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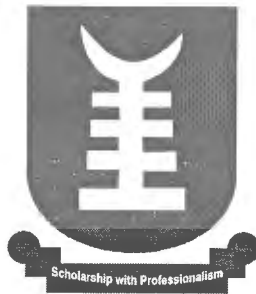
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Chief Editor's Remarks – IPS Journal of Business Research (JBR)

Welcome to the Chief Editor's Page of the Journal of Business Research (JBR), a scholarly business research Journal published by the Institute of Professional Studies (IPS). The fourth edition of the JBR demonstrates improvement in communicating academic and professional business research in Africa and beyond. The JBR continues to receive phenomenal readership, from America, Asia, Europe and Africa. This is evident in the diversity of articles contained in this edition, ranging from Mauritius, Tunisia, Zimbabwe, Nigeria, Portugal and Ghana. Some international libraries particularly in Europe have shown keen interest and are subscribing the JBR. Thanks to the African Journals Online (AJOL) by whose support the JBR is gaining its wide readership. The JBR further appreciates the professionalism displayed by AJOL in its services for promoting and encouraging scholarly and professional publications in Africa. The Institute of Professional Studies is pleased to continue to make its humble contribution to both the academic and professional business community in Africa and beyond. By prospecting business management issues in both developed and developing economies, the JBR hopes to continue to benchmark best practices and ideas in research that can impact on business in developing economies.

The JBR is an International Journal that publishes professional and scholarly research articles in the fields of accountancy, business finance, general management, marketing, business law, economics, entrepreneurship, quality management and social issues that relate to business and management. The JBR is a bi-annual refereed publication. As a philosophy, the JBR believes not only in contributing to existing knowledge but in helping solve practical business management problems. It recognizes and upholds the principles of both objectivity and integrity in research and the ability to place research observations and results in practical context. The editorial philosophy of the JBR is established on the basis of knowledge-based research. We propagate knowledge based research which are conceptual or theoretical in nature or an empirical study, leading to discovery of totally new ideas or explanations or descriptions of a phenomenon; or an invention of a theoretical model for problem-solving purposes, or a reflective study which explains a group of theories, or events, techniques or re-examines a group of ideas or facts.

In selecting papers for publication the JBR seeks a balance between relevance and rigour to bridge the gap in the Rigour-Ethics-Relevance trilogy in business research. In this respect, the JBR models an approach that is informed by such a balance in the form of Original Research Papers, Reviews, and Feature Articles. Such papers must address topical issues presented as synthesis of well validated facts or reorganization, interpretation or conceptualization of existing knowledge and new ideas from an analytical perspective. With this background in mind please be invited to the JBR's fourth edition of business research and reviews covering topics in Human Resource Management, Marketing, Finance and Economics, Environmental and Strategic Leadership. Enjoy the synchronization of academic and professional works that seek to combine academic rigour with relevance. It is assumed that this edition and the many others to follow would impact on the ability to bring about data-informed changes in academic, professional business settings.

I also wish to thank the entire JBR Editorial Team who made this possible. Once again, welcome to the third edition of the IPS Journal of Business Research.

Rev. Mrs. Goski Alabi
Chief Editor – Journal of Business Research (JBR)

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The Effect of Capital Adequacy on Banks' Performance: Evidence from Nigeria

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Abstract

This study estimates the effect of capital adequacy on bank earnings and profitability in Nigeria. Panel data are provided for a sample of 10 strong banks and 10 weak banks in the period 2000-2003 with the strong banks selected on the basis of the first 20 companies listed with the highest market capitalization. With the aid of a Least Square Dummy Variable (LSDV) model, the study found that bank earnings is invariants to factors such as bank assets and bank size but highly driven by liquidity and capital adequacy. The fixed effect model showed the distinction between strong and weak bank does not hold as differential intercept dummy shows that the effect of capital adequacy on bank performance is stronger for weak banks than for strong banks. The study concludes that consolidation exercise that reinforced the capital base of the banks from a minimum capital base of N2 billion to N25 billion was a step in the right direction and suggest that the need for effective regulatory framework in the management liquidity and bank capital to shore-up bank performance in Nigeria.

