African Research Review

AN INTERNATIONAL MULTI-DISCIPLINARY JOURNAL,
ETHIOPIA
AFRREV VOL. 11 (2), SERIAL NO. 46, APRIL, 2017: 121-137
ISSN 1994-9057 (Print) ISSN 2070-0083 (Online)
DOI : http://dx.doi.org/10.4314/afrrev.v11i2.10

Macroeconomy and Banks' Profitability in Nigeria

Chidozie, Uriel Ezike
Economics Department,
University of Lagos, Akoka-Yaba, Lagos
Lagos State, Nigeria

Ayadi, Folorunso Sunday
Economics Department,
University of Lagos, Akoka-Yaba, Lagos
Lagos State, Nigeria
E-mail: funso123@yahoo.com,
Phone: +2348028530208

Abstract

Banks, like any other businesses are driven by the profit motive. The banking environment in Nigeria has been fraught with major macroeconomic shocks over the years. This study therefore analysed the impact of macroeconomic dynamics on banks' profitability in Nigeria. Specifically, the study examined the impact of macroeconomic variables (Gross domestic product growth, Inflation, and Crude oil price) on banks' profitability. It also seeks to examine the significance of microeconomic variables (cost to income ratio, loan to deposit ratio; loan to total assets ratio and total assets) on banks'

Copyright © International Association of African Researchers and Reviewers, 2006-2017: www.afrrevjo.net.
Indexed African Journals Online: www.ajol.info

profitability. It analysed the impact of banking industry concentration on banks' profitability. The estimation technique follows a panel regression which studied a cross section of the banking firms while observing the heterogeneity in the individual firms. The results indicated that the ratio of cost to income market concentration, and crude oil price are negatively significant in determining changes in return on average equity while total assets is positively significant in explaining return on average equity (as a measure of profitability). The study recommended that banks' exposure to the oil and gas sector must be properly managed given the significant impact of crude oil price on banks' profitability. It is evident that the Nigerian banking industry is fairly competitive, and banks size matters in determining profitability. Banks management must therefore focus on strategies that will give them cost advantage as well as differentiate them from other competitors.

Key Words: macroeconomy, bank, profitability

Introduction

Profit is arguably the most important motivation for doing business. The level of profit a firm can reasonably make is driven largely by external influences as well as how the internal mechanisms of the business entity are able to convert those influences to opportunity for its advantage. Profitable banks are able to attract capital investments easily and at lower cost, whereas less profitable banks find it difficult to attract capital investment; and when they do, it is at a prohibitive cost. Therefore, profit certainly has significant effect on the ease and cost of raising capital (Rumler & Waschiczek, 2010).

The importance of having a profitable banking system cannot be overemphasized. One important role that banks play is in transforming savings into investment for sustainable economic growth and development. Therefore, developments in the banking sector are not only of concern to the banks alone but to the whole economy. Efficient and profitable banks are able to catalyse economic activities and development better than non-profitable ones. Also, banks serve as financial intermediaries by taking deposits from the surplus side of the economy and transforming them into credits for the deficit side.

Bank regulators in Nigeria increased the minimum share capital of banks more than five times between 1990 and 2004 (Aburime & Uche, 2008). The essence of these policies was to improve the stability and profitability of banks, albeit with some unintended consequences. Sometimes these regulations when implemented during periods of economic downturn can disrupt the environment of banking, consequently affecting banks' capacity to remain profitable.

The environment of banking in Nigeria has been fraught with major macroeconomic shocks since the post July 2004 National Economic Empowerment and Development Strategy (NEEDS) programme which seeks amongst other things to, re-capitalize

Copyright © International Association of African Researchers and Reviewers, 2006-2017:
www.afrrevjo.net.
Indexed African Journals Online: www.ajol.info

financial institutions, develop a competitive and healthy financial system capable of supporting economic development, address incidences of systemic distress in the financial sector, amongst other things. This has led to increase in minimum capital requirement for banks in Nigeria from minimum capital of ₦25 billion from ₦2 billion with full compliance period of 18 months (July 2004 – December 2005). This marked the beginning of a new era of banking industry consolidation in Nigeria.

Prior to this, the banking sector was highly concentrated – about 4 banks controlled more than 50 percent of industry businesses (Asogwa, 2004; Nwokoma, 2006). Following the consolidation, the number of banks trimmed down to 25 as at January 2006 from 89 in 2004. This was achieved largely through mergers and acquisitions. The banking industry has also witnessed an exponential growth during post consolidation. Between June 2006 and June 2008 the number of bank branches grew by 54 percent, number of deposit accounts surged by 39 percent, loans and advances by 197 percent (Osuagwu, 2014).

Since the consolidation exercise, several macroeconomic changes have taken place; most having profound impact on banks. The global financial crisis of 2008/2009 saw some Nigerian banks distressed and were bailed out by the Central Bank of Nigeria (CBN). As at December 31, 2014, 5 banks controlled more than 50 percent of total assets of the banking industry. Also, with recapitalization, banks gained increased capacity to finance big ticket deals particularly in the oil and gas sector.

