Determinants of Bank Profitability:
Panel Evidence on Bank-Specific Variables in Nigeria.

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ABSTRACT: This study investigated the impact of bank-specific variables on bank profitability in the Nigerian banking industry. In investigating the impact, a regression is used. Using an unbalanced panel data set comprising 65 observations of 15 banks over the 2006-2010 period, the regression results confirm and differ from some previous findings. The results reveal that bank capital adequacy, bank credit portfolio size, and bank credit risk are significant determinants of bank profitability in Nigeria. It also reveals that bank size, customers’ deposit, and management efficiency (measured by operating expenses/total asset ratio) are insignificant determinants of bank profitability in Nigeria. These results imply that Nigerian banks should focus more on increasing their equity-total asset ratio and credit risk management due to its impact on profitability. Therefore, the research provided evidence that supports the Central Bank of Nigeria’s policy of bank recapitalisation and credit management aimed at ensuring profitability and liquidity in the Nigerian banking sector.

Keywords: Nigerian banks, bank-specific variables, profitability, determinants, panel data

1. Introduction
The major changes in the Nigerian banking system realized after 2005 bank consolidation include merger and acquisition, the invocation of margin loan rules, the use of the same calendar (financial period), the divestment in non-banking business, the segregated commercial banking (regional, national and international commercial banking) with their respective minimum capital requirement, and the control of non-performing loans.

The continual regulation of the banking sector is meant to strengthen the stability of the banking system as well as foster the development of the economy at large. The regulator(s) hardly highlight the loss or benefits (profits) that will accrue to the investors as a result of a change in the bank-specific variables (such as total asset, shareholders’ fund, loan loss provision among others) resulting from such regulations. Therefore, it is germane to investigate the loss or benefit - in term of profitability - that will accrue to the investors as a result of a change in the bank-specific variables resulting from the regulations.

The purpose of the study is to closely examine the relationship between profitability and the bank-specific variables using a panel model over the period 2006-2010. The paper is divided into four sections namely: introduction, research methods, results and discussions, and conclusion.

2. Literature Review
Considerable researches have been conducted in
recent years on whether bank-specific variables have effect on the banks’ profitability. The results of these studies varied with respect to the key determinant(s) of bank profitability.

Recently, Fadzlan (2011) investigated the profitability of the Korean banking sector over the period 1992-2003. The results indicate that bank size, bank deposit base, and the level of capitalisation are positively related to the profitability of Korean banks. The results were confirmed by Imad, Qais, & Thair (2011) by using a balanced panel data linear regression model for 10 Jordan banks to study the determinants of bank profitability. He concluded that the level of bank capital adequacy and the size of total loans have positive and significant impact on profitability (ROA). Furthermore, Sanni (2009) took a look at the 2006 consolidation of banks in Nigeria with a view to finding out the short term effect of increase in the minimum paid-up capital of banks on their profitability. After an examination of thirteen banks, Sanni had a mixed result for the selected banks.

In addition, Mathuva (2009) did a comprehensive study of licensed commercial banks in Kenya and concluded that bank profitability is positively related to the core capital ratio and the risk-based capital. Hassan and Bashir (2003) employed various internal and external banking characteristics to predict the performance and profitability of Islamic banks worldwide during 1994-2001. The result indicated that high capital lead to high profitability. To further buttress the relationship existing between capital and bank performance, Abreu and Mendes (2002) found that well capitalized banks face lower expected bankruptcy costs and thus lower funding costs and this resulted into better profitability of commercial banks for some European countries. In the same direction, Athanasoglou, Delis & Staikourasl (2006) examined the effect of bank specific and macroeconomic determinants of bank profitability. The coefficient of capital variable was positive and highly significant, reflecting the sound financial condition of Greek banks.

Generally, although there are theoretical differences as well as inconclusive proof on the direction of causality between bank-specific variables and banks’ profitability, nevertheless, majority of the empirical researches have shown a robust positive relationship between bank capital and banks profitability.

3. Research Methods

The study is conducted using an unbalanced panel (longitudinal) data extracted from annual reports of fifteen commercial banks over the period 2006-2010. The data is restricted to all the fifteen commercial banks that were quoted on the Nigerian Stock Exchange (NSE) as at June 2012. The three banks that were delisted from the NSE and nationalized in 2011 were eliminated from the sample in order to remove element of bias in the nexus between the observed variables.

