MPRI-JFRBD | INTERNATIONAL JOURNAL OF FINANCIAL RES. AND BUSINESS DEVELOPMENT VOL. 02 NO. 1 OCT-2023 ISSN: 1115 - 8530

EFFECTS OF MARKET CONCENTRATION AND EQUITY CAPITAL ON STABILITY OF LISTED DEPOSIT MONEY BANKS IN NIGERIA USING PANEL ARDL APPROACH: THE MODERATING ROLE OF MANAGERIAL EFFICIENCY

***JATSON, MAKAMA MATTHEW; **JACOB OJONUGWA; ***DOGARA MICAH; ****WETNWAN SETLE; & *****DR. YOHANNA GYANG JUGU**

*Department of Business Education, Kaduna state college of Education, P.M.B, 1024, Kafanchan. **Department of Business Administration, Prince Abubakar Audu University, P.M.B, 1008, Anyigba, Kogi state. ***Department of Economics, Kaduna state University, Tafawa Balewa Way, P.M.B, 2339, Kaduna. ****Department of Insurance, University of Jos, P.M.B, 2084, Plateau state, Jos, Nigeria. *****Department of Accountancy, University of Jos, P.M.B, 2084, Plateau state, Jos, Nigeria.

Abstract

Banks must be stable for proper intermediation process. Improper intermediation often result in instability. The Nigerian banks suffered instability at pre-consolidation which necessitated consolidation in 2005 with further concentration of the banks. Despite concentration the Nigerian Deposit Money Banks (NDMBs) manifest symptoms of instability. The study empirically investigated the concentration-stability nexus using quarterly dataset of equity capital, managerial efficiency, concentration ratio, net interest income and firm size sourced from the annual reports and accounts of 14 Listed NDMBs over the period 2006 and 2020. The panel ARDL model along the z-score were employed for analysis. For market concentration, results for long and short-runs showed coefficient of -151.69 with P-value of 0.657 and 66.443 with P-vale of 0.693, evidencing negative and insignificant but positive and insignificant respectively. For long and short-runs, equity capital revealed co-efficient of 2.3066 and P-value of 0.422, and 4.5134 and P-value of 0.123 respectively, showing statistical insignificant evidence. Similarly, the moderating role of managerial efficiency on equity capital in long-run had co-efficient of -7.12e-07 and P-value of 0.075 with short-run co-efficient of -1.62e-07 and P-value of 0.643 showing both negative and absence of statistical association between equity capital and bank stability. Both net interest income and firm size negatively and insignificantly impacted stability. It was recommended that government and regulatory authorities to de-consider concentration but reconsider recapitalizing existing NDMBs

Key Words: Bank Stability, Managerial efficiency, Market Concentration, Panel ARDL, Z-score

EDITOR-IN-CHIEF
Prof. R. Rena [South Africa]

by permitting interaction of market forces such that only resilient banks can thrive. Banks management should set reasonable and acceptable operational risk appetite level especially AMCON levies, penalties, fines and levies, theft and fraud.

Introduction

Monetary transactions in modern economies are facilitated by the banks. Therefore, bank stability is inevitable and its absence catastrophic because of the intermediation role banks perform (Vallascas and Keasey, 2012). The improper intermediation in credits allocation caused the GFC of 2007/2008 (Oduor *et al.,* 2017). It shows the extent financial intermediaries and risks affect, control and impact market quality and stability of not only the financial system but of the general economy. Market quality and stability of NDMBs at pre-consolidation was at stake due to equity capital erosion caused by improper credit allocation, exacerbation of NPLs, enormous losses and unprofitability and fragility of the system (Obilikwu, 2018), revealing managerial inefficiency in banking business and practice. However, consolidation led to the concentration of the NDMBs, enlarged its market power in equity capital, profitability, liquidity and efficiency, and market share in deposits, credits and NPLs (Obilikwu, 2018).

Examination of linkages between banks microeconomic factors have been undertaken by numerous researchers at different times. None have investigated the moderating role of banks managerial efficiency on the stability of banks. This interest stemmed from the assumption that concentrated firms (banks) are more efficient in enhancing adequate equity capital to attract adequate deposits to perform the intermediation role and be stable (Kohlscheen *et al.,* 2018). Despite concentration, the NDMBs manifest elements of instability evidenced in imposition of limits for daily withdrawals, artificial incessant network failure, and excessive levies by AMCON to fund AMCON bonds issued to purchase problem assets. These levies account for over 25% of banks operating cost which weighs on efficiency and stability of banks (Samira *et al.,* 2020). The study aimed at investigating concentration-stability with the objective of examining the moderating effect of managerial efficiency on equity capital for the stability of NDMBs using the z-score as proxy for bank insolvency, and the panel ARDL for analysis. The z-score is more efficient proxy for financial stability than individual bank indicators (Shijaku, 2017). The rest of this study is structured into sections. Section 2 presents literature review, section 3 is methodology, section 4 is data presentation, analysis and discussion, while section 5 presents conclusion and recommendations.

Literature Review

Managerial efficiency (ME) of banking operations is one of the central factors for bank stability. It is management capacity in utilizing bank's limited resources to minimize waste or losses arising from operational failure or catastrophic risk to achieve results (Lee and Hsieh, 2014). It is by nature a negative parameter except management positively exert to reduce losses or operational cost which are inherent in the banking business. It is management ability to impact not only on deposits, credits, nonperforming loans, profitability, but on assets, interest expenses and capital to minimize operating expenses and various financial risks for financial stability (Akani and Ifechi, 2015).

Operational risk is risk of loss from inadequate or failed internal processes, people, and systems or external events (Eco bank, 2016). Operational risk includes both internal and external fraud, transaction processing errors, theft, business interruptions, disputes and litigations with

EDITOR-IN-CHIEF
Prof. R. Rena [South Africa]

employees, clients and vendors, and unethical standards on contractual obligations, penalties and fines, and levies by Asset Management Corporation of Nigeria (AMCON) (Eco bank, 2016). Operational risk is managed based on the efficiency and resources management allocates to fight and limit its occurrence (Eco bank, 2016).

