

*Full Length Research Paper*

# **An empirical assessment of the determinants of bank profitability in Nigeria: Bank characteristics panel evidence**

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Accepted 28 November, 2012

**Given the recent developments in the Nigerian banking industry, only a profitable banking sector is better able to withstand negative shocks and contribute to the stability of the financial system. This assertion compels an in depth investigation of the determinants of the profitability of deposit money banks in Nigeria. Our data set is made up of 147 bank level observations over a 10-year period from 2001 to 2010 in respect of 15 banks that satisfied the study requirements. Data were obtained from the annual reports and accounts of the sampled banks. Pooled OLS (Pooled ordinary least square) stated in a multiple regression form was used to estimate the coefficients. Major outcomes of the analysis include that increase in size (higher total assets) may not necessarily lead to higher profits due to diseconomies of scale; higher capital-assets ratio and loans and advances contribute strongly to bank profitability. Overall, the paper suggests bank size, capital and asset composition as the major endogenous determinants of bank profitability in Nigeria.**

**Key words:** Profitability, bank size, asset composition, liquidity, capital adequacy.

## **INTRODUCTION**

A profitable banking sector is better able to withstand negative shocks and contribute to the stability of the financial system. The profitability of a financial institution is affected by numerous factors. These factors include elements internal to each financial institution and several important external forces shaping earnings performance. In Nigeria, years 2004 and 2005 witnessed a forced consolidation exercise with a regulatory option of mergers and acquisitions. This exercise brought about a landmark change in the number of Nigerian banks as the banking system shrank to only twenty five banks from a whopping eighty nine banks before the consolidation exercise. It is therefore important to understand the determinants of banking sector profitability in Nigeria. This is essentially important in the light of the above notable changes that have occurred in the operating environment of banks in

In banking, the determinants of profitability are well observed and explored as it is increasingly important to strengthen the foundations of domestic financial system as a way to buildup flexibility for capital flow volatility. In the past, researchers investigated the determinants of profitability in the banking sector. A good number of researchers considered only the banking characteristics, whereas others included the financial structure and macroeconomic factors as well. In all these studies, contributions had been made in determining the factors that shape the profitability of banks. More recent studies distinguish between managerial (internal) and environmental (external) factors that affect bank profitability. Literature has argued that financial market structure and entry barriers constitute the main external force driving bank profits. Financial market structure (represented by regulatory conditions or concentration) is one of the external influences that affect bank profitability; others include trade interdependence, economic growth, inflation, market interest rates and ownership structure. The

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internal factors according to past studies include capital ratio, credit risk, productivity growth and size of the bank (Smirlock, 1985; Bourke, 1989; Molyneux and Thornton, 1992; Stienherr and Huvencers, 1994).

A number of other studies have examined bank profitability in an effort to isolate the factors that account for differences in bank profitability. Studies have linked bank earnings and various aspects of bank operating performance to profitability. A second set of studies focused on the relationship between bank earnings performance and balance sheet structure and profitability. A third body of literature examined the impact of regulatory and macroeconomic factors on overall bank profitability. The main conclusion emerging from past studies is that internal factors explain a large proportion of banks profitability; nevertheless external factors have also had an impact on bank profitability. Overall, operational efficiency is the major factor in determining performance across banks. Among the internal factors are the management controllable factors which are the bank specific financial ratios representing cost efficiency, liquidity, asset quality, and capital adequacy. The objective of this paper accordingly is to determine the management controllable factors that determine bank's profitability in the context of the Nigerian banking industry using industrial data set from 2000 to 2010.

This paper contributes to literature in a unique way. Our dataset, made up of 147 bank level observations consist of 71.43% of banks operating in Nigeria. This enhances the generalization of our result to all the banks operating in Nigeria before and after the major changes in the Nigerian banking environment. The rest of the paper is divided as follows. Highlights on the review of related literature are presented. Second, Methodological issues are discussed, presentation of the data and results are then analysed. Finally, conclusions.