Keywords: Capital, Capital Adequacy and Bank Performance.

1. INTRODUCTION

Capital plays an important role in enhancing banks' performance. Customers are more concerned with the sufficiency of banks' capital for the safety of their deposits. Capital adequacy which is determined by capital-asset ratio is a requisite for banks' effective operation which is a function of the deposits and capital funds. Banks as financial intermediaries obtain their capital through owners' funds, reserves and share capital. The profit earning capacity of banks depends on the prudent combination of assets and liabilities to meet the liquidity and solvency requirements imposed by the environment including the monetary and banking policies (Berger, 1995; Longe, 2005; Nnanna, 2005). To ensure availability of funds at any point in time for banks to undertake statutory intermediation requirements there must be in place a well functioning regulatory framework. This helps to reduce the likelihood of banks becoming insolvent (Yudistira, 2003; Brash, 2001; Naceur, and Kandil, 2008).

In Nigeria, the Central Bank (CB) as an apex bank has the statutory obligation to regulate banks' capitalization as a way of mitigating their solvency problems which may destabilize domestic and international financial system (Bernauer and Koubi, 2002; Brash, 2001). Compliance with this statutory requirement has resulted in the adoption of different strategies in the banking industry such as, merger and acquisition and banks shopping for investible funds through the capital market. This exercise according to Soludo, 2005, will protect banks customers' deposits and confer confidence on them in dealing with banks. In furtherance of his assertion, Soludo (2005:1) explained that "the need for recapitalization arises from the fact that banks have not played their expected role in the development of the economy because of their weak capital base and as such, the decision to increase the capital base of banks with the aim of strengthening and consolidating the banking system".

The need for the banks' reform arises from the fact that banks play important role in any nation's economic growth and development. However, the banks in Nigeria have not made much difference as long as economic development and growth is concerned. For instance, governments' efforts and control in ensuring that banks are more involved in financing the real sectors of the economy (through monetary guideline on their lending policy) has not yielded much result rather systemic distress has continued to frustrate the banking system. The number of distressed banks has been on the increase since 1991 irrespective of the capital base of these banks which was fixed at N600,000 and N2million for indigenou commercial and merchant banks respectively (Uremandu, 2000). The report of Nigeria Deposit Insurance Corporation (NDIC) and CBN showed that in 1991, only 8 banks were distressed, but this figure drastically increased from 16 in 1992, to 33 in 1993 and further to 60 in 1995 (Uremandu, 2000). Probably, this might be as a result of low capital base of these banks which was later reviewed by monetary authorities upwards to N500,000 for both commercial and merchant banks. Since then, distress in bank has been on the increase until 2005 when it became obvious that reform in the banking

industry is a necessity (Nnanna, 2005). Hence, the recent reform post consolidation is to reposition the banks in Nigeria for competitiveness and soundness. As Soludo (2005) affirmed: "the strengthening and consolidation of the banking system was ... designed to ensure a diversified, strong and reliable banking sector which will ensure the safety of depositors' money, play active development roles in the Nigerian economy and also become competent and competitive in the regional and global financial system".

Investment and business financing for economic advancement is the main focus for banks' recapitalization. Hence, Soludo (2005) emphatically, emphasized that "what we are expecting at the end of this whole exercise is that we should have banks that will be able to syndicate credit to the system, support agriculture and be a global player". This means that we do not need a banking system that is rent seeking rather we want a banking system that is sound, reliable and can finance investments.

