

Effects of Central Bank Regulations on Performance of Selected Deposit Money Banks in Nigeria: Panel Data Evidence.

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Abstract

The objective of the paper is to investigate the effect of regulation by the central bank on the performance of five selected deposit money banks (DMBs) in Nigeria. Return on assets (used as proxy for bank performance) is the dependent variable while the explanatory variables are bank rate (or monetary policy rate (MPR)), cash reserve ratio, treasury bills rate and exchange rate. To achieve the objective of the study, the panel FMOLS estimator is employed to analyse a balanced panel dataset (covering the period from 2003 to 2013) on five major commercial banks in the country. The empirical evidence indicates that monetary policy rate was positively and significantly related to bank performance. This was attributed to the rising demand for bank loans by the deficit unit (or the ultimate borrowers) of the economy in spite of the rising DMBs' lending interest rate engendered by the rise in the benchmark interest rate (MPR). It was also found that cash reserve ratio was negatively and significantly related to the return on assets of the banks. Furthermore, the study finds that exchange rate depreciation and high treasury bills rate are favourable to the performance of DMBs. To enhance the performance of DMBs in terms of improvement in their returns on assets, the paper recommends inter alia, lowering the cash reserve ratio, increasing the treasury bills rate, and avoiding excessive appreciation of the domestic currency.

Keywords: Bank Regulation, Bank Supervision, Deposit Money Banks, Return on Assets

JEL Codes: E52, E58, G21, G23.

1. Introduction

The deposit money banks also referred to as the commercial banks occupy central stage in the money market of the financial system, and they play pivotal role in the mobilization of funds from the surplus unit of the economy (savers) to the deficit unit (borrowers), thus actively participating in driving economic growth and

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development through financing of investment activities (Aigheyisi and Oaikhenan, 2014). The strength of the commercial banking subsector of the financial system is a key determinant of the strength of the financial system. Weakness of the financial system is caused mainly by weakness of the banking sector, hence efforts to strengthen the financial system usually begins with the strengthening of the banking sector, without which the financial system could suffer total collapse, thereby plunging the economy into deeper economic woes, as safe and strong banking system is central to investor's protection, development of the entire financial system and the entire economy (Bouheni, Ameer, Cheffou and Jawadu, 2014).

In view of the importance of the banking sector to economic growth, the relevance of proper and adequate regulation and supervision of the banking system cannot be overemphasized. This is because proper regulation engenders soundness of the banking system and positions the banks to adequately play their ascribed roles of deposit mobilization, lending, etc.

The responsibility of bank regulation lies with the central bank. The primary function of the central bank is to control the supply of money in the economy through the use of monetary policy (instruments) by manipulating the interest rate, reserve requirement, etc and acting as lender of last resort to the commercial banks especially in times of financial turmoil.

The effect of central bank regulations on banks' performance (measured as return on assets in this paper) in Nigeria has not been adequately investigated. Most of the previous studies on effect of monetary policy instruments on commercial banks' performance in Nigeria use statistical tools such as Pearson product moment correlation analysis, analysis of variance (ANOVA), etc which do not estimate the effects of the instruments on banks' performance, but only show the relationships between them. To the best of our knowledge, the effect of central bank's regulation on banks' performance in Nigeria has not been investigated in a panel data econometric framework which actually gives a more reliable estimation of the effect of bank regulation on bank performance. A gap therefore exists in the literature and this paper intends to fill this gap.

The objective of this paper is to examine the effect of selected quantitative regulatory instruments of the central bank (such as bank rate, cash reserve ratio, treasury bills rate and exchange rate) on the return on asset (ROA) of commercial banks in Nigeria. These variables were selected because they represent some of the key variables affecting commercial banks lending which is one of their major functions.

2. Literature Review

Udeh (2015) employs the Pearson product moment correlation analysis to examine the impact of monetary policy instruments on the profitability of

commercial banks in the period 2005 to 2012 using Zenith Bank Plc as the case study. The study finds that interest rate, cash reserve ratio and liquidity ratio have no significant impact on the profit before tax (PBT) of the bank. However it finds that the bank's PBT is significantly affected by the minimum rediscount rate.

