximally the frequent occurrence of bank distress, as was the case in Nigeria from 1993-2002. Okonji-Iweala (2012) opined that after 18 months of reform most observers concluded that the reforms were successful. Nzotta (2014) saw the occurrence of globalization and its impact on the world economy, the international dimension as regards financial services and the observed establishment of an even playing field for private firms in Nigeria; as been the driving force for the reforms by the CBN.

Two eras were further identified by Nzotta (2014); (i) Era of Banking Consolidation (2004-2008), (ii) Era of Bank Segregated Banking (2009-Date). This research is based on these banking industry reforms in Nigerian. Muraina (2018) observed that the debate on the factors that affect bank profitability is still open because they constitute unresolved issues in accounting and finance literature. There is no known previous empirical study on the impact of banking reforms on the profitability of banks in Nigeria that has focused on all the banks used in this study from 2006-2018. There is a perceived phenomenon this study seeks to unravel based on the results from this study and that is; why are majority of these banks going international? Has the reforms been effective in making them global players? Looking at the ROE; that expresses the banks return to their equity shareholders. What methods can be used to evaluate these banks to reveal the impact of the reforms on their profitability?

1.3 Objectives of the study

The primary goal of this paper was to investigate the effect of bank reforms on the various factors that determine the profitability of DMB's in Nigeria. Specifically, the study aims at: (i) investigate the impact of expansion of the equity share capital base on profitability of DMB's in Nigeria. More specifically determine the impact on the ROE by some bank-specific and macroeconomic variables in order to show how the reforms have had effect on Nigeria's DMB profitability.

1.4 Research Questions

This investigation was aimed at providing answers for;

1. What are the factors that effects increased return on the equity investment of shareholders'?
2. What is the effect on bank profitability by variables that are specific to banks such as; Credit risk exposure, Capital adequacy, Operational efficiency and variables that are of a macroeconomic dimension such as the rate of inflation as well as the rate of exchange?

1.5 Research Hypotheses

From the already given objectives; the following hypotheses are derived in their null form:

H₁: Bank specific factors have no major impact on the ROE of DMB's in Nigeria

H₂: Macroeconomic variables have no major effect on the ROE of DMMB's in Nigeria.

1.6 Significance of the Study

The study is expected to have the following impact as well as enable a clearer understanding of the impact of the various banking reforms on banks and their profitability;

1. It will enhance the confidence and increased effort of the various regulators of the banking industry as they see the fruits or otherwise of the reforms.
2. Analysts and investors will have a better measure of accessing investment activities in the banking industry.

3. The work will be a repository for reference and future research.
4. Insiders in the banking sector will also have areas to focus on in order to drive the profitability and sustained expansion as well as survival of their banks both domestically and internationally.

1.7 Scope of the Study

The study utilized panel data from 12 of the 22 deposit money banks and the study period spanned 2006-2018. The reforms must have had traction on the economy, especially the bank recapitalization policy by 2006 within this period.

The study relies on annual data from banks in Nigeria. The remaining part of the study is broken into; (2) the review of related literature, (3) Methodology, (4) Data presentation, analysis and discussion of findings, (5) Summary, conclusion and recommendations.

2.0 Review of related literature

2.1 Conceptual framework

2.1.1 Banking Reforms

Reforms in the context of our study; are major adjustments in the regulations guiding the operations of the banking industry, the purpose being to make the conditions for individual banks and the industry to perform better. Reforms all over the world are seen as a necessity for the industry as the economy depends on the dynamics of banking and the banking industry. In the study by Antwi-Asare and Addison (2000) it was remarked that reforms in the financial sector were nested in the theoretical postulations of McKinnon (1973) and Shaw (1973); that advocated financial sector policy in developing countries, did lead to financial repression, hence the call for financial liberalization. The monetary authority adopts reforms as a tool to check abuses, correct existing anomalies and any other factor that can undermine the trust the public has on the banking sector. The concept of economic reforms shows that the reason behind it is to make sure all sectors of the economy is functioning in an efficient way in order to arrive at the cardinal objectives of increased economic growth, achieve full employment, ensure price stability, suitable external and internal balances (Sanusi, 2012). It must be emphasized that banking reform in Nigeria is only an aspect of Nigeria's move to develop and grow via reforms.

