

## DETERMINANTS OF BANKS' PROFITABILITY IN A DEVELOPING ECONOMY: EVIDENCE FROM NIGERIAN BANKING INDUSTRY

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### Abstract

The banking sector in Nigeria has in the past decade has undergone numerous structural changes which has affected the banking industry in particular and the economy as whole. This is not unconnected with the Global Financial meltdown which started in the United States then later spreading down to the rest of the world. These myriad of problems lead to dwindling profits of commercial banks and in turn crippled the credit sector thereby making it difficult for the real sector of the Nigerian economy to access bank credits for the promotion of business activities. It is in light of these problems that this study applying the econometric analysis of Cointegration and Error Correction Technique sought to find out what factors really determined profitability in the banking sector of the Nigerian economy using First Bank of Nigeria Plc as a case study. Results from the study revealed that contrary to views of some authors, Bank Size (Natural Logarithm of Total Asset and Number of Branches) and Cost Efficiency did not significantly determine bank profitability in Nigeria. However, Credit Risk (Loan Loss Provision-Total Assets) and Capital Adequacy (Equity-Total Assets) was found to be significant drivers which affected bank profitability both in the long run and short run respectively. Also, while Liquidity affected bank profitability in the short run, Labour efficiency (Human Capital ROI and Staff Salaries-Total Assets) only affected bank profitability in the long run. But as for the external or

macroeconomic variables which determined bank profitability, only Broad Money Supply growth rate was found to be a significant driver both in the long run and in the short run.

**Key words:** *Determinants, Profitability, Performance, Banking Sector, Nigeria*

### **Introduction**

The study of profits is important not only because of the information it provides about the health of the economy in any given year, but also because profits are a key determinant of growth and employment in the medium-term. Changes in profitability are an important contributor to economic progress via the influence profits have on the investment and savings decisions of companies. This is because a rise in profits improves the cash flow position of companies and offers greater flexibility in the source of finance for corporate investment (i.e. through retained earnings). Easier access to finance facilitates greater investment which boosts productivity, productive capacity, competitiveness and employment.

The existence, growth and survival of a business organization mostly depend upon the profit which an organization is able to earn. It is true that when Profitability increases the value of shareholders may increase to considerable extent. The term profitability refers to the ability of the business organization to maintain its profit year after year. The profitability of the organization will definitely contribute to the economic development of the nation by way of providing additional employment and tax revenue to government exchequer. Moreover, it will contribute the income of the investors by having a higher dividend and thereby improve the standard of living of the people.

In order for a business entity (whether public or privately owned) to continue to prosper, there is need for its earnings to be relatively stable for its expansion and growth over time. In addition to its level of earnings, its external environment must also be carefully understood and reliably anticipated. The business organization must ensure that right technology is pursued so as to achieve organizational objectives, Burns and Mitchell, (1946) and Aremu, Mejabi, and Gbadeyan, (2011).

Earnings and business environments are so serious issues that a business must study and understand in order to face its opportunities and threats with vigor and determination. Where for instance, the business does not recognize the effects of changes in external environment which

may necessitate changes in business earnings, it may suffer some losses consequently. This perhaps explains why there has been continuing search by modern businesses in Nigeria to improve their methods of production necessary to cut down costs, and to develop new attributes or products, which may have wider appeal and satisfaction to their customers. On the other hand, the environmental and cyclical conditions are usually volatile and Dynamic (Sabo, (2003), Aremu (2006) and Aremu (2012)).

This underscores the need for business firms to be able to reliably conduct forecast not only for their future demands or sales for their goods and services but also other variables that affect them directly such as their personnel and future profits. The volatility of the changes in the variables from the external environment in specific ways to the immediate factory level and to the remote industry and task environments can sometimes be very significant. These calls for managers' ability to appreciate and apply formal forecasting techniques to assist their banks achieve this veritable task.

The determinants of profitability are empirically well explored although the definition of profitability varies among studies. Disregarding the profitability measures, most of the banking studies have noticed that the capital ratio, loan-loss provisions and expense control are important drivers of high profitability. In this study, the drivers that would be considered are in two categories namely endogenous (internal) and exogenous (external) drivers or factors of Profitability.

Internal drivers of bank performance or profitability can be defined as factors that are influenced by a bank's management decisions. Such management effects will definitely affect the operating results of banks. Although a quality management leads to a good bank performance, it is difficult, if not impossible, to assess management quality directly. In fact, it is implicitly assumed that such a quality will be reflected in the operating performance. As such, it is not uncommon to examine a bank's performance in terms of those financial variables found in financial statements, such as the balance sheet and income statement (Krasah and Ameyaw, 2010).

External determinants of bank profitability are factors that are beyond the control of a bank's management. They represent events outside the influence of the bank. However, the management can anticipate changes in the external environment and try to position the institution to take

advantage of anticipated developments. The two major components of the external determinants are macroeconomic factors and financial structure factors (Krasah and Ameyaw, 2010).

In summary, it appears previous empirical research has suggested a possible connection between bank profitability and various internal and external determinants like Bank Assets, Loan-Loss Provisions, Total Deposit and Inflation, but is far from definitive as different authors have made use of the inclusion and exclusion of different variables in their studies. Hence, our study will try to shed more light on this controversial issue by reviewing more empirical literatures on opposing sides of the topic and finally drawing conclusions from our findings from the mode of data analysis we intend to carry out.