Enyioko (2012) examines the effect of interest rate policy on the performance of deposit money banks in Nigeria using a sample of 20 out of the 25 DMBs that emerged from the 2004/2005 banking sector consolidation exercise in the country. The methods employed for the analysis are regression analysis and analysis of variance (ANOVA). The study finds that interest rate policy exerts no significant effect on the performance of the banks. It also finds that the policy contributes marginally to the growth of the country's economy.

The impact of the Central Bank of Nigeria's and National Deposit Insurance Corporation (NDIC) regulation and supervision on the activities of commercial banks in Nigeria is investigated in Iyade (2006) using the statistical analyses involving percentages, mean score and chi-square test. The analyses indicate that the supervisory and regulatory framework of the CBN and the NDIC are not sufficient to guarantee effective banking practices in the country. In other words, supervisory and regulatory activities of the CBN and NDIC have not been effective.

Bouheni (2013) employs the system generalized method of moments to the investigate the effect of supervision on banking performance in Europe using a sample of 10 largest banks in France, Germany, Greece and UK in the period from 2005 to 2011. The study finds that banking supervision seems to have an impact on the performance of the banks generally. However, when variables capturing the specific, macroeconomic, financial development and institutional indicators are introduced, the impact is dismissed, suggesting that the impact of supervision on bank performance depends on a country's institutional and political factors or environment.

Naceur and Omran (2011) examine the influence of bank regulation, concentration, financial and institutional development on net interest margins (NIMs) and profitability of commercial banks across a broad selection of Middle East and North Africa countries¹ in the period from 1998 to 2005 using dynamic panel estimation technique (the system generalized method of moments). The study finds that bank-specific characteristics such as bank capitalization and credit risk positively and significantly impact on banks' (NIMs), cost efficiency and profitability. Further indications are that except for inflation, macroeconomic and financial development indicators have no significant impact on NIMs. Bank performance is also not affected by regulatory and institution variables.

¹ Countries included in the sample are Egypt, Lebanon, Jordan, Morocco, Tunisia,

Bahrain, Kuwait, Oman Saudi Arabia and United Arab Emirate.

Kale, Eken and Selimler (2015) examine the effect of regulation on the performance of Turkish Banks during the period from 1997 to 2013 using data envelopment and ordinary least squares regression analyses. The study finds that tighter regulations and restrictions, close monitoring, strengthened supervision, more capital and reforms positively and significantly affects the efficiency of banks in the country. The study further finds that banks' efficiency is also affected by economic stability such that foreign banks performs better during periods of instability while domestic banks perform better in periods of economic stability.

3. Methodology

3.1. Model and Estimation Methodology

The panel Fully Modified Ordinary Least Squares (FMOLS) estimation technique is employed to investigate the effect of banking sector regulation by the CBN on the profitability of deposit money banks (DMBs) in Nigeria. The FMOLS is a recent panel data estimation technique originally designed in works by Phillips and Hansen (1990) to provide optimal estimates of cointegrating regressions. An important advantage of the FMOLS according to Pedroni (2000), is that it allows selective pooling of long-run information contained in a panel and permits the short-run dynamics and fixed effect to be heterogeneous among cross sectional units (or different members) of the panel. In addition to this, the method modifies least squares to account for serial correlation effects and for the endogeneity in the regressors that result from the existence of cointegrating relationship. This is in recognition of the fact that most times series data have some non stationary characteristics (Phillips, 1995). Thus it produces asymptotically unbiased estimators and standard normal distributions that are free of nuisance parameters.

The application of panel FMOLS estimation technique for analysis of a balance panel dataset is the major contribution of the paper the existing literature. We note that given the characteristics of the FMOLS estimators, the routinely reported R-Squared (and R-Bar-Squared) and DW-Statistics do not matter for panel cointegration estimations.

The application of the methodology begins with the panel unit root test to determine whether or not the variables are stationary. This is followed by the panel cointegration test and then, the estimation of the specified model.

The model to be estimated is specified in its functional form as:

$$ROA = f(BR, CRR, EXRT, TBR) \quad (1)$$

Where ROA = Return on Assets (proxy for performance of deposit money banks), measured as net profit/total assets*100.