Few studies have looked at the relationship of capital availability on bank operations. A general review of literature has identified certain notable results such as bank performance and supervision in a deregulated economy (Olugbenga and Olankunle, 1998); foreign entry and domestic banking (Claessens, Demirgüç-Kunt, and Huizinga, 2001); the place of capital in development and efficiency of the banking sector in a transitional economy (Hasan and Marton, 2003); the effect of foreign entry and ownership structure (Angelo, Unite and Sullivan, 2003); banks' performance in emerging market crises (Detragiache and Gupta, 2006); factors influencing the profitability of banks (Pasiouras and Kosmidou, 2007); effects of capital regulations on banks' performance (Naceur and Kandil, 2008), and capital as an essential and critical factor for the perpetual continuity of a bank (Vyas, Singh and Yadav, 2008). From these studies, there is no doubt that a minimum amount of capital is required to ensure safety and soundness of a bank and to build trust and confidence of the customers. Upon this premise, the study seeks to find out the relationship between capital adequacy of Nigerian banks and their performance. This paper is structured into five sections. Section one is the introduction, section two examines the conceptual framework and literature review, section three centres on the research methods and model specifications, section four is the results of the statistical analysis while section five is conclusion and recommendations

2. CONCEPTUAL FRAMEWORK/LITERATURE REVIEW

Capital Adequacy

In the banking industry, capital is usually regulated by an apex bank to mitigate bank solvency problems (Bernauer and Koubi, 2002). The Central Bank of Nigeria (CBN) regulates banks' capital (Olugbenga, and Olankunle, 1998). The theory of capital adequacy has its focus on

measures and regulations from the apex bank towards ensuring that banks have enough capital to take care of their numerous financial obligations. With capital adequacy, it is assumed that a bank will be able to absorb its losses and finance its business operations (Vyas, Singh and Yadav, 2008). Bank's capital therefore depends on a number of factors such as the bank's size, the level of risk involved in its operations, the market forces, the lending policy, its management capabilities, its portfolio (assets and cash), CBN requirements on reserves and its growth rate (Olugbenga, and Olankunle, 1998; Barrios and Blanco, 2000; Bernauer and Koubi, 2002; Lin, Penm, Garg and Chang, 2005; Naceur, and Kandil, 2008). All these factors act as factors for determining the capital base of a bank (Goldberg and Saunders, 1981). For instance, if a bank is to grow, with increased deposits and earning assets, it must expand its capital base but at same time keep the risk level constant (Uremadu, 2000, Murinde and Yassen, 2006). However, irrespective of the factor that determines the amount of capital a bank has, it must be adequate and in line with the apex bank's statutory requirement (Murinde, and Yaseen, 2006; Naceur, and Kandil, 2008; Vyas, Singh and Yadav, 2008).

Measurement of Banks' Capital Adequacy

Bank capital adequacy is measured by Capital Asset Ratio (CAR) (Adimorah, 1998; Bank of New Zealand, 2003; Al-Sabbagh, 2004). In a regulated financial environment such as USA, Switzerland and New Zealand, a statutory capital asset ratio is established by bank regulator for measuring capital adequacy (Murinde, and Yaseen, 2006; Vyas, Singh and Yadav, 2008). For instance in US, the banking sector average capital-asset ratios were established based on basic capital adequacy standards (4% Tier CAR and 8 % Tier 1+2 CAR adopted in 1988, which has been in force since 1990/1992) (Bernauer and Koubi, 2002). It is the duty of banks regulatory authorities to establish a minimum requirement as long as banks capital asset ratio is concerned using the Basle Accord Standard (Lin, Penm, Garg, and Chang, 2005). The purpose of Basle Accord Standard (which was initially published in 2004 to use "three Pillar concept", (i) minimum capital requirement (ii) supervisory review and (iii) market discipline) is to create an international standard that banking regulators can use when creating regulations about how much capital banks need to put aside to guide against financial and operational risks banks face (Basle Capital Accord, 1988; Bernauer and Koubi, 2002; Lin, Penm, Garg, and Chang, 2005).

In measuring banks' capital adequacy, bank capital is divided into two; tier one and tier two capital (Brash, 2001). Tier one capital ratio is the ratio of a bank's core equity to its total risk weighted assets (risk weighted assets are the total of all assets held by the bank which are weighted for credit risks according a formula determine by the regulator), while Tier two capital is a measure of a bank's financial strength with regard to the second most reliable form of financial capital from regulatory point of view (Basle Capital Accord, 1988; Brash, 2001). The CBN as the apex bank established three methods for measuring capital adequacy which Uremadu (2000) enumerated as (i) fixed minimum capital requirement (ii) limitation of lending limit and (iii) weighted risk/ asset ratio. Presently, these three methods have constantly been used for bank capital control purposes in Nigeria.