Ojukwu-Ogba (2009) remarked that the monetary authority in Nigeria, in carrying out its core regulatory and supervisory roles, brought in a reform agenda for the financial system that was based on 13 points. This was made known by the Central bank Governor on 6 July 2004 and that fundamental in this reform agenda was the increase in the minimum capital requirement for DMB's in Nigeria from (NGN) two billion to NGN twenty five billion; this has led to the consolidation of banks.

Akpansung and Gidigbi (2014) noted that before the process of bank recapitalisation in 2004, it is recorded that a total of thirty five licensed went distressed; they were subsequently liquidated. The list of banks' was broken down into; thirteen commercial banks, eighteen merchants banks, and one Cooperative bank. Further statistics show that, of all the banks ten were rated as sound, fifty five banks had been rated unsatisfactory, sixteen were classified as marginal, but another ten rated as unsound. This bold policy move led to a drop in the number of licensed banks from 89 to 25 mega banks at the expiration of the deadline of December 31st 2005. Today Nigeria has eight solid banks with international authorisation and these are global players in international finance.

2.1.2 Bank Profitability

The concept of bank profitability is a means to ascertain bank performance. Tan and Anchor (2016) saw profitability as being of a major consideration in the operation of commercial banks, there is also the place of stability, which is taken seriously by the banking regulatory authorities. There is a consideration of risk-taking behaviour, as well as links to the risk as regards DMB's efficiency (Tan and Floros, 2013; Abedifar et al., 2014).

2.2 Theoretical Review

This research work is based on the prescriptions of the theory referred to as the "Big Push" theory by Rosentein-Rodian (1961). This theory enunciates that, the Big Push or big comprehensive programme is required; such as magnitude of investment that is high in minimum terms in order to arrive at economic growth and development as prescribed for the free market free (Jhingan, 2004; Ikeora et al, 2016). The reforms in the banking sector were aimed at ensuring a banking sector that is diversified as well as reliable; this will guarantee the safety of depositors' money and gender economic growth. (Ogubunka, 2005; Ikeora et al., 2016). Uzor

(2006) did posit that the ultimate aim of these reforms' was to enable banks to become very important players, and in a way that will produce a long lasting impact and this results in increased returns to its shareholders and increase the banking sectors contribution to economic growth

The banking reforms that brought in recapitalization of banks have led these banks to be in a position where they can be examined on the basis of profitability. The structure–conduct–performance (SCP) hypothesis, was initially propagated in 1933 by Edward Chamberlain and Joan Robinson, but expatiated upon by Joe S. Bain. The basic tenets of traditional structure conduct and performance (SCP) theory suggest that there may be a collusive behaviour if the market is dominated by a few big firms. When the market concentration is high, they make more profit as a result of collusive behaviour (Yuanita, 2019). The SCP hypothesis declares that the nexus linking market concentration and profit is positive. The contribution of Allen et al. (2005, p.2) was that the standard SCP paradigm asserts a direct link that connects the amount of concentration in the market and the extent of competition among firms. The hypothesis can be considered true, where there is a nexus that shows a positive link of market concentration (measured by industry concentration) and performance (measured by profits), even without firm efficiency (measured by market share). The foregoing can be summarized as such; greater profits are found in more concentrated industries (the goal of the reforms), those with lesser concentration will cause a drop in profits despite their efficiency. The conclusion by Mishra and Sahoo (2012) was that the link connecting performance, conduct and structure cannot be said to be unidirectional.