### **Objectives of the study**

The main objective of this study is to provide a framework to investigate the factors or indicators intrinsic in the bank's asset structure that had impacted on their profitability, and performance for that matter, and make policy recommendation that could be used by bank managers in their policy decisions in the future. Other specific objectives the study seeks are:

- i. To examine the profitability of First Bank Nigeria Plc during the last three decades,
- ii. To examine the key endogenous or company-level value drivers of performance or profitability of Nigerian banks Nigeria using First Bank of Nigeria Plc,
- iii. To examine the key exogenous or macroeconomic value drivers of performance or profitability of Nigerian banks Nigeria using FBN Plc,
- iv. To find out if any long-run or short-run relationship exists between Profitability variables and its determinants using FBN Plc, and
- v. Make policy recommendations regarding the key drivers of profitability at First Bank of Nigeria as well as other commercial banks in the country based on the empirical findings.

### **Literature Review and Theoretical Framework**

Profit, in effect, is a simple residual concept but its level is determined by the complex interaction of a multitude of factors (Nugent, 1998). If we begin at the level of the firm, the typical firm's profit (denoted by  $\Pi$ ) in a simple competitive market model is defined by:

$$\Pi = TR - \omega \cdot N - \rho \cdot K$$

where TR is the total revenue (or total sales) of the firm. The firm's costs are represented by the wage bill (the wage rate,  $\omega$ , times the workforce, N, of the firm) and the cost of capital (the rental cost of capital,  $\rho$ , multiplied by the capital stock of the firm, K). According to Sargent (1987) the 'rental' or 'user' cost of capital is equal to the interest rate on government bonds plus the depreciation rate minus the expected rate of increase in the price of new capital goods. We know from corporate finance theory that in order for investment in fixed capital to be profitable, the rate of return should at least be equal to the cost of borrowing funds to finance that investment plus a charge for depreciation. In other words, if the initial cost of the investment undertaking is greater than the present value of expected future returns on the investment (i.e. the net present value is negative), then the firm should not proceed with the investment. If the net present value of available investment projects is positive, then in a world without capital rationing, the firm should continue to invest in projects until, at the margin, the firm is indifferent between the investment and the purchase of a government bond. Ultimately, the rate of accumulation of new capital (i.e. the level of net investment) depends on the gap between the rate of return on capital and the cost of capital (Nugent, 1998).

### ***General Theories of Influences on Banks' Profitability***

This section presents other theoretical explanations for relationships between regulation, ownership structure, balance sheet structure and profitability. Nevertheless, it should be mentioned that this study focuses on a broader model combining macroeconomic and bank-specific determinants of banks' profitability.

Besides other objectives, the aim objective of regulation and supervision in the banking is to overcome the moral hazard problem in the banking sector. Without any regulation, politicians assume that value-maximizing banks take on more risks than which is optimal and acceptable for depositors. Whilst risk taking is beneficial for average individual banks, one bank failure is highly undesirable for depositors and may spill over to the entire banking sector. Regulation that requires minimum capital ratios would likely negatively influence profitability as regulation constrains value-maximizing banks in risk taking and in reaching an optimal capital structure. Furthermore, according to Saunders and Cornett (2008) the net regulatory burden could also

negatively influence bank performance. The net regulatory burden equals the cost minus the benefits of regulation. Costs of regulation are e.g. compliance costs, referring to the costs of preparing reports and statements to regulators, or costs of being restricted from an optimal portfolio or capital structure.

The main theoretical explanation for the relationship between the ownership structure and profitability is based on the agency theory, first formalized by Jensen and Meckling (1976). Their research explains why managers of entities with different capital structures, choose different activities. In a relationship between owners and managers, a principal-agent relationship, both differs in needs and preferences. In this context, an obvious theoretical argument for the relationship between the ownership structure and profitability arise, capital market discipline could strengthen owner's control over management, giving banks' management more incentives to be efficient and profitable. Following Jensen and Meckling (1976) their results has implications for banks' profitability as results suggest that the ownership structure and corporate governance structure influence performance. Banks with more stringent and value based owners will likely have better profitability than mutual, co-operative or state-owned banks.

Finally, the balance sheet structure could also influence banks' profitability; in this context, the equity-to-asset ratio is an important balance sheet ratio that received much attention. For this ratio, theoretical explanations assume different signs of the relationship with profitability. According to the *Modigliani-Miller theorem* there exists no relationship between the capital structure (debt or equity financing) and the market value of a bank (Modigliani and Miller, 1958). In this context, there do not exist a relationship between the equity-to-asset ratio and funding costs or profitability. Nevertheless, as this chapter already mentioned the agency problem, information asymmetry and transaction costs distort Money Market's perfect market. Thus, when the perfect market does not hold there could be a possible explanations for a negative relationship capital structure and profitability. *Financing theory* suggest that increasing risks, by increasing leverage and thus lowering the equity-to-asset ratio (increasing leverage), leads to a higher expected return as entities will only take on more risks when expected returns

will increase; otherwise, increasing risks have no benefits. This theoretical explanation is known as the risk-return trade off.

There are also theoretical explanations for the opposite relationship that a higher equity-to-asset ratio has a positive effect on profitability. These explanations are based on the signaling and bankruptcy cost hypothesis. The first hypothesis states that a higher equity ratio is a positive signal to the market of the value of a bank (Heid, Porath and Stolz, 2004). Less profitable banks cannot achieve such a signal since this will further deteriorate their earnings. In this way a lower leverage, indicates that banks perform better than their competitors who cannot raise their equity without further deteriorating the profitability. The latter hypothesis suggests that in a case where bankruptcy cost are unexpectedly high, a bank hold more equity to avoid period of distress (Berger, 1995).

### **Conceptual Framework of Profitability**

Profitability connotes a situation where the income generated during a given period exceeds the expenses incurred over the same length of time for the sole purpose of generating income (Banwo, 1997; Sanni, 2006). The fundamental requirements here are that the income and the expenses must occur during the same period of time ('Matching Concept') and the income must be a direct consequence of the expenses. The period of time may be one week, three months, one year etc (Sabo, 2007). It is immaterial whether or not the income has been received in cash nor is it compulsory that the expenses must have been paid in cash. For a profit-oriented organization, profit is the soul of business. The importance of profitability, therefore, stems from its being the 'raison d'être' (purpose) of business.