With significant exposure to the oil and gas sector, profitability of banks in Nigeria is extremely sensitive to the vagaries of the World crude oil prices. Between 2010 and 2014, on average, 23 percent of total banks' loan exposure was to the oil and gas sector, making it the largest amongst the 22 activity areas banks lent to (NDIC, 2014). Therefore, a plunge in crude oil price presents major risk to banks' balance sheet and profitability.

There have been debates among scholars concerning the proper policy measure to adopt in ensuring the performance of the banking sector in the face of macroeconomic shocks. While some scholars have highlighted the need for proper corporate governance by managers of the banks, others have pointed at industry wide issues around proper regulation by the apex bodies. Recent evidences from other countries show that macroeconomic dynamics plays significant role in determining banks' profitability.

Given the importance of bank profits for economic development, this research aims at quantifying the impact of the macroeconomic dynamics on banks' profitability following the 2005 banking industry consolidation. Specifically, the study intends to examine the impact of macroeconomic variables (Gross domestic product growth, Inflation, and Crude oil price) on banks' profitability. It also seeks to examine the significance of microeconomic variables (cost to income ratio, loan to deposit ratio;

Copyright © International Association of African Researchers and Reviewers, 2006-2017:
www.afrrevjo.net.
Indexed African Journals Online: www.ajol.info

loan to total assets ratio and total assets) on banks' profitability. It also intends to analyse the impact of banking industry concentration on banks' profitability.

Literature Review

There is no doubt that proper regulation is required as a prudential measure for banks to maintain adequate capital so as to prevent insolvency. According to Rime (2001), regulation has a significant impact on regulatory capital to asset ratio, indicating that banks increase their Tier capital under stricter regulatory pressure. It then means that imposition of regulation can lead to a desired outcome whereby banks hold more capital for periods of stress and are less vulnerable. More evidence to this effect has also been documented by Heid et al. (2004), where they argued that banks with lower capital buffers (capital in excess of regulatory minimal) try to increase capital and try to lower their risk exposures. Unfortunately, Rime (2001) and Heid et al. (2004) did not expressly test the impact of regulatory pressure on banks' profitability but this can be inferred from the impact of adequate capital on risk asset creation.

Two possible theoretical explanations have been advanced in the literature for the relationship between the equity-to-asset ratio and bank performance. The first possible explanation from theoretical literature is that a higher equity-to-asset ratio is associated with lower risk taking (decreasing leverage will reduce risks of financial distress). Second, corporate finance literature suggests that lower risk taking will negatively influence the expected return.

Saunders and Schumacher (2000) applied the model of Ho and Saunders (1981) to analyse the determinants of interest margins in six countries of the European Union and the US during the period 1988–1995. They found that macroeconomic volatility and regulations have a significant impact on bank interest rate margins. Their empirical evidence supports an important trade-off between ensuring bank solvency, as defined by high capital to asset ratios, and lowering the cost of financial services to consumers, as measured by low interest rate margins.

Based on an unbalanced panel of 389 SSA commercial banks, Flamini et al. (2009) used annual bank and macroeconomic data for 41 SSA countries over the period 1998-2006 to analyse the determinants of commercial banks' profitability using the Arellano Bonds Two-step General Method of Moments (GMM) to correct errors and biases in the model. Their regression results showed that macroeconomic variables significantly affect banks' profitability in Africa. They noted that inflation has a positive effect on bank profits. They drew the inference that banks forecast future changes in inflation correctly and promptly enough to adjust interest rates and margins. They also found that the magnitude and significance of the coefficient (0.21) on the lagged measure of profitability (ROA) in their study show the persistence in return. They concluded that there is the existence of market power in the SSA banking sector and that profit tend to adjust fairly to their average level. Flamini et al. (2009) found a positive and significant

Copyright © International Association of African Researchers and Reviewers, 2006-2017:
www.afrrevjo.net.
Indexed African Journals Online: www.ajol.info

relationship between equity and banks' returns. They concluded that the positive and highly significant coefficient of equity seen implies that well-capitalized banks experience higher returns. However, Flamini et al. (2009) found no direct effect of market concentration on bank profitability for sub-Saharan Africa banking markets due to the limitations of the proxy for concentration imposed on the profitability of banks in the region.

In the case of Austria banks, Rumler and Waschiczek (2010) used a panel regression model to investigate the impact of economic factors on bank profits. The study included 1042 banks that did business in Austria in the period from 1995-2009. They concluded that all three macroeconomic variables (GDP growth, Interest rate and Inflation) included in their analysis have a positive and significant effect on banks' profit.

Contrary to the positive relationships between macroeconomic variables and banks' profitability discovered by some scholars, Osuagwu (2014) saw no significant relationship between both variables. He applied a linear regression model to analyse the determinants of bank's profitability in Nigeria during the period 1980-2010. He concluded that exchange rate as a macroeconomic variable was not a significant determinant of banks' profitability (return on assets). He also found high correlation between two of the macroeconomic variables (exchange rate and inflation). The ratio of operating expenses to total assets has a positive and significant effect on profitability (Return on Assets). He found a negative but significant relationship between return on assets as a measure of profitability and the ratio of total loan to total assets.