## LITERATURE REVIEW

In principle a bank's capacity to absorb unforeseen losses determines its level of risk (Goddard et al., 2004). Several ratios are commonly used to proxy for risk, including the CAR and the liquidity ratio. In theory an excessively high CAR could signify that a bank is operating over-cautiously and ignoring potentially profitable investment opportunities. A bank holding a relatively high proportion of liquid assets is unlikely to earn high profits, but is also less exposed to risk; therefore shareholders should be willing to accept a lower return on equity (Goddard et al., 2004). An overview of previous studies indicates various ways that profitability was examined. Some studies were country specific and few of them considered panel of countries reviewing the determinants of profitability. Such empirical studies on bank profitability literature that focused mainly on specific countries include those of the US (Berger, 1995) Greece

(Kosmidou, 2006); Australia (Pasiouras et al., 2005), Malaysia (Guru et al., 1999); Colombia (Barajas et al., 1999); and Tunisia (Naceur, 2003). Molyneux and Thornton (1992) were the first to investigate a multi-country setting by examining the determinants of bank profitability for a panel of European countries. This is followed by the study of Abreu and Mendes (2000), Staikouras and Wood (2003), and Pasiouras et al. (2005). Other multi-country studies include those of Hassan and Bashir (2003), who examined profitability for a sample of Islamic banks from 21 countries; and Demircuc-Kunt and Huizinga (1999) who considered a comprehensive set of bank specific characteristics, as well as macroeconomic conditions, taxation, regulations, financial structure and legal indicators to examine the determinants of bank net interest margins in over 80 countries. The main conclusion emerging from these studies is that internal factors explain a large proportion of banks profitability; nevertheless external factors have also had an impact on their performance.

The profitability of European banks during the 1990s was investigated by Goddard et al. (2004) using cross-sectional, pooled cross-sectional time-series and dynamic panel models. Their model for the determinant of profitability incorporates size, diversification, risk and ownership type, as well as dynamic effects. They found that despite intensifying competition there is significant persistence of abnormal profit from year to year. The evidence for any consistent or systematic size-profitability relationship is relatively weak. The relationship between the importance of off-balance-sheet business in a bank's portfolio and profitability is positive for the UK, but either neutral or negative elsewhere. The relationship between the capital-assets ratio and profitability is positive.

Javaid et al. (2011) analyzed the determinants of top 10 banks' profitability in Pakistan over the period 2004 to 2008. They focused on the internal factors only. Javaid et al. (2011) used the pooled ordinary least square (POLS) method to investigate the impact of assets, loans, equity, and deposits on one of the major profitability indicator of banks which is return on asset (ROA). The empirical results found strong evidence that these variables have a strong influence on profitability. However, the results show that higher total assets may not necessarily lead to higher profits due to diseconomies of scales. Also, higher loans contribute towards profitability but their impact is not significant. Equity and deposits have significant impact on profitability.

Imad et al. (2011) studied a balanced panel dataset of Jordanian banks for the purpose of investigating the nature of the relationship between the profitability of banks and the characteristics of internal and external factors for 10 banks over the period 2001 to 2010. Using two measures of bank's profitability: the rate of return on assets (ROA) and the rate of return on equity (ROE), the results show that the Jordanian bank's characteristics

explain a significant part of the variation in bank profitability. High Jordanian bank profitability tends to be associated with well-capitalized banks, high lending activities, low credit risk, and the efficiency of cost management. Results also show that the estimated effect of size did not support the significant scale economies for Jordanian banks. Due to the fact that some of the differential slope coefficients are statistically significant, they conclude that the estimation results indicate that individual effects on the profitability are present.

Scott and Arias (2011) developed an appropriate econometric model whereby the primary determinants of profitability of the top five bank holding companies in the United States could be examined and understood. The econometric model was based on internal aspects of the banking organizations as they relate to their return on assets and external aspects of the environment in which they compete as measured by growth in GDP was developed based on guidance provided by economists and industry experts to determine the impact of the external national economy of these five leading banks according to their size as measured by total assets. The results show that profitability determinants for the banking industry include positive relationship between the return on equity and capital to asset ratio as well as the annual percentage changes in the external per capita income.

In another dimension, Gull et al. (2011) examined the relationship between bank-specific and macro-economic characteristics over bank profitability by using data of top fifteen Pakistani commercial banks over the period 2005 to 2009. The paper used the pooled ordinary least square (POLS) method to investigate the impact of assets, loans, equity, deposits, economic growth, inflation and market capitalization on major profitability indicators that is, return on asset (ROA), return on equity (ROE), return on capital employed (ROCE) and net interest margin (NIM) separately. The empirical results showed strong evidence that both internal and external factors have a strong influence on the profitability.