A company remains in operation because it expects to make profits. Once that expectation is confirmed unattainable, the most rational decision is to close shop or exit the business. Three indicators, namely: Net Interest Margin (NIM), Return on Assets (ROA) and Return on Equity (ROE) were identified by Ahmed (2003) to be widely employed in the literature to measure profitability. However, there are divergent views among scholars on the superiority of one indicator over the others as a good measure of profitability. For instance, Goudreau and Whitehead (1989) and Uchendu (1995) believed that the three indicators are all good. Hancock

(1989) used only ROE to measure profitability in her study. Also, Odufulu (1994) used only the gross profit margin in measuring profitability. Ogunleye (1995) did not believe that profit level per se could constitute a good Measure of profitability and therefore used ROA and ROE. Profitability measures, according to Akinola (2008) include Profit Before Tax (PBT), Profit After Tax (PAT), ROE, Rate of Return on Capital (ROC) and ROA. Sanni (2009) used Earnings Per Share (EPS). For this study, we shall limit profitability to the three widely used measures namely Return on Asset (ROA), Return on Equity (ROE) and Net Interest Margin (NIM) as this study is built on the work of Krakah and Ameyaw (2010).

### **Empirical Literature Review**

Profitability of the banking sector is a subject that has received a lot of attention in recent years. There is now a large literature which has examined the role played by management of resources in determining bank profitability. It is generally agreed that better quality management of resources is the main factor contributing to bank performance, as evidenced by numerous studies that have focused on the U.S. banking system (DeYoung and Rice, 2004; Stiroh and Rumble, 2006; Bhuyan and Williams, 2006; Hirtle and Stiroh, 2007) and the banking systems in the western and developed countries (Ho and Tripe, 2002; Williams, 2003; Pasiouras and Kosmidou, 2007; Kosmidou et al., 2007; Kosmidou and Zopounidis, 2008; Athanasoglou et al., 2007; Albertazzi and Gambacorta, 2008).

By contrast, fewer studies have looked at bank performance in developing economies. Guru et al. (2002) investigate the determinants of bank profitability in Malaysia. They used a sample of 17 commercial banks during the 1986 to 1995 period. The profitability determinants were divided into two main categories, namely the internal determinants (liquidity, capital adequacy, and expenses management) and the external determinants (ownership, firm size, and economic conditions). The findings revealed that efficient expenses management was one of the most significant in explaining high bank profitability. Among the macro indicators, high interest ratio was associated with low bank profitability and inflation was found to have a positive effect on bank performance.

Chantapong (2005) investigates the performance of domestic and foreign banks in Thailand during the period 1995 to 2000. All banks were found to have reduced their credit exposure during the crisis years and have gradually improved their profitability during the post-crisis years. The results indicate that foreign bank profitability is higher than the average profitability of the domestic banks although importantly, in the post-crisis period, the gap between foreign and domestic bank profitability has closed, suggesting that the financial restructuring program has yielded some positive results.

Heffernan and Fu (2008) examine the performance of different types of Chinese banks during the period 1999 and 2006. The results suggest economic value added and the net interest margin do better than the more conventional measures of profitability, namely return on average asset (ROAA) and return on average equity (ROAE). Some macroeconomic variables and financial ratios are significant with the expected signs. Though the type of bank is influential, bank size is not. Neither the percentage of foreign ownership nor bank listings has a discernible effect.

Ben Naceur and Goaid (2008) examine the impact of bank characteristics, financial structure, and macroeconomic conditions on Tunisian banks' net-interest margin and profitability during the period of 1980 to 2000. They suggest that banks that hold a relatively high amount of capital and higher overhead expenses tend to exhibit higher net-interest margin and profitability levels, while size is negatively related to bank profitability. During the period under study, they find that stock market development has positive impact on banks' profitability. The empirical findings suggest that private banks are relatively more profitable than their state owned counterparts. The results suggest that macroeconomic conditions have no significant impact on Tunisian banks' profitability.

### **Research Methodology**

This study make use of Time Series data from secondary sources mainly from the annual reports of the case study namely First Bank of Nigeria Plc over the period, 1980 to 2010 on total annual assets, loans, total annual non-interest income, total annual loan loss provisions, total annual overhead expenses, was used to estimate the ratios and coefficients for the internal determinants.

For the external determinants, data on GDP, inflation and Money Supply was obtained from the Nigerian CBN Statistical Bulletin the Golden Jubilee edition over the period 1980 to 2010.

For this study, the regression analysis known as Cointegration and Error Correction model to estimate the relationship between profitability and its determinants was used. This is the distinguishing factor for this study as previous research works on this topic make use of simple OLS Regression technique or Pooled OLS Regressions. To arrive at a result that will not lead to spurious regressions the study tested for stationarity at different levels in the variables making up the model. To further shed more light of the result, the study also made use the Partial Correlation Matrix to test for the absence of Multicollinearity. Other tests were carried out on the model which includes test of Normality, Durbin Watson Test of Serial Correlation, Test of Heteroskedasticity and Test of Model Specification so as to achieve the objectives of our study as well as answer the research question and Hypotheses.