BR = Bank Rate (or Monetary Policy Rate)

CRR = Cash Reserve Ratio

EXRT = Exchange Rate

TBR = Treasury Bills Rate (Proxy for open market operation)

The regressors represent instruments of banking sector regulation by the Central Bank.

The model is specified in its empirical form as:

$$ROA_{it} = \alpha_0 + \sum_{r=0}^m (\beta_r BR_{it-r}) + \sum_{j=0}^n (\gamma_j CRR_{it-j}) + \sum_{k=0}^p (\delta_k EXRT_{it-k}) + \sum_{l=0}^q (\phi_l TBR_{it-l}) + U_{it} \quad (2)$$

For $i = 1$ to 5, where 'i' represents each cross-sectional unit, and m, n, p, q are optimal number of lags of the respective variable to be incorporated in the model to obtain optimal results.

The *a priori* expectations are $\beta_i < 0, \gamma_j < 0, \delta_k > 0, \phi_l > 0$.

3.2. Theoretical Justification of *A Priori* Expectations

Bank Rate (BR) (Or Monetary Policy Rate (MPR))

Bank rate also known as the monetary policy rate is the bench mark lending interest rate, and it is the rate at which the Central Bank lends to the deposit money banks. The loans are usually short term. Higher monetary policy rate invariably translates into higher lending rates charged by the deposit money banks (DMBs) on loans extended to their customers. The higher rate of interest discourages borrowings (especially where there are alternative sources of investible funds such as the stock market, etc) and thus engenders reduction in the amount of loans and advances extended by the deposit money banks as a result of decline in the demand for loans by the private sector. Considering that interest income constitutes significant portion of the income of the commercial banks, the decrease in the loans extended consequent on the increase in the MPR, will adversely affect the incomes/ profitability of the DMBs, and hence the ROA will also be adversely affected. Thus a negative relationship exists between bank rate and ROA.

The cash reserve ratio

This is the proportion of the deposit liabilities of DMBs that they are required to hold as vault cash or/and keep (i.e. deposit) with the Central Bank. It is used to control the amount of loans the DMBs can make to the domestic economy. By raising the CRR, the ability of the DMBs to lend to the deficit unit or the ultimate borrowers of domestic economic is limited. Since lending constituting the main

source of revenue of the DMBs, their interest income is adversely affected, and so is their ROA. Thus *ceteris paribus*, an inverse relationship exists between CRR and ROA.

Exchange Rate

This is the domestic currency price of a foreign currency. It affects the monetary base (and hence money supply) through its effects on the balance of payment and wealth of foreign currency denominated financial assets and deposits. Increase in the exchange rate (i. e. currency depreciation), according to international trade theories, is favourable to export. The resulting increase in export earnings invariably translates into increase in banks deposits in an economy with well functioning financial system (this is in consideration of the fact that deposits are a major determinant of commercial bank loans and advances (Aigheyisi and Oaikhenan, 2014)). The rise in bank deposits which translates into expansion of banks' ability to lend engenders increase in interest income of the DMBs which is a major component of their total income. All things being equal, their ROAs will also increase.

The depreciation of the domestic currency engenders increase in the wealth of holders of foreign currency denominated assets and deposits. Considering that DMBs also hold part of their assets in foreign currencies, the depreciation of the domestic currency results in increase in their wealth (in terms of the domestic currency) and raises their profit levels. Thus, positive relationship exists between exchange rate and ROA.

Treasury Bills Rate

The treasury bills is a major security (government guaranteed debt instrument) issued by the Central Bank in open market operations (OMO). They usually have tenors of 91 days, 182 days and 364 days. The Central Bank sells treasury bills to the bank and non-bank public on behalf to the fiscal authorities (the treasury) to obtain domestic loans/debt. By so doing, they are also able to control inflation by reducing the amount of money in circulation, and also help banks manage their liquidity. Treasury bills constitute part of assets of the DMBs and they attract interest rate known as the treasury bills rate, usually determined by auction. High treasury bills rate increases its attractiveness to the bank and non-bank public. Higher treasury bills rate, invariably translates into more interest income for holders of the instrument. Hence, all things being equal, for the DMBs, positive relationship exists between treasury bills rate and ROA.