Capital Adequacy and Bank Performance

Capital accounts form a small percentage of the financial resources of the banking institutions and it plays a crucial role in their long-term financing and solvency position (Barrios and Blanco, 2000). Furlong & Keeley (1991) listed the factors that may affect bank's capital; these include competition, more depositors, less fund costs, risk in portfolio interest, high return on equity, less distress incidences, profit maximization, avoidance of bankrupt and their negative externalities on the financial system and incentive to increase risky assets. The effect of capital adequacy on bank's performance depends highly on these factors and the regulatory body prevailing in the country (Murinde, and Yaseen, 2006). Since banks' capital accounts constitute over 30% and 44% of the banks' total assets and deposits, respectively (Uremadu, 2000), determining capital adequacy of banks in isolation (without considering its performance) might be misleading. In line with this, Barrios and Blanco (2000) opined that in determining bank's performance in relation with its capital adequacy, some variables must be considered. These variables include banks' managerial quality and productive efficiency which depends so much on the degree of competition in the industry. The ability of the bank management to ensure that bank's capital is effectively managed, determines how adequate the capital is. Having capital adequacy ratios above the minimum levels recommended by the Basle Capital Accord, does not guarantee "safety" of a bank, as capital adequacy ratio is concerned primarily with credit risks (Strokes, 2002; Al-Sabbagh, 2004). There are also other types of risks which are not recognized by capital adequacy ratios such as inadequate internal control systems could lead to large losses by fraud or losses could be made on the trading of foreign exchange and other types of financial instruments. As Brash (2001) and Al-Sabbagh (2004) rightly observed these other risks involved in financial transactions must be seen as relevant while determining bank performance. Capital adequacy ratios are therefore as good as the information on which they are based on and act as indicators for determining banks' financial soundness and performance (Al-Sabbagh, 2004; Brash, 2001; Vyas, Singh and Yadav, 2008).

Evaluating Bank Performance

Banks' performance are usually evaluated using parameters such as turnover made during the year and ability to sustain it, extension of branches to the grass root, net profit of the bank, computerization of its numerous branches, net profit after tax ratio, share of credit in domestic credit, share price, improvement in the employee performance and returns on Assets (Berger, 1995; Dermeguc-Kunt and Huizingua, 1999; Naceur, 2003). Capital adequacy, in line with the standard set, is the ability to meet up with the CBN targets in term of capital reserve, lending to primary sectors and improvement in the employee's performance (Brash, 2001; Al-Sabbagh, 2004; Vyas, Singh and Yadav, 2008).

Considering these variables, apex bank has the statutory obligation to ensure that banks capital is adequate to meet its target goals and objectives of satisfying its various customers and ensuring the safety of customers' deposits (Nnanna, 2005). However, banks' target, goals and objectives

are most often relative. Due to the volatility and uncertainty of the economy, most Nigerian banks have performed below standard as far as these parameters are concerned (Soludo 2005, Nnanna, 2005). For instance, the failure rate of banks has been on the increase since 1992 to 2000 (see appendix 1). It was on this prima facie evidence that the CBN acting as a watch dog on banks, decided to increase the capital base of banks so as to "improve their performance" (Soludo, 2005).

Techniques for Measuring Bank's Performance

Capital as a scarce resource is the basis on which banks tend to be evaluated most often holds the key to the modern approaches towards evaluation of its performance (Demirguc-Kunt and Huizinga, 1998; Naceur, 2003; Nachiket and Maheshwari, 2004). Capital is the cornerstone of bank's strength and it provides a means of responding to opportunity and in most cases, acts as a buffer against uncertainty, unanticipated losses, and in the event of different areas to continue operating whilst problems are being resolved (PricewaterhouseCoopers, 1994; Berger, 1995). Capital has been used as the best parameter for measuring banks' performance and the amount of capital a bank has in its balance sheet determines the soundness and healthiness of the bank and its ability to protect its lenders from the uncertainties of the economy (Demirguc-Kunt and Huizinga, 1998; Naceur, 2003; Naceur, and Kandil, 2008). Banks' performance should be focused on fulfilling the legal obligation towards its lenders (Al-Sabbagh, 2004). As Nachiket and Maheshwari (2004) rightly said, "the first questions a bank needs to ask itself is, how safe would it be?" before deciding the amount of capital it would hold on its balance sheet". Bank's effort on measuring the safety of its lenders deposits have a lot to do in determining their capital base.