Athanasoglou et al. (2005), in studying the determinants of banks' profitability used an unbalanced panel of Greek commercial banks spanning the period 1985-2001. Using a one-way error component regression model, they concluded that profits seem to persist to a moderate extent, which implies that the departures from a perfect competitive market structure in the Greek banking sector may not be so large. They also concluded that operating expenses appear to be an important determinant of profitability.

More recently, a number of studies have emphasized the relationship between macroeconomic variables and bank's risk. Saunders and Allen (2004) surveyed the literature on pro-cyclicality in operational, credit, and market risk exposures. They opined that such cyclical effects mainly result from systemic risk emanating from common macroeconomic influences or from interdependencies across firms as financial markets and institutions consolidate internationally. These scholars argue that these risks may ultimately exacerbate business cycle fluctuations due to adverse effects on bank lending capacity.

Results from a study by Demirgüç-Kunt and Huizinga (1998) suggested that macroeconomic and regulatory conditions have a pronounced impact on margins and profitability. They arrived at this conclusion by using bank level data for 80 countries in the 1988–95 periods to analyse how bank characteristics and the overall banking

Copyright © International Association of African Researchers and Reviewers, 2006-2017:
www.afrrevjo.net.
Indexed African Journals Online: www.ajol.info

environment affect both interest rate margins and bank returns. Results on the impact of macroeconomic conditions on banks' profitability are quite robust.

Credit risk as a proxy for macroeconomic condition has also been shown to impact bank's profitability. The conclusion from a study conducted by Al-Haschimi (2007) is that credit risk and operating inefficiencies determine variations in net interest margins. He used accounting decompositions, as well as panel regressions, to study the determinants of bank net interest rate margins in 10 Sub-Saharan African (SSA) countries and reached the above conclusion.

Result from a different study carried out by Allen and Bali (2004) suggested evidence of pro-cyclicality in both catastrophic and operational risk measurements, implying that macroeconomic, systematic, and environmental factors play considerable roles in determining the risk and returns of financial institutions. This was done using equity returns data over the period 1973–2003 to examine the catastrophic risk of financial institutions.

Abreu and Mendes (2002) examined banks in Portugal, Spain, France and Germany, and found that the loans-to-assets ratio, as a proxy for risk, has a positive impact on the profitability of a bank. This finding lends support to the argument the banks' specific variables are significant determinants of banks' profitability.

Molyneux and Thornton (1992), in the study on the determinants of bank profitability, used a sample of 18 European countries during the period 1986-1989. Among other things, they found a negative and significant relationship between the level of risk and profitability. This result reflects the fact that financial institutions that are exposed to high-risk loans also have a higher accumulation of unpaid loans. These loan losses lower the returns of the affected banks.

Pasiouras and Kosmidou (2007) conducted a research to study and compare the performance of domestic and foreign banks operating in the 15 European Union countries over the period 1995-2001. They demonstrated that there is a positive and significant relationship between macroeconomic factors as well as size and profitability. They also found that better efficiency is associated with higher profitability.

Countering the above position, Micco et al. (2007) found no correlation between the relative bank size and the return on assets for banks. Their research uses data from banks in 179 countries between 1992 and 2002. They argued that the coefficient is always positive but never statistically significant, therefore they concluded that a major determinant of bank profitability is the credit risk or liquidity risk a bank is willing to undertake and not its mere size.

Based on the foregoing, it is even more crucial to further explore this topic given the current state of the Nigerian economy whereby slippages in the prices of crude oil is

Copyright © International Association of African Researchers and Reviewers, 2006-2017:
www.afrrevjo.net.
Indexed African Journals Online: www.ajol.info

springing up new risks for banks' balance sheet. One major gap in extant literature in this regard is the dearth of information on the impacts of macroeconomic variables on banks' profitability since the period after the 2005 banking sector consolidation in Nigeria.

Theoretical Framework

The theoretical framework of the study is an augmented version of the Market Power Model developed by Bikker and Boss (2008). The Bikker and Boss model actually draws strongly from the general theory of profit maximization. The market power model begins with the understanding that banks' performance is related to changes in their environment and the behaviour of their competitors (Bikker & Boss, 2008). Two variants of the market power model – *structure conduct performance (SCP) and efficient-structure (EFS) hypothesis* are considered in the study.

The Structure-Conduct-Performance (SCP) paradigm stipulates that as market concentration (*HHI*) is increasing bank profitability should be decreasing ($\prod^*$) if there is no collusive behavior amongst firms in the industry. However, if bank profit is increasing as concentration is increasing, the implication is that firms in the industry are colluding to reap oligopoly profits. The Structure-Conduct-Performance (SCP) model assumes that market structure influences bank behaviour (conduct), which in turn affects bank performance. In a market with a higher concentration, banks are more likely to show collusive behaviour, and their oligopoly rents increase performance (Bikker and Bos, 2008).