3.3. Data and Sources

The study uses a balanced panel data set for five major banks in Nigeria namely Access Bank, Plc, Diamond Bank Plc, First Bank of Nigeria Plc, Wema Bank Plc and Zenith Bank Plc. The data covers the period from 2004 to 2013. The choice of the study period is dictated by the recent consolidation exercise in the banking

sector which began in 2004 with the phased withdrawal of public funds from the commercial banks. Data for BR, CRR, EXRT and TBR were obtained from various the Central Bank of Nigeria Statistical Bulletin 2014, while data used for computation of ROA which is the only variable that is not directly observable was obtained from the audited financial accounts of the cross sectional units (i. e. the sampled DMBs) for various years. All estimations shall be performed with the aid of Eview8 time series econometric computer software.

4. Presentation and Discussion of Results

4.1. Panel Unit Root Test Results

The outcomes of the homogeneous unit root process and heterogeneous unit root process tests are presented in Table 1.

Table 1. Panel Unit Root Test Results

Variable s	Homogeneous Unit Root Test Process				Heterogeneous Unit Root Process			
	Level		Difference		Level		Difference	
	LLC	Breitung	LLC	Breitung	IPS	ADF-Fisher	IPS	ADF-Fisher
ROA	-	-	-	-	-	21.84*	-	-
EXRT	0.45	-	-	-	1.36	2.62	-	26.35***
CRR	-	1.05	-	1.39*.#	0.19	0.21	-	25.20***
BR	-	1.54	-	-	-0.76	11.66	-	28.89***
TBR	-0.23	0.05	-	-	0.60	0.80	-1.89**	20.66**

***, **, * indicates significance at 1%, 5% and 10% levels respectively

+ = stationary at first difference; # = stationary at 2nd difference

LLC = Levin, Lin and Chut

IPS = Im, Pesaran and Shin W-stat

Source: Author's Estimations using Eviews 8

The outcomes of the homogenous unit root processes (LLC and Breitung) indicate that ROA, CRR and BR are stationary at levels, while TBR is significant at first and second differences for LLC and Breitung unit root processes respectively. The outcomes of the heterogeneous unit root processes (IPS and ADF-Fisher) indicate that only ROA is stationary at levels, while the other variables are differenced stationary. Considering that FMOLS provides optimal estimates for cointegrating regression, a requirement for application of FMOLS for analysis of panel data is that the variables must be cointegrated. Thus we proceed to the panel cointegration test.

4.2. Panel Cointegration Test

The Pedroni and Kao panel cointegration tests are employed to investigate whether or not the variables (ROA and the explanatory variables) are cointegrated. The outcomes of the test are presented in Table 2 and Table 3 respectively.

Table 2. Pedroni's Panel Cointegration Test

Within-Dimension			Between-Dimension	
	Statistics	Weighted Statistics		Statistics
Panel v	-0.74	-1.72	Group rho	2.46
Panel rho	1.17	1.60	Group PP	-6.30***
Panel PP	-2.94***	-3.07***	Group	-2.93***
Panel	-2.69***	-2.21**		

***, **, * indicate significance at 1%, 5% and 10% levels respectively.

Source: Authors Estimation using Eviews8

Evident from the Pedroni's panel cointegration test is that six out of the eleven methods (four for within-dimension and two for between-dimension) indicate that the variables are cointegrated. This result is also upheld and complimented by the outcome of the Kao Residual cointegration test presented in Table 3.

Table 3. Kao Residual Cointegration Test

	t-Statistic	Prob.
ADF	-2.737281***	0.0031

*** indicates significance at 1% level.

Source: Authors Estimation using Eviews8

The Kao Residual Cointegration Test result indicates that the null hypothesis of no cointegration is rejected even at the 1% level. We therefore infer from the above panel cointegration tests that the variables are cointegrated. This suggests that long-run (equilibrium) relationship exists between DMBs' ROA and the quantitative regulatory instruments of the Central Bank. On the strength of this, we proceed to estimate the specified model using the FMOLS technique. The outcome of the estimation is presented in Table 5.