### **The Study Hypotheses**

In view of the foregoing study, with respect to the determinants of Corporate Profitability in the Nigerian Banking Industry, the following null hypotheses were tested:

- H<sub>01</sub>** : Bank Size does not significantly determine Bank Profitability
- H<sub>02</sub>** : Capital Adequacy does not significantly determine Bank Profitability
- H<sub>03</sub>** : Credit Risk does not significantly determine Bank Profitability
- H<sub>04</sub>** : Liquidity Risk does not significantly determine Bank Profitability
- H<sub>05</sub>** : Broad Money does not significantly determine Bank Profitability
- H<sub>06</sub>** : Real GDP does not significantly determine Bank Profitability
- H<sub>07</sub>** : Management Efficiency does not significantly determine Bank Profitability
- H<sub>08</sub>** : Inflation does not significantly determine Bank Profitability
- H<sub>09</sub>** : Labour Efficiency does not significantly determine Bank Profitability
- H<sub>010</sub>** : The explanatory variables are independent (test for NO multicollinearity)
- H<sub>011</sub>** : The variance of the error term is constant (test for homoskedastic)
- H<sub>012</sub>** : The adjacent residuals are NOT correlated (tests for autocorrelation)

**Model Specification**

An economic model is a representation of the basic features of an economic phenomenon; it is an abstraction of the real world (Fonta et al, 2009). The specification of a model is based on the available information relevant to the study in question. This is to say, the formulation of an economic model is dependent on available information on the study as embedded in standard theories and other major empirical works, or else, the model would be theoretical. In order to determine the dynamic and simultaneous inter- relationship between banking industry profitability and its determinants, an empirical model used by Demirguc-Kunt and Huizinga (1999) further popularised by other authors like Ben Naceur and Goaid (2008), Krakah and Ameyaw (2010) is adopted and modified to achieve the objectives of the study.

Three models split into six equations are postulated in this study. The first set are static models aimed to capture the existence of long relationships between internal and external determinants with profitability while the second set models are the dynamic models aimed at capturing the existence of short run dynamics among the variables. The functional form of these models can be specified as follows:

**Model I:**

$$ROA_t = f(BNK\_SZE_t, BRANCHES_t, COST\_INC_t, EQTY\_TA_t, H\_C\_ROI_t, LLP\_TL_t, GRM2_t, GRRGDP_t, INFL_t, STAFSAL\_TA_t, TL\_TA_t, TL\_TBD_t) \text{-----(i)}$$

**Model II:**

$$ROE_t = f(BNK\_SZE_t, BRANCHES_t, COST\_INC_t, EQTY\_TA_t, H\_C\_ROI_t, LLP\_TL_t, GRM2_t, GRRGDP_t, INFL_t, STAFSAL\_TA_t, TL\_TA_t, TL\_TBD_t) \text{-----(ii)}$$

**Model III:**

$$NIM_t = f(BNK\_SZE_t, BRANCHES_t, COST\_INC_t, EQTY\_TA_t, H\_C\_ROI_t, LLP\_TL_t, GRM2_t, GRRGDP_t, INFL_t, STAFSAL\_TA_t, TL\_TA_t, TL\_TBD_t) \text{-----(iii)}$$

But models (i), (ii) and (iii) above are exact or deterministic in nature. In order to allow for the inexact relationship among the variables as in the case of most economic time series variables stochastic error term “ $\mu_t$ ” is added to form equations. Thus, we can express the econometric models in a mathematical form as:

**Equation I:**

$$ROA_t = \beta_0 + \beta_1BNK\_SZE_t + \beta_2BRANCHES_t + \beta_3COST\_INC_t + \beta_4EQTY\_TA_t + \beta_5H\_C\_ROI_t + \beta_6LLP\_TL_t + \beta_7GRM2_t + \beta_8GRRGDP_t + \beta_9INFL_t + \beta_{10}STAFSAL\_TA_t + \beta_{11}TL\_TA_t + \beta_{12}TL\_TBD_t + \mu_t \text{-----(i)}$$

**Equation II:**

$$\Delta ROA_t = \beta_0 + \beta_1\Delta BNK\_SZE_t + \beta_2\Delta BRANCHES_t + \beta_3\Delta COST\_INC_t + \beta_4\Delta EQTY\_TA_t + \beta_5\Delta H\_C\_ROI_t + \beta_6\Delta LLP\_TL_t + \beta_7\Delta GRM2_t + \beta_8\Delta GRRGDP_t + \beta_9\Delta INFL_t + \beta_{10}\Delta STAFSAL\_TA_t + \beta_{11}\Delta TL\_TA_t + \beta_{12}\Delta TL\_TBD_t + \beta_{13}ECM_{t-1} + \varepsilon_t \text{-----(ii)}$$

**Equation III:**

$$ROE_t = \alpha_0 + \alpha_1BNK\_SZE_t + \alpha_2BRANCHES_t + \alpha_3COST\_INC_t + \alpha_4EQTY\_TA_t + \alpha_5H\_C\_ROI_t + \alpha_6LLP\_TL_t + \alpha_7GRM2_t + \alpha_8GRRGDP_t + \alpha_9INFL_t + \alpha_{10}STAFSAL\_TA_t + \alpha_{11}TL\_TA_t + \alpha_{12}TL\_TBD_t + \mu_t \text{-----(iii)}$$

**Equation IV:**

$$\Delta ROE_t = \alpha_0 + \alpha_1\Delta BNK\_SZE_t + \alpha_2\Delta BRANCHES_t + \alpha_3\Delta COST\_INC_t + \alpha_4\Delta EQTY\_TA_t + \alpha_5\Delta H\_C\_ROI_t + \alpha_6\Delta LLP\_TL_t + \alpha_7\Delta GRM2_t + \alpha_8\Delta GRRGDP_t + \alpha_9\Delta INFL_t + \alpha_{10}\Delta STAFSAL\_TA_t + \alpha_{11}\Delta TL\_TA_t + \alpha_{12}\Delta TL\_TBD_t + \alpha_{13}ECM_{t-1} + \varepsilon_t \text{-----(iv)}$$