The postulations of the efficiency (structural) hypothesis are seen as a challenge to the SCP hypothesis. Demesetz(1973) developed the efficiency structure hypothesis, the postulation was that competition will be the product of greater efficiency for companies; this will make them also grow in size as well as develop, causing market concentration to grow. The conclusion was that these companies will have increased profitability and sustained share of the market. Hence, under this hypothesis, when the market concentration is greater, it is assumed that, there will be more efficiency in the market (Tsutsui, Satake, & Uchida, 2006). According to the ESH, firm efficiency is the only source of positive performance and concentration. It is believed that firm efficiency will lead to growth in profits and this will enable the firm to have greater market

share. SCP hypothesis proffers that what is essential is concentration, but the ESH hypothesis asserts the pre-eminence of market share as the major measure of market structure (Molyneux & Forbes, 1995). An analysis of the profitability of DMB's will entail our looking at important measures like those that are reflected by ratios, trends, adequacy of capital, quality of asset based on earnings as well as liquidity (Osadume & Ibenta, 2018). Our research work was based on proving the relevance of both hypotheses as the purpose of the banking reforms; aimed at efficiency as well as improved market concentration.

2.3 Empirical Literature Review

The main motivation for the formation of any going concern is the profit motive and profitability consists of two words; these are profit and ability. Profit referred to the fact that receipts exceed cost, hence the need to know what enhances that profitability, in the sale of goods and services. It is a fact that profit is an expression in absolute terms while profitability is stating it relative terms (Muraina, 2018). Ferrouhi(2018) noted that banks' performance expresses the ability to produce profits in a sustainable way. The profit generating capacity of DMB's in Nigeria should be a measure of the overall efficiency of banks in their operations. In a clearer sense, how efficiently the banks are using their assets and total equity to make profits. In finance the impact of profitability in enhancing the return on equity investment is an important consideration that can affect future investments.

Bashir, (2003) did investigate the factors that impact on Islamic bank profitability; as seen from the experience of Middle Eastern countries. The study was a panel regression that covered 14 Islamic banks between the years 1993 to 1998; it revealed that capital adequacy, risk indicators, GDP, inflation and loan have a positive and strong connection to the profit making capacity of banks, but the nexus of CAD, loan/total asset with profitability was statistically insignificant. Contrarily, in Tunisian banks by the adoption of a balanced panel regression; it was observed that CAD, overhead/asset ratio, loan/asset all exerted a significant and positive influence on profitability and GDP, but on the other hand inflation, size and ratio of assets that were non-interest bearing were insignificant in determining the profitability of Tunisian banks, though size had the most negative relationship with bank's profitability (Ben Naceur, 2003; Olaoye &

Olarewaju, 2015)). The research by Kumbirai and Webb (2010) adopted ratio analysis in determining the efficiency of South African banks between 2005 and 2009. The study discovered that profitability (based on the analysis of the ROA and ROE) had significant connection with financial performance. But same was not true of liquidity and asset quality as these did not have significant relationship with financial performance.

Duferu (2010) carried out an investigation on the operational efficiency of the first private commercial bank in Ethiopia in financial terms between 2003 and 2009 by adopting liquidity, profit, credit risk exposure, solvency and efficiency financial ratios in the adopted method. The study made a comparative analysis of results with industry averages and discovered that of all the adopted variables, only profitability had a significant relationship with the profitability of bank as regards the measures adopted.

The study of Aremu et al. (2013) researched on the factors that induce profitability in banks of an economy that is still developing by utilizing annual time series data from 1980 to 2010; cointegration and an ECM. Their findings show that the adequacy of capital as measured on the basis of equity to total asset ratio had a long run and short run effect on the profitability of banks' and that this was of a negative nexus. In Nigeria, other researchers' have established empirically that profitability in deposit money banks is determined by macroeconomic variables that are bank specific (Ifuero & Chijuka, 2014; Ayanda, Christopher & Mudashiru, 2013; Mamman & Aminu, 2013; Kanwal & Nadeem, 2013; Kalluci, 2011; Mathuva, 2009 among others).

In a similar study for Nigeria, Osuka and Osadume (2013) examined the variables that affect the deposit money banks financial performance in Nigeria between 2001 and 2010 utilizing SPSS regression method. They discovered that; capital adequacy, asset quality and employee motivation had significant relationship with financial performance. But the foregoing does not minimize the impact of the reforms as these areas were the target of the reforms, yet the ultimate goal of the reforms was increased bank profitability.