From 2006 to 2020 records from various banks financial statements showed that litigation cost suffered by Access bank, First City Monument bank (FCMB), Fidelity bank, and United Bank for Africa stood at ₦2.26billion, ₦1.26billion, ₦10.7million, and ₦15.0billion respectively for 2006; ₦6.49billion, ₦1.19billion, ₦6.79million, and ₦29billion respectively in 2007; ₦2.04billion against Access in 2008; ₦29.131billion and ₦2.20billion against Access bank and Fidelity bank respectively in 2009; ₦2.22billion against Access in 2011, ₦312.00million against Fidelity in 2014; ₦909.66million, ₦83.75million, and ₦977.00million against Access, FCMB, and Fidelity banks respectively in 2015. In 2016, Access bank, FCMB, and Fidelity banks incurred ₦49.50million, ₦274.90million, and ₦438.00million respectively.

In 2017, Access bank, Eco bank, FCMB and Guarantee Trust bank incurred ₦17.38billion, 15.14million dollars, ₦6.45million and ₦13.07million respectively. In 2018, Fidelity incurred ₦606.00million, while FCMB made provisions of ₦5.72million and ₦303.63 for 2018 and 2019 respectively. In 2019 and 2020, Fidelity bank incurred ₦726.00million and ₦372.00million respectively. For contravening banking regulations Access bank and FCMB suffered loss of ₦7million and ₦270.00million respectively in 2006. In 2007, Access and Fidelity suffered ₦3.00million and ₦1.00million respectively. Access bank suffered ₦1million and ₦94million in 2008 and 2010 respectively. In 2013, 2014, 2015 and 2017, FCMB incurred ₦2.30million, ₦13.27million, ₦13.31million and ₦8.262million respectively, while First Bank Nigeria (FBN) Plc, and Guarantee Trust Bank incurred ₦21.00billion and ₦2billion respectively in 2017 in penalties. In 2018, FCMB and FBN incurred ₦35.98million and ₦4billion respectively. In 2019 and 2020 FCMB suffered penalties of ₦8.16million and ₦7.99million respectively, while FBN incurred ₦3billion in 2020. In 2009, Eco Bank, and FCMB incurred losses due to internal and external frauds of ₦1.624billion and ₦1.489billion, and ₦10.5million and ₦12.5million respectively, while FBN incurred ₦1.57billion in internal fraud.

In 2010, Eco Bank incurred 2.7million and 1.9million US Dollars in internal and external frauds respectively. In the same year, 2010, FBN incurred ₦2.1billion arising from internal fraud. In 2011, Eco Bank suffered ₦4.895billion and ₦3.481billion in internal and external frauds respectively. Similarly, FBN suffered ₦2.85billion in internal fraud in 2011. In 2012 and 2013, Eco bank suffered internal and external frauds of ₦4.096billion and ₦2.381billion and ₦7.263 and ₦11.085 respectively. In 2014, Access Bank incurred loss in both internal and external frauds in the amounts of ₦15.037billion and ₦27.700billion respectively. In 2016, Eco Bank incurred loss of ₦10.038billion and ₦10.342 in internal and external fraud respectively, and also suffered execution delivery events of ₦3.042, while FCMB incurred internal fraud of ₦16.41million. In 2017, Eco Bank ₦6.978billion and ₦734.50million in internal and external frauds respectively. Similarly, FCMB incurred ₦226.34million due to internal fraud, while Eco Bank incurred ₦6.243billion on execution delivery events. In 2018, Access Bank incurred ₦78million loss in external fraud and ₦43.39million due to successful robbery incidents. In the same year, 2018, FCMB incurred ₦90.51million caused by internal fraud. In 2019 and 2020, Eco Bank suffered loss arising from both internal and external frauds in the amounts of ₦9.208billion and ₦8.181billion and ₦10.764billion and ₦4.306billion respectively.

Of much concern is AMCON levies of 3% on banks total and contingent assets from 2006 over 2012 with an increase to 5% from 2013 to 2020 (Access bank, 2018). In this regard and according to

reports from various banks financial statements, Access bank, FCMB, Guarantee Trust Bank (GTB) and United Bank for Africa (UBA) paid ₦45.40billion, ₦1.5billion, ₦3.2billion and ₦4.30billion respectively in 2011.In 2012, FCMB, GTB, and UBA paid ₦2.49billion, ₦3.98billion, and ₦4.97billion respectively. In 2013, Eco Bank, and GTB paid ₦59.920billion and ₦8.102billion respectively. In 2014, Eco and FBN paid ₦79.914 and ₦9.522 respectively. In 2015, GTB paid ₦10.633billion, and in 2016 Eco Bank, FCMB, FBN, and GTB paid ₦94.046billion, ₦5.620billion, ₦16.550billion and ₦11.388billion respectively. In 2017, Access Bank, Eco Bank, FCMB, and GTB paid ₦17.378billion, ₦55.605billion, ₦6.453billion and ₦13.067billion respectively. In 2018, Access Bank, Eco Bank, FCMB, and GTB paid ₦20.035billion, ₦49.872, ₦6.472billion and ₦16.308billion respectively. In 2019 and 2020, Access Bank, Eco Bank, and GTB paid ₦22.665billion and ₦35.44billion, ₦134.579 and ₦153.586, and ₦15.49billion and ₦17.200billion respectively. Therefore, banks' management must improve in its performance measures, ensure control of performance, provide early warnings, and raise awareness of operational risk from top to bottom through the implementation of a holistic enterprise operational risk approach.