**Equation V:**

$$NIM_t = \varphi_0 + \varphi_1BNK\_SZE_t + \varphi_2BRANCHES_t + \varphi_3COST\_INC_t + \varphi_4EQTY\_TA_t + \varphi_5H\_C\_ROI_t + \varphi_6LLP\_TL_t + \varphi_7GRM2_t + \varphi_8GRRGDP_t + \varphi_9INFL_t + \varphi_{10}STAFSAL\_TA_t + \varphi_{11}TL\_TA_t + \varphi_{12}TL\_TBD_t + \mu_t \text{-----(v)}$$

**Equation VI:**

$$\Delta NIM_t = \varphi_0 + \varphi_1\Delta BNK\_SZE_t + \varphi_2\Delta BRANCHES_t + \varphi_3\Delta COST\_INC_t + \varphi_4\Delta EQTY\_TA_t + \varphi_5\Delta H\_C\_ROI_t + \varphi_6\Delta LLP\_TL_t + \varphi_7\Delta GRM2_t + \varphi_8\Delta GRRGDP_t + \varphi_9\Delta INFL_t + \varphi_{10}\Delta STAFSAL\_TA_t + \varphi_{11}\Delta TL\_TA_t + \varphi_{12}\Delta TL\_TBD_t + \varphi_{13}ECM_{t-1} + \varepsilon_t \text{-----(vi)}$$

**Where:**

<b>BNK_SIZE<sub>t</sub></b>	- Bank Size at time t
<b>BRANCHES<sub>t</sub></b>	- No of Branches at time t
<b>COST_INC<sub>t</sub></b>	- Cost-to-Income Ratio at time t
<b>EQTY_TA<sub>t</sub></b>	- Equity-to-Total Asset Ratio at time t
<b>GRM2<sub>t</sub></b>	- Growth Rate of Broad Money (M2) at time t
<b>GRRGDP<sub>t</sub></b>	- Growth Rate of Real GDP at time t
<b>H_C_ROI<sub>t</sub></b>	- Human Capital Return On Investment at time t
<b>INFL<sub>t</sub></b>	- Inflation Rate at time t
<b>LLP_TL<sub>t</sub></b>	- Loan Loss Provision-to-Total Loans Ratio at time t
<b>STAFSAL_TA<sub>t</sub></b>	- Staff Salaries-to-Total Assets Ratio at time t
<b>TL_TA<sub>t</sub></b>	- Total Loans-to-Total Assets Ratio at time t
<b>TL_TBD<sub>t</sub></b>	- Total Loans-to-Total Bank Deposits Ratio at time t
<b>ROA<sub>t</sub></b>	- Return On Assets at time t
<b>ROE<sub>t</sub></b>	- Return On Equity at time t
<b>NIM<sub>t</sub></b>	- Net Interest Margin at time t
<b>T</b>	- Annual Periods of Observations of the Variables
<b>Δ</b>	- Change Factor from Previous Period t-1 to Present Period t

**The normal DF Unit Root Test is based on the following three regression forms:**

1. Without Constant and Trend;  $\Delta Y_t = \delta Y_{t-1} + \mu_t$  (1)

2. With Constant;  $\Delta Y_t = \alpha + \delta Y_{t-1} + \mu_t$  (2)

3. With Constant and Trend  $\Delta Y_t = \alpha + \beta T + \delta Y_{t-1} + \mu_t$  (3)

**The hypothesis is:**

H0:  $\delta = 0$  (unit root)

H1:  $\delta \neq 0$  (series is stationary)

**Decision rule:**

If  $t^* >$  ADF critical value,  $\implies$  do not reject null hypothesis, i.e., unit root exists.

If  $t^* <$  ADF critical value,  $\implies$  reject null hypothesis, i.e., unit root does not exist.

Each of the equation will be run separately depending on the data specification.

To overcome the problem of autocorrelation in the basic DF test, the test can be augmented by adding various lagged dependent variables which would produce the following test:

$$\Delta y_t = (\rho - 1)y_{t-1} + \alpha_i \sum_{i=1}^m \Delta y_{t-i} + u_t \quad (4)$$

The correct value for  $m$  (number of lags) can be determined by reference to a commonly produced information criteria such as the Akaike criteria or Schwarz-Bayesian criteria. The aim is to maximize the amount of information. The DF and ADF test can also include a drift (constant) and time trend (See Gujarati, 2003).

**Test for Multicollinearity**

This test is carried out using partial coefficient of determination (partial  $R^2$ ). When partial  $R^2$  is  $> R^2$ ; that is, coefficient of determination, we say that there is presence of multicollinearity, otherwise there is no presence of multicollinearity.

**Test of Stationarity (Augmented Dickey-Fuller Test)**

**Table 1: Augmented Dickey-Fuller Test of Stationarity**

VARIABLES	ADF Test (Level Form)			ADF Test (1st Difference)	ADF Test (2nd Difference)	Remarks	
	No Constant and No Trend	With Constant but No Trend	With Constant and Trend	With Constant but No Trend	With Constant but No Trend		
BNK_SIZE	8.472783	1.401707	-2.186528	-3.934730*		I(1)	
BRANCHES	4.500397	2.882694	1.816834	-2.921739**	-6.692471*	I(1)/I(2)	
COST_INC	-0.169517	-2.446719	-2.425676	-4.393855*		I(1)	
EQTY_TA	-0.476314	-2.107703	-3.917876**	-8.743571*		I(1)	
GRM2	-1.485210	-3.322120**	-3.519081**	-6.622808*		I(1)	
GRRGDP	-5.340809*	-5.542538*	-5.967223*	-15.68151*		I(0)	
H_C_ROI	-0.409717	-3.039199**	-3.030189	-5.792720*		I(1)	
INFL	-	1.790658***	-2.925142***	-3.062837	-5.283043*	I(1)	
LLP_TL	-2.477404**	-	2.845798***	-2.930134	-5.496029*	I(1)	
STAFSAL_TA	-0.349826	-2.064420	-1.953690	-5.166201*		I(1)	
TL_TA	-0.126614	-1.183383	-0.688155	-4.479197*		I(1)	
TL_TBD	0.342888	-0.653011	-0.801633	-4.723013*		I(1)	
ROA	-1.534348	-2.987091**	-	3.334780***	-6.045588*	I(1)	
ROE	-	2.058101**	-3.340226**	-	3.264522***	-5.277099*	I(1)
NIM	-	1.776928***	-3.055973**	-3.200335	-6.783917*	I(1)	