But Alhassan (2015) estimated the impact of scores on cost and profit efficiency of a total of 26 banks in Ghana from 2003 to 2011. This research discovered that in large banks, there is high cost as well as profit efficiency than in smaller banks. Djalilov and Piesse (2016) in their study saw a significant link connecting capitalisation and profitability for firms from countries that

transited early from command economy to free market after the collapse of the Iron curtain in Eastern Europe and that for those countries that are late transition countries the nexus is insignificant. The conclusions of Saona (2016), was that there is an inverse U-shaped nexus linking capital to assets ratio and banks' profitability, which is quite an interesting result.

Yüksel et al.(2018) carried out research to isolate the determinants of the profitability of banks' in 13 countries from the former Soviet Union. The annual data that spanned the period from 1996 to 2016 was examined by considering panel regression using GMM. The study found that the value of loan, NIM and output growth were significant factors impacting on profitability. The findings show that, the NIM and economic growth had a strong positive link with profitability. The study made recommendation that post-Soviet countries banks' need to consider means by which their banks NIM can be increased.

Muraina (2018) examined the variables that influenced profitability of DMB's in Nigeria from 2008-2016. Data for the analysis was sourced from fourteen DMB's that were quoted in the NSE. The study adopted ROA as the proxy for profitability, while the regressor variables where; capital adequacy, credit risk, and inflation. The findings from the study show that while CAD had a positive, but significant effect on profitability, credit risk had a negative significant impact on profitability.

In a similar study Almaqtari et al. (2018) examined what determined commercial bank profitability in India. The analysis utilized data from a balanced panel that covered the period 2008 to 2017 for a total of 6 Indian commercial banks. In this study Indian commercial bank profitability was represented by, ROA and ROE, and size of bank, assets quality, CAD, liquidity, operating efficiency, deposits, leverage, assets management, and the numbers of branches were used as other factors that were bank specific. The summary findings show that the size of bank; the number of bank branches, ratio of assets management, operational efficiency, and leverage ratio are the major bank specific factors that influence bank profitability in India as depicted by the ROA. Factors that are considered bank specific were; bank size, assets management ratio, assets quality ratio, and liquidity ratio; which all had significant and positive effect on ROE. The inflation rate, rate of exchange, the rate of interest, and demonetization were seen to have a

serious effect on ROA. The results for the ROE; the macroeconomic factors excluding demonetization all have a major effect on the on the ROE.

Yao et al. (2018) found that in Pakistan, bank profitability is a product of size, increased solvency, financial structure, cost of operation, productivity of labour, market power, and economic growth. The nexus linking size of banks to profitability was an inverted U-shaped. The study adopted the Herfindahl–Hirschman Index in order to measure the effect of market power and the results show a confirmation of the Structure Conduct Hypothesis. The other factors such as; quality of credit, operational efficiency, development of the banking sector, inflation, and industry concentration had a significant but negative link to bank profitability. The study also found that during transition; the profitability of banks was lower. The findings showed Pakistan's specialized banks (SB) generated bigger net interest margin (NIM) than the total number of the remaining commercial banks. Djalilov and Piesse (2019) documented the impact of regulation on bank efficiency by utilizing system GMM via a dynamic panel regression for 21 former Eastern bloc countries spanning 2002-2014. The findings from the system GMM estimation shows that the restriction of bank activity actually improves the efficiency of banks in these countries that make up the study population. But the results from dynamic panel quantile reveal that the impact of regulation was different in the separate quantiles. The conclusion from this study provides a major policy implication as regards the impact of transition countries banking regulations.

The study by Batten and Vo (2019) did inquire into the factors that impact on bank profitability in Vietnam for the period that spanned from 2006 to 2014. The study adopted a number of econometric methods to evaluate the sourced data; the findings of the study shows that, the size of the bank, capital adequacy, risks, expenses, had impact on profitability. The findings also show that the characteristics of the banking sector and the non bank-specific variables affect bank profitability. But the direction of causal links; where similar when assessed based on profitability measures that were examined.