The prospect for financial solvency and stability hinges on efficiency and profitability (Oduor *et al*., 2017). Solvency is measured in terms of capital adequacy, which is reflected in the types and levels of risks the banks indulge in and how the losses are absorbed by the capital of the banks (Anginer *et al*., 2018). Technically insolvent banks are expected to be resolved as they are detected so that the cost of such resolutions would not escalate, and if bank failure is not contagious then the banking sector could be considered stable (Anginer *et al*., 2018). Resolving technically insolvent banks majorly depend on management efficiency (Anginer *et al.,* 2018). Similarly, Bermpei *et al.* (2018) agreed that an efficient banking system with environmental and institutional quality is a prerequisite for an efficient economic system in view of its interconnectedness with all sectors in an economy; and any dramatic decline in efficiency causing low banks returns or profitability and a sharp increase in the number of bank failures with the attendant increase in the costs of their resolutions will normally raise public concern, and this portends an unstable banking system. Agreeing with Bermpei *et al.* (2018), banking stability is enhanced due to considerable reduction in operational risk arising from quality institutional framework for protecting the business right of the banks.

A stable banking system is one efficient in meeting the credit needs of the public, and banks resilience through innovation against both internal and external vulnerability and disruptive conditions is a reflection of its efficiency (Anginer *et al*., 2018). The argument for innovation holds that banks must take calculated financial risk to improve its products and services through efficiency because illiquidity and insolvency affect banks performance causing a loss of franchise with consequential instability (Shaddady and Moore, 2019). In the main, the Naira currency redesign and cashless policies introduced and implemented January 2023 rendered the Nigeria's deposit money banks inefficient due to increased cash crunches and illiquidity portended the system's instability. Due to management inefficiency to maintain liquidity, the absence of it can erode a bank's capital, leading to a loss in a bank's franchise value (Ramadhanti *et al.,* 2019). When the franchise value of a financial system declines continuously through inefficiency of operators (to harmonize risk-taking with profitability), building the health and stability of the system is jeopardized (Shaddady and Moore, 2019).

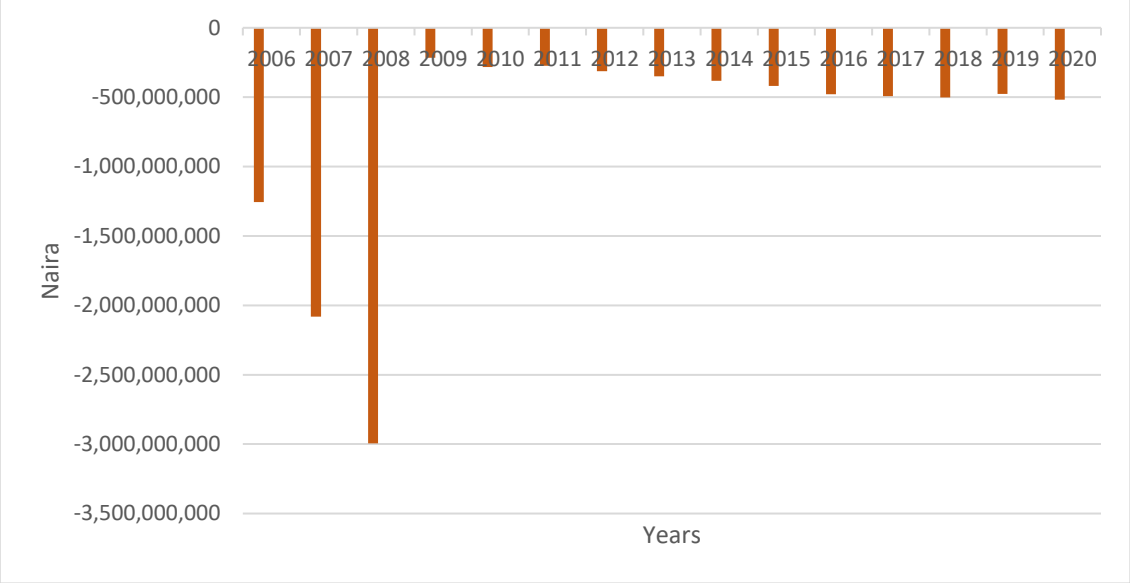
Management must evolve novelty in managing organizational factors to ensure organization's efficiency and continuity. Therefore, a vibrant and efficient bank management that can harness

INTERNATIONAL JOURNAL – FRBD
VOL. 02 NO. 1 OCT-2023 ISSN: 1115 - 8530

bank's systemic factors must be innovative, design and maintain internal environment for processes, policies and individuals working together in groups to effectively contribute to the accomplishment of pre-selected group missions and objective. It is banks capacity to successfully complete tasks within time frame with minimal or no losses. Therefore, management efficiency is a function of how well banks systemic factors are harnessed and challenges minimized to ensure stability for the intermediation role.

Figure1 demonstrates the extent of banks management operational efficiency in minimizing operational risk that can be spiral on credit and liquidity risks to ensure stability. Management inefficiency escalated as high as ₦1.25 billion, ₦2.08 billion, and almost ₦3.00 billion in the years 2006, 2007, and 2008 respectively. This can be attributed to the costs of consolidation through merger and acquisition (M&A) suffered by banks. Management operational inefficiency reduced in the year 2009, but kept increasing significantly at less than ₦500 million except for 2020.

Figure 1. Management efficiency



Source: Researcher's work; 2023

Theoretical Review

Information asymmetry theory

The concept of information asymmetry was first propounded by George Arthur Akerlof (1970), claiming the existence of uneven dissemination of information between transacting parties resulting in an imperfect market (Kemei and Kerongo, 2014). Information asymmetrism occurs when one party to a transaction has more superior information than another. Information is imperfect and costly to obtain, and that the extent of information asymmetry is affected by the actions of firms and individuals (Kemei and Kerongo, 2014). The theory states that it is always difficult to distinguish between good and bad borrowers as this may lead to adverse selection and moral hazard problems increasing not only credit but operational risk in recovering bad loans. It assumes that in the financial market, the lender has superior knowledge of the product (loan contract) sold or offered to the borrower; thus, the borrower takes risk by accepting the loan

EDITOR-IN-CHIEF
Prof. R. Rena [South Africa]

(Makri *et al.,* 2014). Conversely, lack of perfect information to and about the borrower as a result of managerial inefficiency often give rise to high non-performing loans in the banks (Kemei and Kerongo, 2014). The evidence of moral hazard can be reduced if the incidence of adverse selection arising due to banks officials' inability to effectively determine the credit worthiness of borrowers is curtailed. If deserving borrowers get the credit facilities, loan default rates would be reduced. This depends on how efficient management can duly access and act on all financial or banking information to lower operational cost and risk.