The relationship between the S-C-P derived by Bikker and Bos (2008) is as follows:

$$p * Y - \sum_{i=1}^{N} wi \frac{dX_i^*}{dY_i} Y_i = - \sum_{i=1}^{N} ((Yi/Y)^2)(f'(Y)Y^2) (1 + (\Sigma \lambda i \, Yi)/ (\Sigma Y_i^2)) \text{.....1}$$

Dividing equation 3.0 by $p*Y$ gives:

$$\prod^* = P^*Y - w_i \frac{d X_i^*}{dY_i} Y_{i} = - \left((HHI) \left(-\frac{1}{\eta} \right) (1 + \mu) \right) \text{. ..... 2}$$

Where the Herfindahl–Hirschman Index (HHI) = $\sum (Yi / Y)^2$, $\frac{1}{\eta} = f'(Y)Y^2 / P^*Y$ and μ = $\sum (\Sigma \lambda i \, Yi)/ (\Sigma Y_i^2)$ .Where η is a constant and μ is an implicit function of *HHI*,the above equation becomes a basic relationship between performance and structure thatis consistent with the S-C-P relationship. Thus the basic equation (without control variables) becomes:

$$\prod^* = ((HHI)(1 + \lambda)) \, p^*Y) \text{..... 3}$$

The derived relationship between market structure and performance can be used to test the SCP hypothesis.

Copyright © International Association of African Researchers and Reviewers, 2006-2017:
www.afrrevjo.net.
Indexed African Journals Online: www.ajol.info

The efficient-structure (EFS) hypothesis postulation is that higher market concentration may arise when efficient firms generate higher profit as a result of increased size and market share. The EFS model suggests that market concentration is not a random occurrence but occurs as a result of superior efficiency possessed by some firms. By combining these two variants of market power model, it is possible to have a combined equation that can be used to test both the SCP hypothesis and the EFS hypothesis without any identification problems.

$$\prod^{*}=MS\ (CE)i(1+\lambda))\ p^{*}Yi) \quad \text{..... 4}$$

where ($\prod^{*}$) is profit, *MS* is market share, *CE* is an efficiency measure,λ is the conjectural variation of firm *i*, *p* is the output price vector, *Yi* is the output vector. Banks maximize their profits by equating marginal cost and perceived marginal revenue, according to the short-run model for the empirical determination of the market power of an average bank developed by Bresnahan (1982) and Lau (1982), who furthermore assumes that banks produce only one product and use several input factors. Assuming **n** banks in the industry supplying a homogeneous product, the profit function of the average bank **i** takes the form:

$$\Pi i = pYi - ci\ (Yi,Si) - Fi \quad \text{..... 5}$$

where Πi is profit, Yi is the volume of output, p is the output price, ci are the variable costs, Si is a vector of exogenous variables affecting the marginal costs, but not the industry demand function, and Fi are the fixed costs of bank i.

The S-C-P model which is microeconomic in nature is augmented in this study by extending it to include macroeconomic factors. In essence, the structure is seen as the structure of the macro-economy as against market structure originally discussed in the S-C-P model.

Methodology: For the empirical model, the theoretical profit function (3.4) is redefined as a linear profit maximization function and reads:

$$p = \alpha_0+\alpha_1 rp+\alpha_2 D+\alpha_3 D\cdot rdep+\varepsilon \quad \text{..... 6}$$

where p, is profit, rdep, the market deposit rate, rp and Ds are exogenous variables affecting industry demand for deposits but not marginal costs, such as disposable income, unemployment, the number of bank branches and interest rates for alternative investments (that is the money market rate and the government bond rate) and ε is the error term.

The explanatory variables are represented by the following set of variables: cost to income ratio (CIR), loan to deposit rate (LDR), total assets (TA), loan to total assets ratio (LTA), real gross domestic product (GDP) growth, Inflation rate; crude oil price and Hirschman-Herfindahl index (HHI). Profitability is the dependent variable and it

Copyright © International Association of African Researchers and Reviewers, 2006-2017:
www.afrrevjo.net.
Indexed African Journals Online: www.ajol.info

is represented by return on average assets (ROAA) and return on average equity (ROAE). Equation (3.5) can then be written in a functional form as:

ROAA= f (CIR, LDR, TA, LTA GDP, HHI) ……7

ROAE= f (CIR, LDR, TA, LTA GDP, HHI) …… 8

The study is based on panel dataset containing individual bank data (ROAE, ROAA, LDR, CIR, TA, and LTA), macroeconomic data (GDP growth rate, Inflation rate, crude oil price) and industry data represented by the Hirschman-Herfindahl index (HHI). The high frequency data were converted to the appropriate frequency (quarterly). The estimation technique follows a panel regression, which provides the advantage of studying a cross section of the banking firms while observing the heterogeneity in the individual firm (Baltagi, 1995; López, 2005).

Model Specification

This study builds on the econometric model suggested by Athanasoglou et al., (2006), Chirwa and Mlachila (2004), Brissimis et al., (2008), Osuagwu (2014). By modifying their model and considering other variables the following model was specified:

$$y_{it} = \alpha + \sum X'_{it}\beta + \sum X^{i}_{it}\beta + \sum Z'_{t}\gamma + \varepsilon_{it} \quad \text{..... 9}$$

where y_{it} is profitability measures (ROAE and ROAA) of bank i for period t as the dependent variables, α is the regression constant; β and γ are the coefficient vectors to be estimated. Vector,X'_{it} contains the macroeconomic variables (inflation rate (INF), GDP growth rate, crude oil price (OIL)). X^{i}_{it} represent industry specific variable (*HHI*). Z_t is the vector of all bank specific variables (loan to deposit ratio (LDR), lending as a percentage of total assets (LTA), cost to income ratio(CIR) and total assets (TA)). ε_{it} is the error term.