3.1 Model Specification

In order to analyse the profitability in the Nigerian banking sector, this study employs the Fadzlan (2011) approach with some adjustment in the following form:

\[
ROA_{it} = \beta_0 + \beta_1 \log(TA_{it}) + \beta_2 CAR_{it} + \beta_3 LLP/TLA_{it} + \beta_4 OE/TA_{it} + \beta_5 CD/TA_{it} + \beta_6 TLA/TA_{it} + \epsilon_{it}
\]

Where:

- \(ROA_{it}\) represents the return on total assets for bank i in year t.
- \(\log(TA_{it})\) represents the natural logarithmic of total assets for bank i in year t.
CAR\(_{it}\) represents capital adequacy ratio of bank \(i\) in year \(t\).

LLP/TLA\(_{it}\) represents loan loss provision divided by net loans and advances of bank \(i\) in year \(t\).

0E/TA\(_{it}\) represents the ratio of operating expenses to total assets for bank \(i\) in year \(t\).

TLA/TA\(_{it}\) represents the ratio of total net loan and advances to total assets of bank \(i\) in year \(t\).

\(\varepsilon_{it}\): Error term

\(\beta_0\): Constant

\(\beta_1, \beta_2, \text{ and } \beta_3\): Coefficients

\(i\): banks

\(t\): Time (2006 – 2010).

3.2 Variable Definition

This section defines and justifies the variables included in the regression model. There are a total of seven variables: one dependent variable and six independent variables. The profitability indicator – ROA – serves as a dependent variable. The six performance determinants – LogTA, CAR, LLP/TLA, OE/TA, CD/TA and TLA/TA serve as explanatory variables. The variables are discussed below.

ROA: Following Fadzlan (2011), and Mathuva (2009), this dependent variable is used to measure bank profitability; it is expressed as a function of bank-specific variables.

LogTA: Following Fadzlan (2011), the LogTA is included in the regression as a proxy to account for the possible cost advantages associated with size (economies of scale). The mix findings of previous studies about the relationship between the size of the banks and their profitability leave the expectation door open to a positive or negative relation for these variables.

CAR: Following Fadzlan (2011), this variable is incorporated in the model to capture the possible effect of capital adequacy on profitability. In this case, a positive causation from capital adequacy to profit is expected as banks with high capital adequacy level need to borrow less in order to support a given level of assets, and tends to face lower cost of funding due to lower prospective bankruptcy costs.

LLP/TLA: Following Fadzlan (2011), this ratio is built-in to capture the effect of bank credit risk on profitability. This variable measures the percentage of the bank’s loan portfolio for which the bank has set aside capital to cover nonperforming loans. Since loan-loss provisions are a source of heavy financial losses to a bank and have actually been held responsible for the 2010-2011 bank distress in Nigeria, an inverse relationship is expected.

OE/TA: Following Fadzlan (2011), this ratio is incorporated in the model to establish the causal relationship between profitability and operating costs in the sector. A negative relationship is expected. However, Molyneux and Thornton (1992) found a direct relationship between bank expenses and profitability.

CD/TA: The effect of cheap fund source on profitability is captured by the customers’ deposits/total assets ratio following Uhomoibhi (2008). Being the major and perhaps the cheapest source of funding for banks, a positive relationship is expected. However, if loan demand is not enough, more deposits may depress earnings, since deposit is costly in terms of the required branching network.

TLA/TA: The effect of asset composition is captured by net total loans and advances to total assets following John et al (2005). Bank loans and advance are expected to be the main source of income and are expected to have a positive impact on bank performance. However, it could be the case
that banks that are rapidly increasing their loan books have to pay a higher cost for their funding requirements, and this could lead to a negative impact on profitability.

3.3 Model Estimation

The properties of the panel time series data are investigated by carrying out a correlation test on variables of the empirical model, before an Ordinary Least Square (OLS) is used to check the causal effect between the explained (ROA) and explanatory variables (LogTA, CAR, LLP/TLA, OE/TA, CD/TA, and TLA/TA).

4. Results and Discussion

4.1 Correlation Matrix

Generally in model specification, variables that are correlated (those with values exceeding 0.60) cannot be placed in the same model as they play basically the same role - multicollinearity problem. Therefore, the correlation matrix is extremely useful for getting a rough idea of the relationships between independent variables, and for a preliminary look for multicollinearity. In Table 1 below, the correlation matrix is reported for the variables that were included in the regression model.