On the other hand, where high-risk borrowers are successful in securing loans than credit worthy borrowers because of adverse selection exposure, credits deteriorate into bad loan portfolio. Therefore, it is risky for banks to have loan growth because it often result in building long run bad loans leading to banks instability (Nwosu *et al.,* 2020). Thus, adverse selection and moral hazards problems are assumed to be present in every loan contract. It is also assumed that the monopoly of knowledge creates an imbalance of power in transactions which can cause the transaction to be inefficient leading to market failures as it was in the case of the global financial crisis of 2007/2008. According to Akerlof (1970), despite uneven dissemination of information, firms in a concentrated system are cost efficient due to management diligence which can overcome information asymmetries. This is possible because both parties to a contract seek to have increased knowledge in their expertise fields, and information sharing and relationship duration can generate favorable outcome to arrest and reduce the incidences of nonperforming loans (Kemei and Kerongo, 2014).

Empirical Review

Bank management efficiency

Bank's management is often evaluated objectively on its competence to deliver, adhere to regulatory policies with leadership acumen employed in the midst of economic adversity. It is hypothesized in extant literature that concentrated banking system is more efficient. The concentration-stability nexus was investigated by Deltuviate (2010). The author used concentration (CR3), efficiency and profitability on frequency and cost of banking crises for 47 banking crises of 37 sampled banks from 160 developed and emerging economies, also incorporated economic and macroeconomic variables of gross national income (GNI), GDP and inflation as variables of interest for the period 1987 and 2007. The study used the HHI to measure concentration, simple and multiple correlations and the z-score statistic for bank stability, empirical evidence indicated fiscal cost incurred in their resolution related to broader welfare of the economy were less in countries with more concentrated banking system, supporting the concentration-stability view.

Also, Abdul-Latif *et al.* (2016) examined bank market power (concentration), relative market power, and efficient structure framework of banks in Ghana. Panel data was used on a sample of 26 banks for the period 2003 and 2011, employed the Herfindahl Hirschman Index (HHI) and concentration as proxies for market power hypothesis, while efficiency scores used as proxy for efficient market hypothesis, and the generalized method of moment (GMM) to analyze for profitability with the adoption of return on assets (ROA), return on equity (ROE), and net interest income (NII) as proxies. Result obtained indicated profitability was increased as banks management were technically efficient in handling systemic crises. To understand de-concentration (competition), efficiency and stability, Klaus and Cihak (2019), investigated the

effect of de-concentration by reallocating profits from inefficient banks to efficient ones. Data were sourced from bankscope for a sample of 3,325 savings and commercial European banks (Austria, Belgium, Denmark, France, Italy, Germany, Luxembourg, Netherlands, Switzerland, and U.K), with 17, 965 bank year observations for the period 1995 and 2005. Incorporated macroeconomic variables of unemployment and GDP, the Boone indicator, total assets, asset growth, HHI and diversification in time series were employed as predictor variables, while the z-score (log), ratio of NPLs to total assets used as response variables for analysis. Empirical result revealed that de-concentration was stability enhancing, and its effect greater for more efficient banks. The result proved that efficiency served as a connecting rod or conduit by which competition contributed to stability. It also shows that pressure from competition improved by eliminating adverse selection problem through conduction of efficient screening and monitoring of borrowers' performance. It also shows more credit allocation since incidence of adverse selection and moral hazard were curtailed.

In respect of market concentration, diversification and bank profitability in China and India, Nguyen and Nghiem (2016), examined the operational efficiency and effect of market concentration of banks in the period 1997 and 2011. A data set for each country was used and two-stage boots-trap procedure was employed to obtain valid inferences on the efficiency determinants, and the HHI for market concentration. Results obtained confirmed that bank market concentration was negatively associated with cost and profit efficiencies of Chinese banks. However, market concentration was positively associated with cost efficiency, but unrelated to profit efficiency of Indian banks (Nguyen and Nghiem, 2016). This result had an ambiguous or a pseudo divergent view country-wise but ultimately a concentration-fragility view for Chinese banks. The non-improvement in cost and profit efficiencies of Chinese banks typifies management inefficiency in operational and credit risks management that soared nonperforming assets with adverse effect on both profitability and liquidity, resulting to concentration-fragility, and thus, instability of the banks (Wood and Skinner, 2018).

Taking aggregate data for 133 developed and emerging economies, Tran *et al.* (2022) investigated market concentration, capital and bank stability. Data were sourced from the Global Financial Development Database and the World Development Indicator data set for the period 2002 and 2020. The z-score and the generalized method of moment (GMM) were used to analyze for stability. Besides adoption of GDP and inflation as economic variables, total assets were used for market structure, concentration (CR_3) adopted, while efficiency (cost-to-income ratio), net interest margin, and liquidity ratio (ratio of liquid reserve to total assets) employed as control variables. Empirical results showed banks in more concentrated markets were more stable, and capital significantly influenced bank stability in emerging economies. It was also proved that market concentration positively enhanced capital buffer on bank stability.

Methodology

Source and Method of data Analysis.

The study sourced data from the annual reports and accounts of the only 14 Listed NDMBs on the Nigerian Stock Exchange. The panel autoregressive distributive lagged (ARDL) approach was applied regardless of whether unit root level of stationarity was I(0), I(1), or both I(0) and I(1) (Sulaiman and Abdul-Rahim, 2018). Panel ARDL with various variables can include various lags, which are inapplicable using the standard cointegration test. Using panel ARDL, both long-run and

EDITOR-IN-CHIEF
Prof. R. Rena [South Africa]

short-run coefficients were produced at once (Sulaiman *et al.,* 2015). In order to resolve the bias due to heterogeneous slopes in dynamic panels, Pesaran *et al.* (1995), suggested the Mean Group (MG), Pooled Mean Group (PMG) and Dynamic Fixed Effect (DFE) models. The MG estimator provides the long-run parameters for the panel through making an average of the long-run parameters from ARDL models for individual firms, while the PMG detects the long and short run association between the dependent and independent variables and also investigate the possibly heterogeneous dynamic issue across firms (banks). The DFE confines the coefficient of the co-integrating vector to be equal across all panels in the long run. The Hausman test was used to test whether there was a significant difference between the PMG, MG and DFE.