Seven years earlier, Goddard et al. (2004) had investigated the profitability of European banks during the 1990s using cross-sectional, pooled cross-sectional time-series and dynamic panel models. Models for the determinants of profitability incorporate size, diversification, risk and ownership type, as well as dynamic effects. They found that despite intensifying competition there was significant persistence of abnormal profit from year to year. Their results suggest that evidence for any consistent or systematic size-profitability relationship is relatively weak; the relationship between the importance of off-balance-sheet business in a bank's portfolio and profitability is positive for the UK, but either neutral or negative elsewhere. Furthermore the relationship between the capital-assets ratio and profitability was positive.

In a study on the determinants of the Tunisian banking industry profitability for 10 banks in Tunisia for the period 1980 to 2000, Naceur (2003) observed that high net interest margin and profitability are likely to be associated

with banks with high amount of capital and large overheads. Further the paper also noted that other determinants such as loans has positive and bank size has negative impact on profitability.

Naceur and Goaid (2001) investigated the impact of banks' characteristics, financial structure and macro-economic indicators on banks' net interest margins and profitability in the Tunisian banking industry from 1980 to 2000. Individual bank characteristics explain a substantial part of the within-country variation in bank interest margins and net profitability. High net interest margin and profitability tend to be associated with banks that hold a relatively high amount of capital, and with large overheads. Size is found to impact negatively on profitability which implies that Tunisian banks are operating above their optimum level.

## METHODOLOGICAL FRAMEWORKS

The large body of empirical literature, as earlier highlighted, propose that the determinants of bank profitability can be divided into two groups; internal and external factors. This study is limited to the internal drivers of bank profitability. Return on asset (ROA) was used as the major metric for measuring profitability while the endogenous drivers of bank profitability were used as the independent variables. Our sample consists of 15 deposit money banks, selected through a non-probabilistic sampling method (purposive sampling). The deposit money banks selected include stand-alone banks and banks that retained their brand names after the 2005 concluded bank consolidation exercise that have complete dataset for the period under review. The data set covers a 10-years period from 2001 to 2010 for fifteen Nigerian deposit money banks yielding 147 observations. Data concerning total asset, net profit, total loans and advances, total equity were obtained from the sampled banks annual reports of various years. The basic estimation strategy involved pooling the observations across the banking industry and estimating the determinants of bank profitability by means of regression analysis. The symbolic form of the model followed the earlier studies of Gull et al. (2011) and Javaid et al. (2011) and is as stated as follows:

$$Y_t = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + u_t$$

Where;

$Y_t$  = ROA represents (return on asset); ROE (return on equity); NIM (net interest margin) for bank  $i$  at time  $t$ .

$X_{1t}$  = Log (TA) represents natural logarithm of total asset for bank  $i$  at time  $t$ .

$X_{2t}$  = TE/TA represents ratio of total equity to total asset for bank  $i$  at time  $t$ .

$X_{3t}$  = TL/TA represents ratio of total loans to total asset for bank  $i$  at time  $t$ .

$u_t$  = Error term.

The advantage of pooling is that more reliable estimates of the parameters in the model can be obtained. It is a valid procedure where the relationship between the variables is stable across cross-section units and is as applied by Javaid et al. (2011) and Gull et al. (2011). Our data set gives evidence that Nigerian banks show similar response to cyclical movements. Therefore, we believed that the relationship between profitability and independent variables are stable across banks in 147 observations and that is why we applied POLS estimation method.

**Table 1.** Descriptive statistics.

	Mean	Std. deviation	N
ROA	.2299	1.87547	147
NLTA	7.4883	1.14236	147
TETA	3.5648	29.89715	147
TLATA	6.5539	53.65346	147

Source: Authors' SPSS output.

Endogenous drivers of bank profitability as detailed as follows were factored into the model.