where \*, \*\*, \*\*\* signifies levels of McKinnon Critical Values at 1%, 5% and 10% respectively

**Source:** Computer Print out from E-Views 7.1

In a bid to capture empirically the determinants of profitability in the Nigerian banking sector using First Bank of Nigeria Plc as our case study, from the specified model stated in Chapter three of this study, we employ the Engle-Granger Two Step Cointegration and Error correction Mechanism approach to drive home our findings. As a well known fact in econometric literatures Time series data exhibit stochastic trends which in most cases render the OLS regression model to be spurious as first discovered by Yule (1926). This spurious regression according to Engle and Granger occurs when a non-stationary time series is regressed against another. A first step in achieving our Augmented Engle

Granger model is to test the variables in our model for stationarity and this is achieved by making use of the Augmented Dickey Fuller Test (ADF Test) as shown in table 1 above.

From the result in table 1 above, the variables considered in our model are BNK\_SIZE, BRANCHES, COST\_INC, EQTY\_TA, GRM2, GRRGDP, H\_C ROI, INFL, LLP\_TL, STAFSAL\_TA, TL\_TA, TL\_TBD, ROA, ROE and NIM can be seen to be all stationary after first differenced. This shows that all the variables in our model are DSP (i.e. Differenced Stationary Process) meaning that they are I(1) while GRRGDP is I(0). When tested against the critical values of Mackinnon (1996), it can be observed that all the variables are significant at 1% except for BRANCHES which was only significant at 5% level. This condition satisfies a first step in achieving our Engle-Granger Two Step model estimation approach.

**The Long-Run or Static Co-Integration Models**

**Table 2: Cointegration Models**

Dependent Variable	MODEL 1: ROA		MODEL 2: ROE		MODEL 3: NIM	
Variable	Coefficient	t-Statistic	Coefficient	t-Statistic	Coefficient	t-Statistic
C	-0.00220	-0.04324	1.1172	1.3456	-0.1919*	-2.9343
BNK_SIZE	0.00258	0.88827	0.0007	0.0154	0.0023	0.6210
BRANCHES	-0.00002	-0.40302	0.0004	0.5416	0.0000	-0.6458
COST_INC	-0.00620	-0.10154	-1.1264	-1.1307	0.1953**	2.4883
EQTY_TA	-0.03948	-0.41951	-4.2057**	-2.7404	-0.2097***	-1.7348
GRM2	0.00024	1.67314	0.0052**	2.2820	0.0000	0.2505
GRRGDP	0.00001	0.66913	0.0003	0.9839	0.0000	-0.0292
H_C_ROI	-0.00128	-0.23169	-0.0403	-0.4480	0.0156**	2.2003
INFL	-0.00007	-0.52607	-0.0010	-0.4748	-0.0002	-1.3608
LLP_TL	-0.03293*	-3.48499	-0.8046*	-5.2215	-0.0176	-1.4522
STAFSAL_TA	-0.04472	-0.16543	3.8939	0.8833	0.8340**	2.4015
TL_TA	-0.04619	-0.58194	-1.8465	-1.4266	-0.0348	-0.3418
TL_TBD	0.00262	0.04554	0.8504	0.9058	0.0997	1.3484
R-squared	0.76146		0.8141		0.7267	
Adjusted R-squared	0.60243		0.6901		0.5445	

S.E. of regression	0.00701		0.1143		0.0090
Sum squared resid	0.00088		0.2352		0.0015
Log likelihood	118.21520		31.6724		110.4463
F-statistic	4.78814		6.5671		3.9887
Prob(F-statistic)	0.00151		0.0002		0.0042
Mean dependent var	0.01523		0.2340		0.0142
S.D. dependent var	0.01112		0.2053		0.0133
Akaike info criterion	-6.78808		-1.2047		-6.2869
Schwarz criterion	-6.18673		-0.6033		-5.6855
Hannan-Quinn criter.	-6.59205		-1.0086		-6.0908
Durbin-Watson stat	2.24063		1.7974		2.1075

Where \*, \*\*, \*\*\* signifies levels of significance at 1%, 5% and 10% respectively

**Source:** Computer Print out from E-Views 7.1

Table 2 shows empirical regression results from the Long Run Co-integrating Regression model. As can be seen from the table above, the explanatory power of the models in our study are reasonably high given by the R<sup>2</sup> (and Adjusted R<sup>2</sup>) at 0.76(0.60) for the ROA model, 0.81(0.69) for the ROE model and 0.73(0.55) for the NIM model respectively. The Overall F-Statistic of the three models are also statistically significant at 1% each with the values given as 4.78 for the ROA model, 6.57 for the ROE model and 3.99 for the NIM model respectively. This shows that the coefficients of the variables in all three models are statistically different from zero in the Long Run. From the Durbin Watson Statistic given also in table 2 above, it can be deduced that there is no problem of Serial Correlation in all the three Long Run Profitability models as ROA has as its D.W Stat. the value of 2.24, ROE has 1.79 and NIM has the value of 2.10 respectively. Consequent upon this, it helps to nullify any traces of Spurious Regression in any of the three models of profitability from the table above.