Model Specification

Adapting Tran *et al.* (2022), the model was modified to include the effect of the moderating role of managerial efficiency, and the control variables of net interest income and firm size proxy by total assets given the negative influence of operational risk. Managerial efficiency has the capacity to alter the causal relationship between the predictor and response variable (Baron and Kenny, 1986; Kim *et al.,* 2001), while control variables as necessary constants that enhance relationships.

$$\mathbf{\Delta BKS}_{it} = \alpha_0 + \alpha_1\mathbf{\Delta BKS}_{it-i} + \alpha_2\mathbf{\Delta EQT}_{it-i} + \alpha_3\mathbf{\Delta CRL}_{it-i} + \alpha_4\mathbf{\Delta ME}_{it-i} + \alpha_5\mathbf{\Delta EQT*ME}_{it-i} + \alpha_6\mathbf{\Delta NII}_{it-i} + \alpha_7\mathbf{\Delta FSZ}_{it-i} + \beta_1\mathbf{BKS}_{it-i} + \beta_2\mathbf{EQT}_{it-i} + \beta_3\mathbf{CRL}_{it-i} + \beta_4\mathbf{ME}_{it-i} + \beta_5\mathbf{EQT*ME}_{it-i} + \beta_6\mathbf{NII}_{it-i} + \beta_7\mathbf{FSZ}_{it-i} + \varphi z_{t-1} + U_t$$

BKS_{it} = stability of bank i in time t.
EQT_{it} = Equity of bank i in time t.
CRL_{it} = Concentration level of bank i in time t.
DEP_{it} = Deposit of bank i in time t.
ME_{it} = Management efficiency of bank i in time t. (Moderating variable)
NII_{it} = Net interest income of bank i in time t. (control variable)
FSZ_{it} = Firm size of bank i in time t. (control variable)
$ME*EQT_{it}$ = interaction terms
i = number of banks (1, 2, 3, ……14)
t = quarterly data from 2006 to 2020
u_i = bank error term
z = error correction variable
Ø = coefficient of error correction
α_0 = Constant intercept
α_1 to α_6 = the alpha coefficients of the independent variables.
ß1 to ß2 = the beta coefficient of the independent variables

Data Analysis

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
bks	840	5.166293	17.78003	-16.21566	104.3103
eqt	840	15.39475	5.457377	0	26.31798
bd	840	15.68271	5.514582	0	24.24766
nii	840	13.67495	4.639232	0	19.61921
me	840	-5.26e+07	2.55e+08	-2.84e+09	0

EDITOR-IN-CHIEF
Prof. R. Rena [South Africa]

```
-------------+--------------------------------------------------------
         clr |      840    .0221829    .0897408        0    .768666
         fsz |      840    18.15374    4.686363        0   24.57766
-------------+--------------------------------------------------------
```

Table 1 shows the descriptive statistics for the variables, bank stability (BKS), equity capital (EQT), deposits (BD), bank concentration (CLR), management efficiency (ME), net interest income (NII), and firm size (FSZ). The results indicated that the mean scores of the variables range between 18.154 and -5.26e+07. The standard deviation ranges between 17.78 and 0.0897. The standard deviations are small compared to their mean values respectively. This implies that the statistical mean provides a good fit of the observed data (Field, 2009). Thus, the data are normally distributed.

Table 2: Correlation Matrix

```
             |   bks     eqt      bd     nii      me     clr     fsz
-------------+---------------------------------------------------------------------
         Bks |  1.0000
         eqt |  0.1494   1.0000
          bd | -0.0595   0.5544   1.0000
         nii | -0.0803   0.7496   0.7239   1.0000
          me |  0.0391  -0.2554  -0.2498  -0.1627   1.0000
         clr | -0.0211   0.2834   0.2650   0.1779  -0.9456    1.0000
         fsz | -0.2057   0.6025   0.6511   0.7305  -0.2162    0.2470  1.0000
-------------+---------------------------------------------------------------------
```

Table 2 shows result of the matrix correlation for bank stability (BKS), equity capital (EQT), banks deposits (BD), bank concentration (CLR), management efficiency (ME), net interest income (NII), and firm size (FSZ). The result revealed that equity capital (EQT), management efficiency (ME), correlated positively to bank stability. While banks deposits (BD), bank concentration (CLR), net interest income (NII) and firm size (FSZ) negatively correlated with bank stability. The correlation revealed equity capital correlated to bank stability by 14.94%, and management efficiency, 3.91%. However, there was a negative correlation between deposits (BD), bank concentration (CLR), net interest income (NII) and firm size (FSZ) on bank stability by 5.95%, 8.03%, 2.11% and 20.57% respectively. The result revealed that correlation among the variables is weak.

Table 3. Levin, Lin Chu (LLC) and Im, Pesaran Shin (IPS) Unit root Tests

Variable	IPS@ Level	IPS@ 1st Difference	Order of co-integration
BKS	-2.09**	-16.03**	I(0)
EQT	-3.93**	-16.14**	I(0)
BD	-2.39**	-16.06**	I(0)
NII	-3.21**	-16.16**	I(0)
ME	-1.56	-15.94**	I(1)
CLR	-2.44**	-15.81	I(0)
FSZ	-3.22**	-16.46**	I(0)

Source: E Views 10 analysis of data

EDITOR-IN-CHIEF
Prof. R. Rena [South Africa]

Table 3 shows the result of the unit root test for the variables of the study, which was derived from the Levin, Lin Chu (LLC) and Im, Pesaran Shin (IPS) methods. The result shows that bank stability (BKS), equity capital (EQT), deposits (BD), bank concentration (CLR), net interest income (NII) and firm size (FSZ) were stationary at level with integration order of I(0). While managerial efficiency was stationary at first difference which implies an integration order of I(1). This result therefore, has a mixture of I(1) and I(0) integration. Hence, this study applied the Panel-ARDL method of analysis.