Table 1. Correlations Matrix

<table>
<thead>
<tr>
<th></th>
<th>ROA</th>
<th>LOG(TA)</th>
<th>CAR</th>
<th>LLP/TLA</th>
<th>OETA</th>
<th>CDTA</th>
<th>TLA/TA</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>1.000000</td>
<td>-0.038438</td>
<td>0.432157</td>
<td>-0.408718</td>
<td>-0.168789</td>
<td>-0.293032</td>
<td>-0.106877</td>
</tr>
<tr>
<td>LOG(TA)</td>
<td>-0.038438</td>
<td>1.000000</td>
<td>0.009296</td>
<td>-0.366772</td>
<td>-0.288223</td>
<td>0.032550</td>
<td>0.133913</td>
</tr>
<tr>
<td>CAR</td>
<td>0.432157</td>
<td>0.009296</td>
<td>1.000000</td>
<td>-0.575467</td>
<td>-0.388942</td>
<td>-0.483699</td>
<td>0.412285</td>
</tr>
<tr>
<td>LLP/TLA</td>
<td>-0.408718</td>
<td>-0.366772</td>
<td>-0.575467</td>
<td>1.000000</td>
<td>0.482740</td>
<td>0.331545</td>
<td>-0.306775</td>
</tr>
<tr>
<td>OE/TA</td>
<td>-0.168789</td>
<td>-0.288223</td>
<td>-0.388942</td>
<td>0.482740</td>
<td>1.000000</td>
<td>0.407417</td>
<td>-0.009825</td>
</tr>
<tr>
<td>CD/TA</td>
<td>-0.293032</td>
<td>0.032550</td>
<td>-0.483699</td>
<td>0.331545</td>
<td>0.407417</td>
<td>1.000000</td>
<td>-0.062767</td>
</tr>
<tr>
<td>TLA/TA</td>
<td>-0.106877</td>
<td>0.133913</td>
<td>0.412285</td>
<td>-0.306775</td>
<td>-0.009825</td>
<td>-0.062767</td>
<td>1.000000</td>
</tr>
</tbody>
</table>

The correlation matrix shows that correlation between the independent variables is not strong, suggesting that multicollinearity problems are not severe or non-existent.

4.2 Panel Regression Results

The regression results, focusing on the relationship between bank profitability and the explanatory variables, are presented in Table 2 below.

Table 2. Panel Regression Results

<p>| | |</p>
<table>
<thead>
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<tbody>
<tr>
<td>Dependent Variable: ROA</td>
<td></td>
</tr>
<tr>
<td>Method: Panel Least Squares</td>
<td></td>
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<tr>
<td>Sample: 2006 2010</td>
<td></td>
</tr>
<tr>
<td>Cross-sections included: 15</td>
<td></td>
</tr>
<tr>
<td>Total panel (unbalanced) observations: 65</td>
<td></td>
</tr>
</tbody>
</table>
The R\(^2\) is a measure of how much of the variability in the outcome is accounted for by the predictors. For this study its value is 0.366319, which means that LogTA, CAR, LLP/TLA, OE/TA, CD/TA, and TLA/TA account for 36.63% of the variation in ROA. It also show that other factors aside from the above mentioned influence banking profitability in Nigeria. However, it is important for us to acknowledge that the focus of this study is to examine the influence of the bank-specific variables on bank profitability in Nigeria hence the restriction on the specific variables used in the model.

The Adjusted R\(^2\) gives us some idea of how well the model generalises, and ideally we would like its value to be the same or very close to the value of R\(^2\). In this study the difference between the values is 0.366319 - 0.300766 = 0.065553 (about 6.56%). This shrinkage means that if the model were derived from the population rather than a sample it would account for approximately 6.56% less variance in the outcome.

The “F-statistic” is used to test the hypothesis that none of the explanatory variables actually explain anything. The Prob(F-statistic) value given is just below the F-statistic which is the marginal significance level of the F-test. If the Prob(F-statistic) value is less than the significance level being tested say 0.05, we reject the null
hypothesis that all slope coefficients are equal to zero. For the Table 4.4 above, the Prob(F-statistic) value is less than 0.05.