### **Capital Adequacy**

Capital Adequacy represented by the variable EQTY\_TA enters our models by being negatively related to profitability in all the three circumstances but only being significant at 5% and 10% in the Long Run for only the ROE and NIM models respectively. Based on the theory of Capital, a good explanation for the negative sign is an indication that Banks in Nigeria, in particular FBN Plc do not efficiently utilize or manage their capital as such this is consistent with the findings of Berger and Mester (1997).

### **Liquidity Risk**

Liquidity Risk represented by the variables TL\_TA and TL\_TBD enters the long-run Co-integration models by being negatively and positively related to profitability respectively in all the three instances i.e. ROA, ROE and NIM models. Though with these relationships, these results proved to be statistically insignificant in determining profitability in the Long Run for the period of our study. An explanation of this could be that most banks in Nigeria do not prefer to hold Long Term funds as holding funds for a longer period only tends to constitute idle cash thereby having absolutely no effect on the profits of the bank in the Long term. The positive relationship with Profitability supports the findings of Bourke (1989) while Pasiouras and Kosmidou (2007) agree to the negative relationship of liquidity with profitability.

### **Credit Risk**

Credit Risk represented by the variable LLP\_TL enters all three models being negatively related to profitability and statistically significant at 1% each for ROA and ROE models respectively. This supports the findings of Miller and Noulas (1997) as well as Duca and McLaughlin (1990). As such, the significant nature of this variable in our long-run model shows that banks in Nigeria are exposed to highly risky loans in the Long Run so as to shore-up their profits as posited by Cooper et al (2003).

### **Efficiency Management**

Efficiency Management shows how banks are able to manage their cost in order to boost their profits and this is represented by the variable COST\_INC in our long-run model. This variable enters the three models having negative relationships with profitability in the ROA and ROE models, but proved statistically insignificant in determining profitability for these models.

However, it was found to be positively related and statistically significant in the NIM model thereby supporting the findings of Abreu and Mendes (2001). This shows that for the period of our study, banks in Nigeria have not really efficiently managed their expense patterns this explains the major reasons behind some of the recent Sanusi Lamido led CBN policies of cost control in Nigerian banks.

### **Bank Size**

Bank Size represented by the variables BNK\_SZE and BRANCHES enters all the long-run Profitability models having mixed relationships but being insignificant determinants of profits. While Natural Log of Total Assets (BNK\_SZE) was positively and insignificantly related to ROA, ROE and NIM variables, however number of BRANCHES was inversely and insignificantly related to profitability in the three models. This indicates that banks in Nigeria has neither benefited from economies of scale or diseconomies of scale arising as a result of ownership of large assets and increasing branch networks in the long run. This therefore supports the findings of Berger et al (1997) and Heffernan and Fu (2008) of no significant relationship between a Bank's Size and its profitability thereby refuting the findings of a significant positive relationship between the two variables by Bikker and Hu (2002) as well as Goddard et al (2004).

### **Labour Efficiency**

Represented by two variables in our study (H\_C ROI and STAFSAL\_TA), empirical findings from the introduction of Labour Efficiency variables in our Long Run models indicates that both variables are positively and statistically significant at 5% each for only the NIM model while the ROA and ROE models found the variables to be insignificant in determining profitability in the long-run. This confirms and justifies our introduction of these variables in our models as has never been done in any previous literatures. As such, this shows that the Nigerian Banking industry (i.e. FBN Plc) has truly benefited from staff efficiency in the long-run. Thus, the assertion of Fitz-Enz (2000) is put to practical empiricism in this study.

### **Macro-Economic Variables**

Represented by three variables in our Static or Long-run co-integration models (GRM2, GRRGDP and INFL), the presence of macroeconomic variables in these models is almost unrecognized except for Money Supply growth rate which had a significant positive relationship with profitability in the

ROE model at 5% level of significance. Aside this, all other macroeconomic or external variables like Growth Rate of RGDP and Inflation Rate did not significantly affect the profitability of banks in Nigeria for the period under review. This findings support that of Krakah and Ameyaw (2010) who found M2 growth rate to be the only significant external variable in their exogenous and combined (endogenous and exogenous) profitability models.

**Unit root test on error terms of profitability model**

Table 3: Augmented dickey-fuller test of stationarity on error terms

MODELS	ADF Test (Level Form)			Remarks
	No Constant and No Trend	With Constant but No Trend	With Constant and Trend	
ECM (Model 1)	-6.328004*	-6.21334*	-6.111019*	I(0)
ECM (Model 2)	-4.923701*	-4.833855*	-4.749765*	I(0)
ECM (Model 3)	-5.688599*	-5.589843*	-5.494347*	I(0)

where \*, \*\*, \*\*\* signifies levels of McKinnon Critical Values at 1%, 5% and 10% respectively

**Source:** Computer Print out from E-Views 7.1

Co-integration test helps examine whether long run relationship exists between dependent and independent variables. Long run relationship exists, even when variables are not stationary, in as much as the series of the error terms obtained from regressing them are stationary. From table 4.3 above, the null hypothesis that our residual terms ECM (MODEL 1), ECM (MODEL 2) and ECM (MODEL 3), has a unit root can be accepted based on Mackinnon (1996) critical values when compared to our ADF Test Statistics of -6.111019, -4.749765, -5.494347 which are all significant at 1% for constant and trend model. Based on the results in table 3 above, we therefore concluded that our variables are co-integrated i.e. they have a long run relationship among them, thus they are I (0) thereby fulfilling the first condition of the Engle-Granger two step procedure.