The two indicators of bank profitability- earnings after tax as a percentage of average core capital (ROAE) and earnings after tax as a percentage of average total assets (ROAA) are available at the individual bank level *i =1, …, N* for the year 2005 through 2014, *t =1, …,10.* Hence, to estimate the relationship between banks' profitability and macroeconomic variables a panel regression model is used in this study. To capture the tendencies of profit to persist over time as a result of impediments to market competition and high sensitivity to serially correlated macroeconomic shocks, the study adopts a dynamic specification of the model by including a lagged dependent variable among the regressors. The model with the lagged profitability becomes:

$$ROAA_i = \alpha + \delta ROAA_{it-1} + \beta 1 lINFit + \beta 2 lGDPit + \beta 3 lOILit + \beta 4 HHIit + \beta 5 llDRit + \beta 6 lLTAit + \beta 7 lCIRit + \beta 8 lTAit + \varepsilon_{it} \quad \text{..... 10a}$$

Copyright © International Association of African Researchers and Reviewers, 2006-2017:
www.afrrevjo.net.
Indexed African Journals Online: www.ajol.info

$$ROAE_i = \alpha + \delta ROAE_{it-1} + \beta 11lINFit + \beta 2lGDPit + \beta 3lOILit + \beta 4HHIit + \beta 5llDRit + \beta 6lLTAit + \beta 7lCIRit + \beta 8lTAit + \varepsilon_{it} \quad \text{10b}$$

where $ROAE_{it-1}$ and $ROAA_{it-1}$are the one-period lagged profitability and δ is the speed of mean reversion. A value of δ between 0 and 1 implies persistent profitability, but they will eventually return to the equilibrium level. Values closer to 0 signify a fairly competitive industry, that is, high speed of adjustment, whereas a value of δ close to 1 implies very slow adjustment (less competitive market).

Unit root test is conducted on the variables to test for stationarity so as to avoid a spurious result. A test for the presence of multicollinearity using the correlation coefficient of the variables was done. A further diagnostic test which eliminates the consideration of an ordinary least squares (OLS) as a method of estimation in this study was introduced. A test to decide between a random effects regression and a simple OLS regression was utilized.

Sources of Data

Data from individual bank annual reports and statement of account as well as from Central Bank of Nigeria's (CBN) database were used. Specifically, the real GDP growth data was sourced from the CBN Statistical Bulleting (2014). Inflation rate data was from NBS December CPI Statistical News (2014), and CBN Statistical Bulleting (2014). Crude Oil price data was gotten from the Bloomberg terminal (2014) and CBN Statistical Database (2014). Banks' financial data was sourced from Agusto Banking Industry report (2014), Bloomberg Terminal (2014) and from annual and quarterly balance sheet and statement of accounts of the sampled banks.

Results and Discussion

The empirical analysis begins with a presentation of the unit root results of variables used in the study which is shown in table 1 below.

Table 1: Panel unit root test: Individual root –Fisher -Augmented Dickey Fuller (ADF)

	Level			**First difference**			
Variables	Intercept	Trend & Intercept	None	Intercept	Trend & Intercept	None	Decision
LCIR	43.2449 (0.0019)	35.5238 (0.0175)	10.4976 (0.9582)	83.0380 (0.0000)	54.4628 (0.0000)	139.473 (0.0000)	I(1)
LGDP	61.4174 (0.0000)	48.0670 (0.0004)	7.87271 (0.9927)	224.489 (0.0000)	184.207 (0.0000)	327.303 (0.0000)	I(1)
LLROAA	41.9058 (0.0028)	33.4938 (0.0298)	31.5492 (0.0483)	79.4656 (0.0000)	50.9530 (0.0002)	134.364 (0.0000)	I(0)
LLROAE	51.7334	33.7769	32.2387	81.2093	53.1720	136.089	I(0)

Copyright © International Association of African Researchers and Reviewers, 2006-2017:
www.afrrevjo.net.
Indexed African Journals Online: www.ajol.info

	(0.0001)	(0.0277)	(0.0408)	(0.0000)	(0.0001)	(0.0000)	
LOIL	61.0805 (0.0000)	50.2597 (0.0002)	9.75680 (0.9724)	184.207 (0.0000)	150.286 (0.0000)	263.864 (0.0000)	I(1)
LTA	48.4299 (0.0004)	32.9281 (0.0344)	0.56067 (1.0000)	77.641 (0.0000)	55.6993 (0.0000)	101.494 (0.0000)	I(1)
LHHI	77.1979 (0.0000)	51.7713 (0.0001)	15.3755 (0.7545)	64.6276 (0.0000)	40.2950 (0.0046)	118.578 (0.0000)	I(1)
LINF	41.3139 (0.0034)	20.5472 (0.4242)	21.7143 (0.3562)	163.549 (0.0000)	128.861 (0.0000)	229.057 (0.0000)	I(1)
LLDR	33.0172 (0.0336)	22.8212 (0.2977)	5.50315 (0.9994)	98.3927 (0.0000)	70.6059 (0.0000)	155.826 (0.0000)	I(1)
LLTA	20.6499 (0.4180)	19.8501 (0.4673)	4.58744 (0.9999)	77.1637 (0.0000)	49.1618 (0.0003)	127.112 (0.0000)	I(1)
LROAA	43.0070 (0.0020)	32.5412 (0.0379)	30.8967 (0.0566)	75.9019 (0.0000)	48.6118 (0.0003)	129.773 (0.0000)	I(1)
LROAE	53.2606 (0.0001)	33.8698 (0.0270)	30.6758 (0.0596)	78.9727 (0.0000)	51.5580 (0.0001)	132.986 (0.0000)	I(1)