Charles Soludo, a former governor of CBN, while commenting on the banking reform (the recapitalization policy) observed that it was meant to: (1) enable the nation's banks to become global players'; (2) protect the safety of depositors money, by making the banking sector to become strong; (3) make the banks to become effective in economic development; (4) enable the

banks to become less dependent of public funds, and (5) become at major financier of the real sector (Akpansung & Gidigbi, 2014)). These reforms were based on certain anchors, they were; improving the quality of all banks, enhancing financial stability, ensuring healthy financial sector improvements, and enabling the financial sector impact tremendously on the output growth of the real economy.

The argument seem to go back and forth, yet within the intervening period Nigerian banks have become global players with international authorization by the CBN, if the reforms have expanded their asset and equity base, has it an effect on their profitability? This makes for an interesting case study. Literature in finance and economics is replete with studies that have investigated the profitability of DMB's in Nigeria. In previous studies, application was made of linear regression, while others adopted the ordinary least square (OLS) regression fixed and random effect.

3.0 Methodology

3.1 Research Design

The quasi-experimental research design was used in this study; because the study was done after the occurrence of the events reflected by the data, hence, it is Expost facto. Data utilized is annual time series and this depended on a sample of features that were collected from the specific population of interest.

3.2 Population of the study

The research obtained panel data from 12 of the 22 DMB's in Nigeria, which included 8 banks with international authorization and 4 banks with national authorization; these were used for the study. The selected sample was for period of thirteen years from 2006 to 2018 which was mainly the period after the recent banking reforms. The financial statements from the banks were utilized.

3.3 Sample

The number of variables adopted for this study is given in Table 1, with the given signs that express the nexus as well as expatiation on the measure of profitability and the factors that impact on it (see appendix). The annual panel data covered the period 2006-2018.

3.4 Sources of Data

The specification for each bank is based on annual data regressors that are considered bank specific; sourced from the financial reports of the individual banks (Ikeora et al., 2016). The macroeconomic variables; inflation and the rate of exchange were sourced from World Bank database.

3.5 Model development and variable description

Three basic measures of profitability were identified by the ECB, these are; net interest margin, return on assets, and return on equity (Ferrouhi, 2018). Previous studies have focused on mainly; ROA and ROE and the NIM, but there is a need to focus on the ROE that measures the useful return to investors' investment. Kosmidou (2008), Abbasoglu et al. (2007) in determining the measures of profitability adopted the ROA as the main instrument to be regressed against. Hence, ROE expresses how the banks have been able to efficiently utilize its shareholders investment to generate returns for their shareholders. There was significant contribution by Hassan and Bashir (2003) that the way many banks grow their ROE is through; effective financial leveraging and to maintain the competitiveness of their banks in the industry. From the foregoing, the present study uses ROE for profitability measures of the DMB's in Nigeria. This study thus uses the above mentioned dependent variable to show the profitability of the banks based on the reforms in the banking sector. The list depicted in Table 2 shows 8 different variables and their explanations. Out of these variables, 6 are bank specific variables whereas 2 are macroeconomic variables. Since our analysis is on the industry level, all variables that are bank-specific and are aggregates in comparison to the industry level, as well as reflected as macro variables.

3.5 Model specification

There is an attempt in this study to assess bank profitability determination via panel data which is made up of n cross-sections $n = 1, \dots, N$ and is observed at time period $t = 1, \dots, T$. The total observations are $n \times T$ and the basic regression model of Brooks (2008) for this study is as follows;

$$y_{nt} = \alpha + \beta X_{nt} + \varepsilon_{nt} \dots\dots\dots(1)$$

Here, y is the dependent variable (measure of profitability) and α reflects intercept term. X represents explanatory variables (Independent variables) while β is regression coefficient. The derived functional model is given as;