**Summary, Conclusion and Recommendations**

This study started initially to examine and analyze what determines profitability in the Nigerian banking industry over the past three decades, precisely from 1980 to 2010. It was discovered that a number of key drivers regarded as internal or financial statement variables and external or macroeconomic variables help to determine banks profitability. It was also be inferred that the

views of the various authors reviewed for this study helped to shed more light on this research topic thereby providing a cogent justification for the study. Although different authors had divergent views of the nature and relationship these value drivers had in determining banks' profitability but a general deduction from their findings show that balance sheet items, industry characteristics and broad macroeconomic variables indeed affects bank profitability eventually. On the basis of these divergent views, we sought to test empirically the nature of the relationship using an econometric method of analysis known as Co-integration and Error Correction Mechanism which not widely employed for studies of this nature as regards what the determinants of profitability in the Nigerian banking industry are, hence we used First Bank of Nigeria Plc as our case in point from 1980 to 2010. Previous research works on this topic have only used OLS regressions or fixed and random effects models to empirically examine the causal relationships between bank profitability and its determinants. The closest to study to the kind of analysis used in this study can be found in the work of Chirwa (2003) who employed the use of Co-integration and Error Correction models to ascertain the nature and direction of causality between persistent profits in banks and its determinants.

### **Conclusion**

The study has explored empirically the relationship between profitability and internal as well as external determinants in the Nigerian banking industry using annual time series data spanning 1980 through 2010 by relying on co-integration and error correction methodology. The findings of this study revealed that Capital Adequacy through Equity-to-Total Assets ratio significantly had a negative effect banks' profitability both in the long-run and in the short run in Nigeria. This finding thereby supports the conclusion of Berger and Mester (1997) and Olujide and Aremu (2004) that well-capitalized banks appear less risky and as such, profits are lower because they are perceived to be safer.

Furthermore, findings from this study also revealed that Liquidity Risk through variables in our models Total Loans-to-Total Assets ratio and Total Loans-to-Total Bank Deposits ratio have significant negative and positive relationships with profitability respectively in the Nigerian banking industry only in the short run and not in the long run. Thus, this confirms the findings of

Bourke (1989) and that of Pasiouras and Kosmidou (2007) that banks tend to hold a lower amount of liquid assets they are more vulnerable to large deposit withdrawals and vice versa.

Empirical findings from this paper further revealed that Credit Risk variable Loan Loss Provision-to-Total Loans had an almost perfectly significant negative relationship with profitability in all circumstances as observed in chapter four. This relationship was found to be negative in both the long run and short run models as expected and as such supports the findings of Miller and Noulas (1997) which suggested that the more financial institutions are exposed to high risk loans, the higher the accumulation of unpaid loans and the lower the profitability.

However, while it was also discovered that Bank Size had no effect on bank profitability in Nigeria based on its variables Natural Logarithm of Total Assets and Number of Branches either in the long run or short run models, Cost-to-Income ratio which represented Management Efficiency was found to also have a positively insignificant effect on bank profitability. These findings were corroborated by the works of Berger et al. (1987) who posited for bank size that the effect of a growing a bank's size on profitability may be positive up to a certain limit. Beyond this point the effect of size could be negative due to bureaucratic and other reasons. And as for cost-to-income ratio both authors agreed that cost efficiency is achieved when a significant negative relationship exist between profitability and cost.

Finally, this study show that from the macroeconomic variables used, only the Growth Money Supply (GRM2) is a determinant of banks' profitability. The growth of money supply was positively associated with profits in the banking sector. For the two other variables within the macroeconomic factors, the inflation rate and Growth Rate of Real GDP, there is no evidence found that these are determinants of profitability contrary to findings of Dietrich and Wanzenried (2011).

### **Policy Recommendations**

The results leave several implications for investors and banking firms. Viewing evidence about what drives banks' profitability will help businesses understand which economic and financial factors are critical to track and analyze in order to attain operational success. Importantly, if banking firms know which factors are likely to boost performance, then this should create

increased competition in the marketplace. Economically, this would aid in keeping prices low, providing new substitute and complementary goods and creating jobs.

Individuals or investors can use the knowledge derived from the findings of this study and personally start taking care of their retirement through equity investing. Recognizing the drivers of ROA, ROE and NIM will help new investors analyze financial statements and make informed equity investment decisions. It is important that individuals recognize the urgency of investing for their future and that stocks historically have appreciated over time leading to substantial long-term gains in the market. The implications of these findings for public policy include further education about personal finance in regards to investment analysis. With a debt driven economy, the need to save and guarantee future financial security is becoming ever more apparent. A society that understands financial measurements and their implications on company operating performance is more capable of making good decisions that can help drive individual prosperity and growth which will eventually translate to the general economy as a whole. Furthermore, the findings of this study have considerable policy relevance for managers and regulators. It could be argued that the more profitable a bank is, the more it will be able to offer more new products and services. To this end, the role of technology advancement is particularly important given that a bank with relatively more advanced technologies may have added advantage over its peers. The continued success of the Nigerian banking sector depends on its efficiency (management and labour), profitability, and competitiveness. In view of the increasing competition attributed to the more liberalized banking sector, bank managements as well as the policymakers will be more inclined to find ways to obtain the optimal utilization of capacities as well as making the best use of their resources, so that these resources are not wasted during the production of banking products and services. Finally, the ability to maximize risk adjusted returns on investment and sustaining stable and competitive returns is an important element in ensuring the competitiveness of the Nigerian banking sector. Thus, from the regulatory perspective, the performance of the banks will be based on their efficiency and profitability. The policy direction will be directed towards enhancing the resilience and efficiency of the financial institutions with the aim of intensifying the robustness and stability of the banking sector in Nigeria.

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