The time series behaviour of each of the series is presented in the table 1 above using Fisher- ADF test type at level. The last column shows the respective order of integration. The extractions from the computer output are presented in table 2 above.

Table 2: Correlation Matrix of Variables of the Model

	DLCIR	**DLGDP**	**DLHHI**	**DLINF**	**DLLDR**	**LLROEA**	**DLLTA**	**DLOIL**	**DLTA**
DLCIR	1								
DLGDP	0.026981	1							
DLHHI	0.231647	-0.01448	1						
DLINF	-0.08751	0.050315	-0.09705	1					
DLLDR	-0.03294	0.0384	0.044925	0.140446	1				
LLROAA	0.127548	0.063543	-0.06274	0.00799	0.049654				
LLROEA	0.119958	0.063497	-0.07286	0.007656	0.06531	1			
DLLTA	0.054001	0.02567	-0.01304	0.098635	0.275844	0.067825	1		
DLOIL	0.013294	0.00422	-0.23336	-0.00379	-0.08879	-0.08842	-0.05141	1	
DLTA	0.248211	-0.01736	-0.28452	0.106704	0.031224	0.07222	-0.02982	0.078538	1

Note: Data is normalized by taking the log of all the variables (dependent and independent variables)

Copyright © International Association of African Researchers and Reviewers, 2006-2017:
www.afrrevjo.net.
Indexed African Journals Online: www.ajol.info

Table 2 presents the result of multicollinearity test for all the variables used in the analysis. Variables with correlation coefficients of about 0.2 absolute basis points away from 1 or -1 may be considered multi-collinear. There is no multicollinearity among the variables of the models.

Panel Regression: Fixed effect (FE) and Random effect (RE) estimation

Table 3: FE estimation and Random effect (RE) estimation results

Variable	**Fixed effect (FE) estimates**		**Random effect (RE) estimates**	
	DLROAA	**DLROAE**	**DLROAA**	**DLROAE**
DLLDR	0.048571 (0.107208)	-0.218597 (0.302560)	0.039016 (0.107050)	-0.237897 (0.302142)
LLROAA	-0.143141*** (0.023363)	-	-0.115903*** (0.021120)	-
DLLTA	0.048159 (0.090187)	-0.155039 (0.254536)	0.057489 (0.089195)	-0.157867 (0.251745)
DLCIR	-1.152399*** (0.117143)	-2.665287*** (0.328745)	-1.186855*** (0.115995)	-2.723437*** (0.326346)
DLGDP	0.018018 (0.047781)	0.142574 (0.134776)	0.014482 (0.047763)	0.134583 (0.134736)
DLHHI	-1.826959*** (0.360775)	-2.868431*** (1.015768)	-1.769287*** (0.359423)	-2.759484*** (1.012672)
DLINF	0.072902 (0.047915)	0.116162 (0.135169)	0.072742 (0.047897)	0.117816 (0.135116)
DLOIL	-0.167329*** (0.070054)	-0.425553** (0.196366)	-0.152935*** (0.069850)	-0.401715** (0.196101)
DLTA	0.093113*** (0.041306)	0.202533* (0.116533)	0.089234*** (0.040628)	0.191122* (0.114585)
LLROAE	-	-0.187557*** (0.028413)	-	-0.160719*** (0.026235)
C	0.117867*** (0.026281)	0.430280*** (0.078168)	0.091298*** (0.024395)	0.365495*** (0.073540)
Observations	390	390	390	390
R-squared	0.401201	0.311549	0.388499	0.299836
F-statistic	13.80966	9.327254	26.82468	18.08113
Prob(F-statistic)	0.000000	0.000000	0.000000	0.000000

Significance levels: *p<0.10; ** p<0.05; *** p<0.01 Standard errors are in parenthesis.

Copyright © International Association of African Researchers and Reviewers, 2006-2017:
www.afrrevjo.net.
Indexed African Journals Online: www.ajol.info

In the fixed effect model shown in table 3, variables LLROAA, DLCIR, DLHHI, DLOIL, regressed against DLROAA are significant at 0.01. Similarly, when LCIR and DLHHI are regressed against DLROAE they are significant at 0.01. LLROAE is also significant at 0.01, whereas DLOIL and DLTA are significant at 0.05 and 0.1 respectively as shown in table 3.

In the random effect model also shown in table 3, variables LLROAA, DLCIR, DLHHI, DLOIL, regressed against DLROAA are significant at 0.01. Similarly, when LCIR and DLHHI are regressed against DLROAE they are significant at 0.01. LLROAE is significant at 0.01, whereas DLOIL and DLTA are significant at 0.05 and 0.1 respectively as shown in table 3.