Profitability = f (Bank specific variables + Macroeconomic variables)..... (2) Here, profitability of banks is measured through return on the equity share capital (ROE) while bank specific variables are capital adequacy (CAD), credit risk(CRISK), operational efficiency(OEEF), capital exposure (CAPE), market capitalization(Mkt. Cap.), credit to the private sector(CPS) and macro economic variables include the rate of exchange and the rate of inflation. Based on the already stated facts, following model is used in this study which is as follows:

$$ROE = \alpha + \beta_1 CAD_{nt} + \beta_2 CRISK_{nt} + \beta_3 OEEF_{nt} + \beta_4 CAPE_{nt} + \beta_5 EXR_{nt} + \beta_6 INF_{nt} + \beta_7 Mkt. Cap.-nt + \beta_8 CPS_{nt} + \mu_t \dots\dots\dots(3)$$

3.6 Method of data analysis

The research adopted the GMM method of estimation; for the investigation in this study, the panel regression and GMM models used, based on its fixed effect implications. The GMM methodology is useful for panel data analysis as in past empirical studies (Masood & Ashraf, 2012; Raza et al., 2013; Ali, 2015 and many more). Results from econometric investigations are considered to be sensitive to the approach that is adopted to analyse the estimated model. But the fixed effects model might include; the problem of endogeneity as result of the structure of the econometric model. To eliminate the existence of endogeneity, the GMM approach introduced by Arellano and Bond (1991) was adopted for further tests. The results from test statistics are also displayed together with the estimated results in the study. Further test for zero-first or

second order correlation that is based on differenced errors utilized the Arellano–Bond (AR) (Stata, 2018). The system GMM estimation’s quality is based on the validity of the instruments matrix as well as the assumption that there was validity of no residual. The study proposes two tests; one is that the matrix of the instruments’ is not to be correlated with the disturbance. This hypothesis is evaluated using the Sargan test and the Hansen test.

4.0 Data presentation, analysis and discussion

4.1 Data presentation

Table 1. Summarized log_roe, log_lagroe, cap_adeqcy, crd_risk, inf_rate, exch_rate, cap_exp, separator(0)

Variable	Obs	Mean	Std. Dev.	Min	Max
Log roe	110	4.6025930	1.846199	-2.217325	9.621114
Log lag roe	109	0.4197798	2.200965	-6.484474	6.695593
Crđ . private	120	75.1243300	121.526800	3.550000	1,380.010000
Cap adequacy	120	11.5157500	19.979670	-154.7500	30.980000
Crđ. Risk	120	9.7998330	24.608570	0	235.360000
Op, efficiency	120	63.4541700	24.116880	21.19000	175.100000
Mkt. cap	120	8.0225830	0.556297	6.79000	9.060000
Inf. Rate	120	11.9000000	2.763264	8	16.500000

Exch. Rate	120	198.4300000	61.81802	148.9000	306.100000
Cap, exposure	120	11.819170	29.60830	-1.94000	98.450000

Table 2 Shapiro-Wilk W test for normal data

Variable	Obs	W	V	Z	Prob>z
Log roe	110	0.93959	5.402	3.762	0.00008
Log lag roe	109	0.91332	7.692	4.547	0.00000
Crđ. Private	120	0.15897	80.931	9.843	0.00000
Cap. Adequacy	120	0.36588	61.020	9.211	0.00000
Crđ. Risk	120	0.34895	62.649	9.270	0.00000
Inf. Rate	120	0.95783	4.058	3.138	0.00085
Exch. Rate	120	0.74989	24.068	7.126	0.00000
Cap. Exp.	120	0.43885	53.998	8.937	0.00000

Table 3 estat vif

Variable	VIF	1/VIF
exch_rate	2.35	0.425741
cap_exp	2.11	0.473946
inf_rate	1.83	0.546533
op_efficie~y	1.48	0.677033
crd_risk	1.42	0.703955
cap_adeqcy	1.22	0.819149
mkt_cap	1.19	0.840483
log_lagroe	1.17	0.857661
crd_privat~c	1.06	0.940438
Mean VIF	1.54	

4.1 Empirical Results

This section presents the empirical results and its discussion. The findings from GMM analysis are stated in Table 1.