Estimation, Results and Discussion

Table 4. Results of Mean Group (MG), Pooled Mean Group (PMG) and Dynamic Fixed Effect (DFE) Estimates

	Mean Group MG		Pooled Mean Group PMG		Dynamic Fixed Effect DFE	
	Coeff	**P-value**	**Coeff**	**P-value**	**Coeff**	**P-value**
			Long-Run			
EQT_{it}	-	-	2.3066	(0.422)	-	-
CRL_{it}	-	-	-151.69	(0.657)	-	-
ME_{it}	-	-	0.00002	(0.067)***	-	-
$EQT*ME_{it}$	-	-	-7.12e-07	(0.075)***	-	-
NII_{it}	-	-	6.4338	(0.119)	-	-
FSZ_{it}	-	-	-2.9708	(0.161)	-	-
			Short-Run		-	-
ECM(-1)	-	-	-0.0113	(0.336)	-	-
ΔEQT_{it}	-	-	4.5134	(0.123)	-	-
ΔCRL_{it}	-	-	68.443	(0.693)	-	-
ΔME_{it}	-	-	2.66e-06	(0.683)	-	-
$\Delta EQT*ME_{it}$	-	-	-1.62e-07	(0.643)	-	-
ΔNII_{it}	-	-	-2.6409	(0.299)	-	-
ΔFSZ_{it}	-	-	-0.6203	(0.441)	-	-
CONST	-	-	0.3068	(0.329)	-	-
N	826		826		826	
Hausman Test (1)	*PMG vs MG* P-value = 0.1992					
Hausman Test (2)	*PMG vs DFE* P-value = 0.1256					
Hausman Test (3)			*DFE vs MG* P-value = 0			

Dependent variable: $(BKS)_{it}$ Note: *** ** ***** show significance at 1%, 5% and 10% respectively

Table 4 shows the summary of results for the Pooled Mean Group (PMG) in the short-run and Long-run, given that the outcome of MG and DFE were indeterminate. Hence, all interpretations were based on the PMG outcome.

Long-run Relationships

The relationship between equity capital and stability of Nigeria's deposit money banks in the long-run, revealed that equity capital had a positive and insignificant effect on the stability of the Deposit Money banks under review from 2006 to 2020. The beta coefficient of the variable was

EDITOR-IN-CHIEF
Prof. R. Rena [South Africa]

2.3066 and the p-value of 0.422. The implication of this finding is that increase in equity capital, increased the level of bank stability insignificantly. From the result, it revealed that the effect of market concentration level (CLR) on bank stability was negative and insignificant with coefficient value of -151.69 and the p-value of 0.657. By this, it means that a unit increase in the concentration level insignificantly decreased the stability of the selected banks under study. It indicated that the consistent increase in market concentration consistently decreased bank stability. The effect of management efficiency on stability of Nigeria's deposit money banks in the long-run, revealed that managerial efficiency had a positive and significant effect on the stability of the Deposit Money banks in Nigeria. The beta coefficient of the variable was 0.00002 and the p-value of 0.067 at 10% level of significance. The implication of this finding is that management efficiency, increased the level of bank stability significantly**.** The moderating effect between management efficiency and equity capital on stability of Nigeria's deposit money banks in the long-run, revealed that the moderating effect (***EQT*ME***) had a negative and significant effect on the stability of the Deposit Money banks in Nigeria. The beta coefficient of the variable was -7.12e-07 and the p-value of 0.075. The implication of this finding is that increase in the moderating role of management efficiency and equity capital (***EQT*ME***) decreased the level of bank stability. The effect of the control variables net interest income (NII) and firm size (FSZ) showed that NII had a positive and an insignificant effect on bank stability while, firm size (FSZ) had a negative and insignificant effect on bank stability.

Short-run Relationships

Consequently, the following outcomes obtained from the short-run relationship between the independent variables and stability are: the result of the ECM(-1) revealed that there was a long-run equilibrium relationship among the variables and due to the presence of the unit root, it took a very low speed of 1.13% for disequilibrium caused by the presence of unit root to adjust to equilibrium in the following quarter. The relationship between equity capital and bank stability in the short-run, revealed that equity capital had a positive and insignificant effect on the stability of the Deposit Money banks for the period under review (2006 to 2020). The beta coefficient of the variable was 4.5134 and the p-value of 0.123. This implies that in the long-run equity capital (EQT) was positive which was also positive in the short-run. Hence, equity capital brought about increase in bank stability at an insignificant level.

From the result, it revealed that in the short-run, the effect of market concentration (CLR) on bank stability (BKS) was positive with coefficient value of 66.443 and the p-value of 0.693. By this, it means that increase in market concentration insignificantly increased the stability of the selected banks under study. However, in the long-run the relationship was negative, implying that market concentration caused banks to be unstable.

The effect of management efficiency on stability of Nigeria's deposit money banks in the short-run, revealed that management efficiency had a positive and insignificant effect on the stability of the Deposit Money banks in Nigeria. The beta coefficient of the variable was 2.66e-06 and the p-value of 0.683. The implication of this finding is that management efficiency increased the level of bank stability insignificantly. However, the moderating effect between management efficiency and equity capital on stability of Nigeria's deposit money banks in the short-run, revealed that the moderating effect (***EQT*ME***) had a negative and insignificantly effect on the stability of the Deposit Money banks in Nigeria. The beta coefficient of the variable was -1.62e-07 and the p-value of 0.643. This means that increase in the moderating role of management efficiency and equity capital (***EQT*ME***) decreased the level of bank stability. The changes in control variables, NII and FSZ were both negative to bank stability.