The Hausman specification test reported in table 4 below shows that the random effect model is a better estimate of the explanatory variable for both return on average assets (LROAA) and return on average equity (LROAE) as measures of profitability compared to the fixed effect.

Table 4: Hausman Specification test (Test cross-section random effects)

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	9	1.0000

From the above result, since the p-value is greater than 0.05(5 per cent), the null hypothesis (H_0) cannot be rejected meaning that Random effect model is the most appropriate for the estimation of the model.

Table 5: Breusch –Pagan LM Test

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	254.9793	45	0.0000
Pesaran scaled LM	22.13376		0.0000
Pesaran CD	3.455614		0.0005

Also, further diagnostic test which eliminates the consideration of an ordinary least squares (OLS) as a method of estimation in this study is introduced; the Breusch-Pagan Lagrange Multiplier test (see table 5) ascertains whether a random effect regression is

Copyright © International Association of African Researchers and Reviewers, 2006-2017:
www.afrrevjo.net.
Indexed African Journals Online: www.ajol.info

needed as opposed to a simple ordinary least squares. In this case, it is found that the random effects model is the most appropriate in all cases.

Discussion of Results

With exception of crude oil price, other macroeconomic variables used in this study showed no significant relationship with profitability. With respect to real GDP growth, the study did not show any significant relationship between output variability and its cyclical effects on banks' profitability. Based on findings in the literature, real GDP growth is expected to have a positive influence on bank profitability (Demirguc-Kunt & Huizinga, 1998). However, the finding from this study did not show such relationship but appears to be consistent with some other findings that posit that macroeconomic environment has limited effects on margins in Sub-Saharan African countries (Al-Haschimi, 2007).

The market power variable (DLHHI) is a measure of banking industry concentration in this study and is significant to estimating the changes in return on average assets as well as return on average equity. The relationship is negative which signifies that as bank concentration is increasing, profitability is decreasing. This result is consistent with findings in Osuagwu (2014) but contradicts the finding in Flamini et al. (2009) for the banking system in sub-Saharan Africa. Also, the finding in the study regarding the relationship between market concentration and profitability goes contrary to findings by Goddard et al., (2007). First, Goddard et al., op cit., posited that under the structure-conduct-performance (SCP) or market power hypothesis that a higher market power results in non-competitive pricing and yields higher monopoly profits. Second, under the efficient hypothesis, a more concentrated market creates more efficient and profitable banks (Goddard et al., 2007).

Total asset (DLTA) is another significant variable with a positive relationship to return on average asset and return on average equity as measures of profitability. This supports the argument that size has major influence of banks' profitability as espoused by Flamini et al., (2009).

The negative but significant relationship that existed between cost to income ratio (DLCIR) and profitability in this study shows the level of management's inefficiencies as espoused by (Osuagwu, 2014). The significance of this outcome becomes profound when it is juxtaposed with the fact that no significant relationship was established between inflation rate and bank profitability. It is established in the literature that inflation has a positive effect on banks' profitability (Flamini et al., 2009), the contrary findings in this study then suggests that Nigerian banks do not forecast future changes in inflation correctly and promptly enough to enable them adjust interest rates and margin to their benefit.

Copyright © International Association of African Researchers and Reviewers, 2006-2017:
www.afrrevjo.net.
Indexed African Journals Online: www.ajol.info

Recommendations

Banks' exposure to the oil and gas sector must be properly managed given the significant impact of crude oil price on banks' profitability. As a matter of policy, the central bank should use prudential guidelines to effectively manage the exposures of the banking industry to avoid concentration risks in volatile commodity prices.

Measures to better manage cost and improve management efficiency should be top priority for banks. This is even more pertinent during periods of low crude oil prices and weak economic growth. Therefore, managers of banks should commit significant resources to environmental scanning and macroeconomic researches even as they pursue balance sheet efficiency measures.

The findings from this study has shown that bank size matters, banks management should be encouraged to pursue policies that effectively enhance adequate capital position and liquidity provisions that will support further asset expansions.

From the findings of this study it is evident that the Nigerian banking industry is fairly competitive, banks management must therefore focus on strategies that will give them cost advantage as well as differentiate them from other competitors.

References

Abreu, M. & Mendes, V. (2002). Commercial bank interest margins and profitability: Evidence from E.U countries. *Porto Working paper series.*

Aburime, T. U. & Uche, C. U. (2008). Impact of share capitalization on bank profitability in Nigeria. *European Journal of Scientific Research*, 19 (3), 438-452. Available at http://www.eurojournals.com/ejsr.htm

Al-Hashimi, A. (2007). "Determinants of bank spreads in Sub-Saharan Africa," draft.

Allen, L. & Bali, T. G. (2004). Cyclicality in catastrophic and operational risk measurements. *Working Paper.*

Allen, W., Chan, K. K., Milne, A., & Thomas, S. (2010, September 30). Basel III: Is the cure worse than the disease. Retrieved from http://ssrn.com/abstract=1688594

Asogwa, R. C. (2004). Globalization of the banking sector: Costs, benefits and challenges for the Nigerian financial system. In *Globalisation and Africa's economic development. Selected Papers for the 2003 Annual Conference*, Nigerian Economic Society.