Cap. Exp.	0.0023922	0.0020681	1.16	0.272	-0.0021596	0.0069441
_Cons	4.475956	1.057873	4.23	0.001	2.1475920	6.8043190
AR(1)	0.09					
p-value	0.930					
AR(2)	-1.78					
p-value	0.075					
Hansen test	1.05					
p-value	0.306					
Sargan test	7.14					
p-value	0.008					

4.2 Test of hypothesis

H₁: Bank specific variables have no major effect on the ROE of DMB's in Nigeria

The bank specific variables were mostly insignificant except for credit risk, which had an impact that was significant on the return of equity. Hence bank specific variables have a serious impact on the ROE.

H₂: Macroeconomic variables have no significant effect on the ROE of DMB's in Nigeria.

Macroeconomic variables all had significant effect on the return on equity at 5% and 10% level of significance.

4.3 Discussion of Findings

4.3.1 Autocorrelation

The serial correlation test via the Arellano-Bond test shows that the model is free from autocorrelation problems but of order two. Thus, the model is adequate, lagged values of the dependent variables, AR 2 must not be significant. This represents the residual correlation test. The foregoing is derived from the fact that the difference equations are supposed to be correlated to order one, but not order two. This use of AR (1) and AR (2) test developed by Arellano and Bond (1991) was adopted as the methodology to test the hypothesis;

H₀: non presence of second order correlation

H₁: Negative first order correlation.

The results of AR (2) are more significant than that of AR (1), it has a p-value of 0.075, which shows that there is no serial correlation.

4.3.2 Sargan test:

H₀: The instruments are valid.

H₁: The instruments are not valid

The Sargan test p-value of 0.008 confirms the validity of the instruments.

4.3.3 Hansen J- Statistic.

The prescriptions from this test; requires that the number of instruments that were excluded is not more than the number of variables that are endogenous in order to make the model valid.

The Hansen test is used to evaluate the null hypothesis that the model is not over identified.

H₀: The model is not over identified.

H₁: The model is over identified

For the model to be over to over-identified, the p-value must not be significant at any level of significance employed in the study. The p-value of 0.306 shows that the model is over-identified, as the p-value indicates insignificance. Based on the findings, the null hypothesis is rejected and we draw the conclusion that the model is strongly over-identified.

As observed in Table 1, the F-statistic is 7.71 with a p-value less than 1%; this indicates that the bank profitability model as a whole is significant at the 1% level. Hence, the regressors collectively determine bank profitability.

The signs of all the estimated coefficients of the explanatory variables in the model conformed to their a priori expectations. The coefficient of the log of return on equity lag is positive and significant. It is 0.36933 with a t value of 3.79. The t-statistic passed the significance test at the 1 per cent level. For instance, if the previous year's return on equity was higher by 10 per cent, the current return on equity would increase by about 3.7 per cent. This shows that the previous year's value of return on equity has a positive significant impact on its current value. The coefficient of bank credit risk is negative. It has a coefficient of -0.09 and a t-statistic of -2.73. Its value is less than 0.05 p-values. The coefficient passed the statistical test of significance at the 5 per cent level of significance. The implication is that bank credit risk has a negative but significant effect on ROE. That is, when bank credit risk rises on the average by 10 per cent, the return on equity will drop by about 9 per cent.

The coefficient of inflation rate is negative. It is -0.14 with a t-value of -3.26. It passed the test of statistical significance at the 5 per cent level. Thus, the rate of inflation has a negative and significant impact on the return on equity. This implies that the higher the level of inflationary pressure the lower the value of return on equity. That is, when rate of inflation increases by 10 per cent; return on equity will decrease by about 1.4 per cent. Exchange rate is positively signed; it has a positive coefficient of 0.0059 with a t-value of 2.20, it passed the test of statistical significance even at the 10 per cent level of significance. Thus, exchange rate does have a

significant effect on return on equity. Similarly, though capital adequacy is negative, it is insignificant at the 10 per cent level of significance.