Test of Hypothesis

H_0: The moderating role of managerial efficiency has no statistical significant effect on the relationship between equity capital and stability of Nigeria's deposit money banks

EDITOR-IN-CHIEF
Prof. R. Rena [South Africa]

Decision rule

The decision rule is that if the p-value is less than the level of significance of 0.05, the null hypothesis is rejected while the alternate hypothesis is accepted. But if the p-value is greater than the level of 0.05, accept the null hypothesis and reject the alternate.

From Table 4, the moderating role of management efficiency and market power in equity (***EQT*ME***) revealed that the p-values in the long-run and short-run were 0.075 and 0.643 respectively. Since the p-value in the long-run was lesser than the level of significance at 0.10, we accept the alternate hypothesis and reject the null hypothesis, whereas in the short-run we reject the alternate hypothesis. However, the negative beta coefficient of the moderating role of management efficiency showed that there was no significant effect of the moderating role of management efficiency on the relationship between equity capital and the stability of Nigeria's deposit money banks.

Discussion

The test of hypothesis showed that moderating role of managerial efficiency has no significant effect on the relationship between equity capital and the stability of Nigeria's deposit money banks. Management efficiency depicts how cost is controlled because every entity has a cost structure, and cost is incurred prior to earnings and profitability. As a moderating variable, ME has a weakening causal effect, but can also amplify or even reverse the causal effect (Baron and Kenny, 1986, Kim *et al.,* 2001). The findings of the study differed from the concentration – stability nexus by Deltuviate (2010), that used concentration (CR3), efficiency and profitability on frequency and cost of banking crises for 47 banking crises of 37 sampled banks from 160 developed and emerging economies, also incorporated economic and macroeconomic variables of gross national income (GNI), GDP and inflation as variables of interest for the period 1987 and 2007. The study used the HHI to measure concentration, simple and multiple correlations and the z-score statistic for bank stability. Empirical evidence indicated fiscal cost incurred in their resolution related to broader welfare of the economy were less in countries with more concentrated banking system, supporting the concentration-stability view.

However, the findings of the study partly agreed with the study of Nguyen and Nghiem (2016) that examined the operational efficiency and effect of market concentration of banks in the period 1997 and 2011. A data set for each country was used and two-stage boots-trap procedure was employed to obtain valid inferences on the efficiency determinants, and the HHI for market concentration. Results obtained confirmed that bank market concentration was negatively associated with cost and profit efficiencies of Chinese banks. However, market concentration was positively associated with cost efficiency, but unrelated to profit efficiency of Indian banks.

The findings of the study is inconsistent with result of Abdul-Latif *et al.* (2016) who examined bank market power (concentration), relative market power, and efficient structure framework of banks in Ghana. Panel data was used on a sample of 26 banks for the period 2003 and 2011, employed the Herfindahl Hirschman Index (HHI) and concentration as proxies for market power hypothesis, while efficiency scores used as proxy for efficient market hypothesis, and the generalized method of moment (GMM) to analyze for profitability with the adoption of return on assets (ROA), return on equity (ROE), and net interest income (NII) as proxies. Result obtained indicated profitability was increased as banks management were technically efficient in handling systemic crises. The empirical evidence proved that banks management consistently complied with regulatory guidelines in the maintenance of required systemic factors of capital adequacy, asset quality, management quality, earnings quality, liquidity and sensitivity to market analysis. Similarly, Wood and Skinner (2018) found that the non-improvement in cost and profit efficiencies of Chinese banks typified management inefficiency in operational and credit risks management that soared

nonperforming assets with adverse effect on both profitability and liquidity, resulting to concentration-fragility, and thus, instability of the banks.

The study also differed from the work of Klaus and Cihak (2019) that investigated de-concentration (competition), efficiency and stability. To understand the effect of de-concentration, profits were reallocated from inefficient banks to efficient ones. Data were sourced from bankscope for a sample of 3,325 savings and commercial European banks (Austria, Belgium, Denmark, France, Italy, Germany, Luxembourg, Netherlands, Switzerland, and U.K), with 17, 965 bank year observations for the period 1995 and 2005. Incorporated macroeconomic variables of unemployment and GDP, the Boone indicator, total assets, asset growth, HHI and diversification in time series were employed as predictor variables, while the z-score (log), ratio of NPLs to total assets used as response variables for analysis. Empirical result revealed that de-concentration was stability enhancing, and its effect greater for more efficient banks. The result proved that efficiency served as a connecting rod or conduit by which competition contributed to stability. Hence, there is often significant relationship between management efficiency and bank stability because organizations collapse if management is inefficient.

Conclusion and Recommendations

The study adopted the quantitative research approach guided by the positivist philosophy where causes determine outcome. The research strategy was expost-facto and correlations design. The null hypothesis was analyzed at 5% or 10% level of significance using the panel autoregressive distributive lag after testing for stationarity and unit root using the Levin Lin Chu, Im Pesaran Shin method. The population as well as sample consisted of the only fourteen (14) quoted deposit money banks in Nigeria. Data for the study were sourced from the annual reports and accounts of the sample deposit money banks. Therefore, the validity of the data was reliable because of their source. Based on the data analyzed, findings both at long and short-runs showed that the moderating role of managerial efficiency had a negative and significant effect on the relationship between equity capital and the stability of Nigeria's deposit money banks. That is, management efficiency did not increase the stability of the banks.

Government and regulatory authorities to reconsider recapitalization of existing banks by permitting concentration through the interaction of market forces of demand and supply and not by regulatory recapitalization policy that compressed the numbers of banks in a concentrated structure as too-big-to-fail with weak performance.

Banks management to identify, assess, control, and manage and challenge operational risk inherent but prohibiting the achievement of banks goals and objectives. This can be achieved by setting up reasonable but acceptable risk appetite level across all risks areas of the bank. This is followed by establishing and communicating risk management structure, design and execute measurable and achievable standards and methods of assessment, design and implement control processes and reporting every risk exposures so as to be adequately managed. Therefore, banks management must develop strategies communicated to all cadres of the implications of litigations against the banks as this and levies and other penalties and fines caused by non-compliance of regulatory guidelines escalate costs, lowers profitability with its negative impact on bank stability. The principle of 'reward for efficiency' in honesty and service, securing staff loyalty and integrity, code of conduct awareness and re-awareness, vacation policy enforcement and using non-permanent staff on sensitive roles be adopted to discourage both internal and external fraudulent activities. This will minimize syndicated theft inside and outside as banks staff could collude to wreak havoc on banks.