Table 5. Panel Fully Modified OLS Estimation Results

ROA	Depend ent	Variab le:		
Variable	Coefficien	Std. Error	t-Statistic	Prob.
BR(-1)	1.675454	0.201157	8.329071	0.0000
CRR(-1)	-0.766684	0.130659	-	0.0000
EXRT	0.171232	0.026005	6.584479	0.0000
TBR	0.344139	0.098870	3.480707	0.0013

Source: Authors' Estimation using Eviews8

The panel FMOLS estimation results indicate that the signs on all the variables except one period lag of BR conform to *a priori* expectations. It also shows that all the variables are highly statistically significant even at the 1% level. Thus the selected quantitative instruments of banking sector regulation significantly affect DMBs' ROA. Specifically, a unit increase in bank rate engenders 1.68 units increase in ROA after a lag of one year. This observation which runs contrary to expectation could be attributed to the fact that the 'ultimate' borrowers or deficit unit of the domestic economy still rely heavily on loans from the DMBs in spite of the high interest rate (engendered by increase in BR which is the bench mark interest rate) charged on those loans by the DMBs. This tends to increase their interest income and returns on assets.

A unit increase in the cash reserve ratio (CRR) engenders 0.76 unit decrease in ROA of DMBs after a lag of one year. This indicates that increase in the cash reserve ratio adversely affects deposit money banks' ROA through its effect on their capacity to lend.

Depreciation of the currency is favourable to the performance of the DMBs. This is indicated by the positive and significant coefficient of the exchange rate variable. A unit rise in the exchange rate of the naira relative to the dollar is associated with 0.17 unit rise in DMBs' ROA. This could be attributed to the positive effect of currency depreciation on the country's export and the resulting increase in economic activities in the tradable sectors of the economy as well as the increase in the wealth of holders of foreign currency (dollar) denominated financial assets and deposits (including the DMBs) which could have positive spillover effect on DMBs' ROA where financial inclusion is adequate.

Considering that treasury bills constitute significant portion of the assets of DMBs, the observed positive effect of increase in treasury bills rate on ROA is not unexpected as it increases their interest income leading to increase in their ROA. The result indicates that a unit increase in the TBR is associated with 0.34 unit increase in ROA of DMBs.

5. Conclusion and Recommendations

In this paper an attempt has been made to investigate the effect of Central Bank's regulations on the performance of deposit money banks in Nigeria. Return on assets (ROA) of the banks is used to proxy bank performance. The quantitative instruments of regulation considered were the bank rate (minimum rediscount rate or monetary policy rate), cash reserve ratio, exchange rate and the treasury bills rate. Data used for the study were annual time series data spanning the period from 2004 to 2013. The banks selected for the study were Access Bank Plc, Zenith Bank Plc, First Bank of Nigeria Plc, Wema Bank Plc and Diamond Bank Plc. The Fully Modified OLS method of analysing panel data was employed for the investigations. It was found that all the explanatory variables significantly affected the DMBs' ROA within the study period. Contrary to expectations,

monetary policy rate was observed to be positively related to ROA of the selected banks. This was attributed to the rising demand for bank loans by the deficit unit (or the ultimate borrowers) of the economy in spite of the rising DMBs' lending interest rate engendered by the rise in the benchmark interest rate (MPR). It was also found that increase in cash reserve ratio adversely affected the ROAs of the selected banks. Further evidences from the analysis were that exchange rate depreciation and higher treasury bills rate are favourable to the performance of DMBs.

In the light of the empirical evidence, the following are recommended to enhance the performance (ROA) of DMBs in the country.

- i. Considering that monetary policy rate (or bank rate) is positively related to DMBs ROA, there is need to increase the BR, but in doing this, care should be taken not to set it at levels that will discourage domestic investment in the country.
- ii. The treasury bills rate should be set at levels that are attractive to commercial banks.
- iii. Considering that currency depreciation is favourable to DMBs performance as measured by ROA, there is need for the government through the Central Bank of Nigeria to avoid over appreciation of the domestic currency and maintain the exchange rate at levels favourable to the country's growth.
- iv. Since CRR was observed to be inversely related to ROA, there is need for the CBN to lower the CRR to reduce the limit it imposes on the ability of the DMBs to lend, and hence enhance their ROA since lending constitutes their major avenue for generating interest income. However, the CRR should be set at levels that will not engender excessive liquidity in the system in particular, and trigger inflation in the economy in general.

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