#### Total assets (TA)

Total assets determine the size of a bank. Size is used to capture the fact that larger banks are better placed than smaller banks in harnessing economies of scale in transactions to the plain effect that they will tend to enjoy a higher level of profit. In most of the finance literature, the total assets of the banks are used as a proxy for bank size. Consequently, a positive relationship is expected between size and profits. Molyneux and Thornton (1992), Bikker and Hu (2002) and Goddard et al. (2004) find size to be positively related to profitability. The size of the bank is included as an independent variable in this study to account for size related economies and/or diseconomies of scale. However, since the dependent variable in the model (ROA) was deflated by total assets it would be appropriate to take the natural logarithm total assets before including it in the model to reduce the scale effect of numbers and be consistent with other ratios.

#### Total equity (TE) to total assets (TA)

Capital – assets ratio is taken as the ratio of equity capital to total assets. It's interesting to note that higher capital level breeds higher profitability level since by having more capital, a bank can easily adhere to regulatory capital standards so that excess capital can be provided as loans (Berger, 1995). The capital ratio (TE/TA), which is measured by total equity over total asset, reveals capital adequacy and should capture the general safety and soundness of the financial institution (Gull, 2011). It indicates the ability of a bank to absorb losses and handle risk exposure for shareholders. Previous studies have found a positive relationship between TE/TA and profitability (Hassan and Bashir, 2004). TE/TA is expected to have a positive relation with performance because well capitalized banks are less risky and more profitable (Bourke, 1989). TE/TA is included as an independent variable to examine banking profitability.

#### Total loans and advances (TL&A) to total assets (TA)

Asset composition of loans and advances are the main source of income and are expected to have a positive impact on bank performance. Other things constant, the more deposits are transformed into loans, the higher the interest margin and profits. However, if a bank needs to increase risk to have a higher loan-to-asset ratio, then profits may decrease. In addition, as bank loans and advances are the principal source of income, we expect that non-interest bearing assets impact negatively on profits (Gul et al., 2011). Asset composition (TL&A/TA), which is explained by total loans divided by total asset, provides a measure of income source and measures the liquidity of bank assets tied to loans (Javaid et

al., 2011: 3798). TL/TA is included in the study of profitability as an independent variable to determine the impact of loans on banks' profitability.

Profitability is primarily measured by return on assets. The details of these metrics follow in the succeeding section. The ROA is a functional indicator of bank's profitability. It is a ratio calculated by dividing net income by total assets. ROA shows the profit earned per dollar of assets which reflects bank's management ability to utilize the bank's financial and real investment resources to generate profits (Naceur, 2003).

## DATA AND RESULTS

The banks in the Nigerian banking industry include banks with very different sizes and business mixes as evidenced by the descriptive statistics shown in Table 1.

Table 1 shows the descriptive statistics for the variables. ROA (profitability), size (natural log of total asset), asset composition (ratio of total loans and advances to total asset) and capital adequacy (ratio of total equity to total asset) have a positive mean value which ranges from 0.2299 for profitability to 7.4883 in size. The banks in the Nigerian banking industry include banks with varying sizes and business mixes. Capital adequacy and asset composition has the highest standard deviation of 29.89 and 53.65 respectively. This indicates that the observations in the data set are widely dispersed from the mean. It means that all the banks in the industry are consistent with increase in total equity as a result of the 2005 forced consolidation by the regulatory authority in Nigeria. This also implies that the consolidation exercise provided the banks with a lot of loanable funds which resulted in increased loans and advances. Thus there is greater variation in the data set of capital adequacy and loans and advances because of the size differences of deposit money banks operating in the Nigerian banking industry. Relationships among the study variables were tested using Pearson correlation and the outcomes are presented in Table 2.

Model specification involves the determination of the dependent and explanatory variables which were included in the model and the expectations about the sign and the size of the parameters of the function (Koutsoyiannis, 2003; Onwumere, 2008).

The correlation matrix presented in Table 2 shows that size has a weak negative relationship with profitability (ROA) at -14.7%. This means that bigger banks have lower ROA. Capital adequacy and asset composition have a positive relationship with profitability. The strength of their relationship is indeed strong at 88.7 and 92.8% for capital adequacy and asset composition respectively. Although size has a negative relationship with profitability, the one tailed significance level 5% shows that all the independent variables are statistically significant. This result is strengthened as  $P^*$  of  $0.05 > .038, .000$  and  $.000$  for size capital adequacy and asset mix.