References

Abdul-Latif, A., Michael, L. T., & Freeman, O. B. (2016). Market power, efficiency and bank profitability: evidence from Ghana. *Econ Change Restruct*, 49: 71-93. DOI: 10.1007/s10644-015-9174-6.

Access Bank. (2018). Analysis of operating expenses. Financial reports and Accounts, 337.

EDITOR-IN-CHIEF
Prof. R. Rena [South Africa]

Akani, H. W., & Ifechi, K. J. (2015). Effects of recapitalization on commercial banks survival in Nigeria: Pre and post CAMEL Analysis. *European Journal of Accounting and Finance Research.* 3 (9), 12-30.

Anginer, D., Demirgüç-Kunt, A., & Mare, D. S. (2018). Bank capital, institutional environment and systemic stability. *Journal of Financial Stability*, 37, 97-106.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in Social Psychology research: conceptual, strategic, and statistical considerations. Journal of personality and social Psychology, 51(6), 1173.

Bermpei, T., Kalyvas, A., & Nguyen, T. C. (2018). Does institutional quality condition the effect of bank regulations and supervision on bank stability? Evidence from emerging and developing economies. *International Review of Financial Analysis*, 59, 255-275.

Deltuvaitė, V. (2010). The concentration stability relationship in the Banking system: Empirical research. *Journal of Economics & Management, 900-909*. Retrieved from, https://www.researchgate.net/publication/228586766.

Eco Bank (2016). Operational risk management. Annual report and accounts, 80-82.

George Akerlof (1970). The market for 'Lemons': Quality, Uncertainty and the market

Kemei, J. C., & Kerongo, F. (2014). The effects of information asymmetry in the performance of the banking industry: A case study of banks in Mombasa country. *International Journal of Education and Research,* 2(2).

Kim, W., Kim, H., Lee, S. H., Chang, M. B., Maeng, W. J. (2001). Study of canola seed processing on nutrient disappearance and fermentation. *Journal of Animal Science Technology,* 43(6), 841-858.

Klaus, S., & Cihak, M. (2019). Competition, efficiency, and stability in banking. *International Journal of Financial Management Association,* 43(1), 215-241.

Kohlscheen, E; Murcia, A., & Contreras, J. (2018). Determinants of bank profitability in emerging markets. *Journal of Bank for International Settlements*. Working papers No. 686. BIS' website (www.bis.org).

Lee, C. C., & Hsieh, M. F. (2014). Bank reforms, foreign ownership, and financial stability. *Journal of International Money and Finance*, 40, 204-224.

Markri, V., Tsagkanos, A., & Bellas, A. (2014). Determinants of non-performing loans: The case of Eurozone. *Panoeconomicus,* 61(2), 193-206.

mechanism. Quarterly Journal of Economic theory, 81(1), 163-200.

Nguyen, T. P. T., & Nghiem, S. H. (2016). Market concentration, diversification and bank performance in China and India. *Journal of Managerial Finance,* 42(10), 980-998.

Nwosu, C. P., Okedigbo, D. O., & Anih, D. O. (2020). Non-performing loans and profitability of the Nigerian commercial banks. *CBN Economic and Financial Review,* 58(3), 35-58.

Obilikwu, J. (2018). The impact of capital, concentration, size and liquidity on banking industry performance in Nigeria. *International Journal of Economics and Financial Issues,* 8(4), 54-63.

Oduor, J., Ngoka, K., & Odongo, M. (2017). Capital requirement, bank competition and stability in Africa. *Review of development finance*, 7(1), 45-51.

Pesaran, M. H., & Smith, R. P. (1995). *New directions in applied macroeconomic modeling*. Department of applied Economics, University of Cambridge.

Ramadhanti, C., Marlina, M., & Hidayati, S. (2019). The effect of capital adequacy, liquidity and credit risk on profitability of commercial banks. *Journal of Economics, Business, and Government Challenges,* 2(1), 71–78.

Samira, M., Trevor, B., Sahil, T., Mohamed, D., Ravi, B., & Charlotte, M. (2020). Banking sector outlook: Nigerian banks face struggles on many fronts. *S & P global ratings review,* 1-12

Shaddady, A., & Moore, T. (2019). Investigation of the effects of financial regulation and supervision on bank stability: The application of CAMELS-DEA to quantile regressions. *Journal of International Financial Markets, Institutions and Money*, 58, 96-116.

Shijaku, G. (2017). Does concentration matter for bank stability? Evidence from the Albanian banking sector. *Journal of Central Banking Theory and Practice,* 3, 67-94.

Sulaiman, C., & Abdul-Rahim, A. S. (2018). Population growth and CO2 emission in Nigeria: A recursive autoregressive distributive lagged approach. Sage opens, 2, 1-14.

Sulaiman, C., Bala, U., Tijani, B. A., Ibrahim Waziri, S. I., & Maji, I. K. (2015). Human capital, technology, and economic growth: Evidence from Nigeria. Sage opens, 5, 1-10.

Tran, S., Dat, N., Liem, N. (2022). Concentration, capital, and bank stability in emerging and developing countries. *Borsa Instanbul Review,* 22(6), 1251-1259.

Vallascas, F., & Keasey, K. (2012). Bank resilience to systemic shocks and the stability of banking systems: Small is beautiful. *Journal of International Money and Finance*, 31(6), 1745-1776.

Wood, A., & Skinner, N. (2018). Determinants of non-performing loans: Evidence from commercial banks in Barbados. *The Business and Management Review,* 9(3), 44-64.

EDITOR-IN-CHIEF

Prof. R. Rena [South Africa]