The relationship between total assets (LogTA) and banks’ profitability (ROA) is negative in contrary to the results of Fadzlan (2011) and Faisal (2005). However, the coefficient is not statistically significant at 5% level which means that in Nigerian banking sector, size is not an important determinant of ROA at least for the period under study. Furthermore, in line with the findings of Udomiibhi (2008) and John R. et al (2005) this result does not indicate the presence of economies of scale.

The coefficient of CAR, the ratio of equity to total assets, is positive and highly significant at 5% level. The coefficient of CAR implies that 1% increase in CAR will lead to 0.20% increase in ROA. This interpretation is true only if the effects of LogTA, LLP/TLA, OE/TA, CD/TA, and TLA/TA are held constant.

The existence of a strong positive causal relationship between CAR and bank performance (ROA) confirms recent findings by Imad Z et al (2011), Mathuva (2009), John et al (2005), Ben Naceur (2003) and Berger (1995). This result implies that Nigerian banks should focus more on increasing their equity-total asset ratio.

The coefficient of LLP/TLA (credit risk) is negative and significant at 5% level which means that credit risk is important in determining returns on assets in the banking sector of Nigeria. This supports the findings of Imad Z et al (2011), and Fadzlan (2011).

With respect to OE/TA, the results showed insignificant direct relationship between operating expense and profitability. Furthermore, the coefficient of CD/TA is negative but insignificant which means that the proportion of customers’ deposit is not important in determining returns on assets in the Nigerian banking sector.

The relationship between credit portfolio (TLA/TA) and Nigerian banks’ profitability (ROA) is negative and significant at 5% level. The reasons for this could be the facts that as banks rapidly increase their loan books; they have to pay a higher cost for their funding requirements which could lead to a negative impact on profitability. This supports the findings of Udomiibhi (2008), and Vong (2005).

5. Conclusion

In light of the recent capital adequacy and non-performing loans challenges faced by some of Nigerian banks, studying and analyzing the impact of bank-specific variables on bank performance become very important. In view of this, the study has sought to examine how bank-specific determinants (total assets, capital adequacy, credit risk, operating expenses, customers’ deposit, and net loans and advances) affect the profitability (ROA) of Nigerian banks over 2006-2010.

To comply with the objective of this research, the paper is primarily based on quantitative research method, which obtained data from banks’ annual reports to construct an econometric model to identify and measure the determinants of banks profitability. In specific, multiple regression analysis is adopted to measure the effect of the internal determinants on banks profitability.

For testing the research hypothesis, all the 15 Nigerian banks that were quoted on the Nigerian Stock Exchange (NSE) as at June 2012 were used to generate an unbalanced panel data for the period time 2006 to 2010. There are several significant points that emerged from the analysis.

Firstly, the results of this study has revealed that
bank size which is defined as the logarithm of total assets is insignificant and negatively related to returns on assets in the banking sector of Nigeria. This insignificant negative relationship suggests that size does not necessarily connote efficiency in the Nigerian banking sector. However, what is important to note is that as bank size increases bank profitability (ROA) reduces in Nigeria and vice versa.

With regards to capital adequacy (CAR), the regression result indicates a significantly positive association. This suggests that capital adequacy is very important in determining banks’ profit in Nigeria. In addition, the variable LLP/TA captures the effect of bank credit risk on profitability. The coefficient of LLP/TLA is negative and significant. This implies that the banks should focus more on credit risk management due to its negative impact on profitability.

The OE/TA and CD/TA were found to be insignificant in determining bank profitability in Nigeria at 1%, 5%, and 10% levels. This means that the variables do not necessarily translate into enhancing returns on asset in the banking industry in Nigeria. Furthermore, TLA/TA was found to be very important in determining banks’ profit in Nigeria, and as the credit portfolio increases, ROA decreases.

The R^2 0.366319 revealed that other factors rather than the bank-specific variables (in this study) influence bank profitability in Nigeria. The other possible factors include: management quality, industry specific and macroeconomic indicators. Notwithstanding, the study suggests a direction for further research. While this paper covers bank-specific variables and their impact on Nigerian banks, the result is limited to the sample period. A study covering an extended time period would be most useful, especially if the macroeconomic variables are employed in addition to the bank-specific variables.

**References**