4.0 Summary, conclusion and recommendations

4.1 Summary

The banking reforms were aimed at giving a solid capital base to Nigerian deposit money banks as well as making them solid global players in finance. Increased investment relies on a bank's perceived profitability, especially from the perspective of equity shareholders (existing and potential). The reforms focused on the variables that were utilized in this study. The findings show that reforms on credit risk exposure (Kolapo et al., 2012; Njoku et al. (2017; Adebayo & Oluwaremi, 2017), exchange rate regime (Getachew, 2016; Priti, 2016) and inflation (Ishfaq & Khan, 2015; Certin, 2017) stabilization measures do have significant effect on the ROE; a crucial measure of profitability of deposit money banks from an investor's perspective.

Mensah (2020) did allude to the fact that currently, Nigerian banks face additional liquidity risks because of the dual-currency nature of their balance sheets, and high net external debt; this could cause potential pressure on their U.S.-dollar liquidity when foreign currency reserves drop because of declining oil prices.

4.2 Conclusion

The increased level of return on equity (ROE), based on the banking reforms seem to have enhanced the profitability of deposit money banks in Nigeria. The study seems to justify the fact that eight of the twelve banks considered from a total of 22 banks have international authorization. Their outreach has gone beyond the ECOWAS sub region, to major financial centres of the world. But the CBN must thus undertake adequate regulatory oversight of the commercial banks operations in order to enhance efficiency of their stocks performance and mitigate the impact of the volatility of bank stocks with the aim of boosting investors' confidence in the banking sector (Asemota & Ekejiuba, 2017). The findings show that the product of the reforms was not just to achieve market concentration, but efficiency as envisaged in both the SCP and EH hypotheses. Our research work proves that the reforms instil efficiency

in the banks; yet this enables them to achieve market concentration as alluded by Yao et al.(2019) for Pakistan.

4.3 Recommendation

The study reveals there are still more areas of reforms that will help qualify more Nigerian banks for global financial intermediation. The reforms can be; (1) increased capitalization,(2) further reduction in the banks' exposure to credit risk,(3) reforms on monetary policy innovation as well as the positive impact of operating a rate of exchange regime that is managed. The CBN should consider increasing the minimum capitalisation of banks in line with perceived naira depreciation or an inflation rate spike. Where there is an adequate regulatory effort by the CBN, banks will become more efficient and that efficiency of their stocks performance will reduce volatility, which will boost investors' trust and participation in the bank equity holding. But the decision by the CBN to increase the loan to deposits ratio to 60 per cent in order for banks to lend to the real sector in 2019, might increase the credit risk exposure of DMB's; as this directive came with the penalty of a fine. Banks seem to have been investing their depositors' cash on less risky assets such as government securities.

4.4 Contribution to knowledge

The confirmation that credit risk exposure reforms and innovations in monetary policy and exchange rate, have had an impact on the profitability of deposit money banks' in Nigeria; shows the reforms on DMB's in Nigeria was positive. That increased return on equity increases the suitability for a bank to receive further investments.

4.5 Suggestion for further study

There is a need for further study on the need for reforms on the impact of other determinants of profitability of deposit money banks; in order to enhance the capacity of Nigerian banks' to increase the level of their global financial intermediation expansion and increased profitability. Further studies on the nexus linking FDI to the profitability of deposit money banks can also improve their increased reach.

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APPENDIX

Table-1 Profitability determinant of Bank

sDeterminants	Variable	Measure	Notation
Dependent variable	Profitability	Return on equity (ROE) = net profit/equity ROE	ROE
Bank-specific		Capital adequacy=Equity/Assets	CAD(-)
		Capital exposure	CAPE
		Credit Risk	CRISK

Macro-economic	Economic activity	Inflation rate Exchange rate	INF(-) EXR(+)
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List of Banks utilized for the study

S/N	Banks	Authorization
1	Access Bank	International
2	Fidelity Bank	International
3	First Bank Holding	International
4	First City Monumental Bank	International
5	Guaranty Trust Bank	International
6	Stanbic IBTC Holding	National
7	Sterling Bank	National
8	Union Bank of Nigeria	International
9	United Bank of Africa	International
10	Unity Bank	National
11	Wema Bank	
12	Zenith Bank	International