Athanasoglou, P. et al. (2005). Bank-specific, industry-specific and macroeconomic determinants of bank profitability. Bank of Greece, *Working Paper No 25*, June 2005.

Copyright © International Association of African Researchers and Reviewers, 2006-2017: www.afrrevjo.net.
Indexed African Journals Online: www.ajol.info

Athanasoglou, P. et al., (2006). Determinants of bank profitability in the south eastern European Region. Bank of Greece. *Working Paper No. 47*, September 2003.

Baltagi, B. (1995). Econometric analysis of panel data, Baffins Lane, Chichester.

Bikker J. A. & Bos, J. B. (2008). *Bank performance: A theoretical and empirical framework for the analysis of profitability, competition and efficiency*. New York: Routledge.

Bresnahan, T. F. (1982). The oligopoly solution concept is identified. *Economics Letters, 10*, 87–92.

Brissimis, S. N., Delis, M. D., &Papanikolaou, N. I. (2008). Exploring the Nexus between Banking Sector Reform and Performance: Evidence from Newly Acceded EU Countries. *Journal of Banking and Finance*, 32, 2674–2683. http://dx.doi.org/10.1016/j.jbankfin.2008.07.002

Chidozie U. E. (2016). Macroeconomic dynamics and banks' profitability in Nigeria. PGD Dissertation submitted to the Department of Economics in partial fulfilment of the requirements for the award of PGD in Economics, University of Lagos, Nigeria.

Chirwa, W. E., & Mlachila, M. (2004). Financial reforms and interest rate spreads in the commercial banking system in Malawi. *IMF Staff Papers, 51(1),* 96–122.

Demirgüç-Kunt, A. & Huizinga A. (1998). Determinants of commercial bank interest margins and profitability: Some international evidence. *World Bank Economic Review 13*, 379-408.

Flamini, V., Calvin, M., & Liliana, S. (2009). *The determinants of commercial bank profitability in sub-Saharan Africa*. International Monetary Fund.

Heid, F., Porath, D., & Stolz, S. (2004). Does capital regulation matter for bank behaviour? Evidence for German savings banks. Frankfurt am Main: Deutsche Bundesbank.

Ho, T. S. Y., & Saunders, A. (1981). The determinants of bank interest margins: Theory and empirical evidence. *Journal of Financial and Quantitative Analysis*, 16(04), 581–600. http://dx.doi.org/10.2307/2330377.

Lau, L. (1982). On identifying the degree of competitiveness from industry price and output data. *Economics Letters, 10*, 93–9.

López, F. (2005). Debt ownership structure and legal system: An international analysis. *Applied Economics, 37*, 355-65.

Copyright © International Association of African Researchers and Reviewers, 2006-2017: www.afrrevjo.net.
Indexed African Journals Online: www.ajol.info

Micco, A., Panizza, U., & Yañez, M. (2007). Bank ownership and performance. Does politics matter? *Journal of Banking and Finance, 31*, 219–241. http://dx.doi.org/10.1016/j.jbankfin.2006.02.007

Molyneux, P., & Thornton, J. (1992). Determinants of European banks profitability: A note. *Journal of Banking and Finance, 16*, 1176–1178. http://dx.doi.org/10.1016/0378-4266(92)90065-8

Nwokoma, N. I. (2006) Issues and challenges in banking sector consolidation and economic development in Nigeria. In Akano, S. O. & Familoni, K. O. (2006). *The national economic empowerment and development strategy: Philosophy, opportunities and challenges.* Lagos: University of Lagos Press.

OPEC (2015). *Monthly oil market report*. Vienna Australia. Available at http://www.opec.org. Retrieved 3 September 2015.

Osuagwu, E.S (2014). Determinants of bank profitability in Nigeria. *International Journal of Economics and Finance*: Vol. 6, No. 12; 2014, doi: 10.5539/ijef.v6n12p46.

Pasiouras, F. & Kosmidou, K. (2007). Factors influencing the profitability of domestic and foreign commercial banks in the European Union. *Research in International Business and Finance 21 (2).* 222-237.

Rime, B. (2001). Capital requirements and bank behaviour: Empirical evidence for Switzerland. *Journal of Banking & Finance, 25(4)*, 789-805.

Rumler, F. & Waschiczek, W. (2010). The impact of economic factors on bank profits. *Monetary Policy & the Economy Q4/10*. OeNB. 44- 67.

Saunders, A., & Allen, L. (2004). Incorporating systemic influences into risk measurements: A survey of the literature. *Journal of Financial Services Research, 26(2),* 161–191. http://dx.doi.org/10.1023/B:FINA.0000037545.38154.8a

Saunders, A., & Schumacher, L. (2000). The Determinants of bank interest rate margins: An international study. *Journal of International Money and Finance*, 19, 813–832. http://dx.doi.org/10.1016/S0261-5606 (00)00033-4

Copyright © International Association of African Researchers and Reviewers, 2006-2017: www.afrrevjo.net.
Indexed African Journals Online: www.ajol.info