The size (nLog of total asset) has a significant negative relationship with profitability. This significant negative

**Table 2.** Correlations.

		ROA	NLTA	TETA	TLTA
Pearson correlation	ROA	1.000			
	nLogTA	-.147*	1.000		
	TETA	.887*	-.165	1.000	
	TLTA	.928*	-.164	.995	1.000
Significant (1-tailed)	ROA		.038	.000	.000
	NLTA	.038	.	.023	.024
	TETA	.000	.023	.	.000
	TLTA	.000	.024	.000	.

Source: Authors' SPSS output. \* are significant at 5%.

**Table 3.** Regression coefficient.

Model	Unstandardized coefficient		Standardized coefficient	T	Sig.	
	B	Std. error	Beta			
1	Constant	-.006	.051		-.124	.901
	nLogTA	.001	.007	.001	.146	.884
	TE/TA	-.234	.003	-3.735	-92.089	.000
	TL/TA	.162	.001	4.645	114.533	.000

$R^2 = .999$ ; Adj.  $R^2 = .998$ ; Durbin Watson = 1.8; Sig. F-change = .000  
Source: Authors' SPSS output.

relationship shows that the size of a bank could significantly affect the profitability of the bank negatively. This is in consonance with the findings of Berger et al. (1987), Boyd and Runkle (1993), Bourke (1989), Naceur (2003) and Javaid et al. (2011).

Asset composition (ratio of total loans and advances to total asset) shows a positive and significant relationship with profitability. This suggests that with increase in inflation in the economy, the banks interest rate on all kinds of advances would increase and in this way the bank's interest earnings would show significant increase. Assuming other variables remains constant, the higher the rate of transforming deposits into loans, the higher the profitability of the bank. Thus a positive relationship between the loans and advances of a bank with profitability is as expected and is as documented by Imad et al. (2011). This result is consistent with the study of Athanasoglou et al. (2006). Also, Abreu and Mendes (2000) found a significant and positive relationship between asset composition and profitability.

Capital adequacy (ratio of total equity total asset) shows a positive correlation with profitability (ROA). In the presence of asymmetric information and bankruptcy costs, the way the assets are funded could affect the banks value. A well-capitalized bank may send a good signal to the market regarding its performance (Imad et al., 2011). Our result is in consonance with the findings of (Goddard et al., 2004) that investigated profitability of European banks profitability.

The relatively high coefficient of multiple determination suggest that with a conservative coefficient of multiple determination of  $R^2 = 0.998$  (Table 3), the model summary shows that 99.8% of the variations in the profitability of Nigerian banks are explained by the banks internal factors in our model. These internal factors are the management controllable factors, the bank specific financial ratios representing size, asset composition and quality, and capital adequacy.

The regression result presented in Table 3 reveals that not only do capital adequacy and asset composition have strong positive relationships with bank profitability, they also impacts significantly on bank profitability. Given that the t-Statistics of 92.089 and 114.533 >  $t^* 2$ , we confirm a statistical significant impact of capital adequacy and asset composition captured as ratios of total equity and total loans and advances to total asset. This confirmation is strengthened with the perfect significance value of  $0.000 < 0.05$  significance value. Our result is in line with the findings of Javaid et al. (2011), Imad et al. (2011), Gull et al. (2011), Goddard et al. (2004) and Naceur (2003) whose empirical results found strong evidence that loans and equity are positively related and have strong influences on profitability.

## Conclusion

Our econometric analysis revealed major outcomes in

bank profitability in Nigeria. The major outcome of this study is that higher total assets may not necessarily lead to higher profits. The negative coefficient of size indicates that this relation might be negative due to diseconomies of scale suffered by banks due to uncontrollable increased size. Higher loans and advances contribute towards profitability. This reveals that more dependence on one major asset, may lead to profitability but with less significant impact on overall profitability. Overall we conclude that asset composition and capital adequacy are the major endogenous factors under the control of management that determines the profitability of banks in Nigeria.

Banks in Nigeria should endeavor to manage adequately the liquidity and profitability trade-off while diversifying their asset in a way to remain profitable and sustainable. However, further research is needed to clear the grey areas especially over a longer period of time. In addition variables such as cost efficiency, credit risk, and exogenous factors such as inflation, GDP and market concentration could also be incorporated to ascertain the determinants of bank profitability in Nigeria.

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