A target of internal safety goals as well as maximization of the banks' returns (from lender's perspectives) must be set by banks as a guide in keeping with its various transactions that it gets itself involved (Yudistira, 2003; Al-Sabbagh, 2004). It is the responsibility of the bank executives to ensure effective bank management in taking decision on the allocation of bank's capital (Naceur, and Kandil, 2008). The Basle Accord established that 4% of "pure" capital as the minimum a bank should have in relation to its assets (Al-Sabbagh, 2004). It therefore takes effectiveness and efficiency in bank management through the use of some techniques which serve as building blocks to ensure that this capital is really adequate. Nachiket and Maheshwari (2004) enumerated the three techniques as Matched Fund Transfer Pricing Process (MFTP); Risk Quantification Methodologies (RQMS) and Activity Based Costing (ABC). MFTP provides clarity on the cost dimension of money; RQM provides clarity in the capital dimension in the banks, while ABC helps banks to link their "activities" to the actual costs themselves. As Nachiket and Maheshwari (2004) further explained, these three building blocks must be in place for establishment and evaluation of banks performance. Ensuring an effective performance, bank's capital must be able to cover three generic risks which include (i) credit risk (ii) market risk and (iii) operations risk (Al-Sabbagh, 2004; Vyas, Singh and Yadav, 2008).

Banks' capital must be also effectively allocated in such combination that these three areas of risks will be covered in its business unit (Naceur, and Kandil, 2008). A bank that is performing effectively, should be able to indicate using capital asset ratio whether their capital adequacy has helped them to absorb banks' realized and anticipated losses (risk) and improve their return on capital investment shareholders' value added (SVA) which is usually expressed as a percentage of rate of return over economic capital deployed of Risk Adjusted return on capital (RAROC) (Nachiket & Madeshwari, 2004 ; Vyas, Singh and Yadav, 2008).

3. METHODOLOGY

Research Design

The study is a causal study using a quantitative design aimed at examining the influence of capital adequacy on bank performance using a panel data on 20 banks for 4 years (2000-2003) with the data drawn from the Nigerian Stock Exchange Fact Book (2004). The 20 banks were classified into 10 strong banks and 10 weak banks. Classification of the banks into strong and weak banks is drawn from the report of the Bank of International Settlement (2002). According to the report, "a weak bank is one whose liquidity or solvency is or will be impaired unless is a major improvement in the financial resources, risk profile, strategic business direction, risk management capabilities and/or quality of management". For the purpose of this study, we classify the strong banks on the basis of the 10 banks listed amongst the first 20 companies emerging with the highest market capitalization in the 2004 Nigerian Stock Exchange Fact Book. The weak banks were drawn from the banks falling below the first 20 companies emerging with the highest market capitalization.

Model Specifications

The model adopted for this study is a nonlinear econometric model that uses the balanced panel regression method to capture the performance of banks in Nigeria in relation to capital adequacy. To enable easy estimation of the model the study assumed two cross sectional identifiers—Strong Banks and Weak Banks and cutting across the time series endogenous and exogenous variables. Drawing largely from the empirical analysis, the study propose the model presented in equation 1, in which the selected exogenous variables are expected to determine the performance of both strong and weak banks in Nigeria as measured by the bank earnings.

$$E = f(CA, LQ, TA, TA^2) \dots\dots\dots (1)$$

Where:

E =earnings (profit after tax): a measure of bank performance;

CA = capital adequacy (proxy by shareholder's funds);

LQ =Liquidity (current assets of banks).

TA = total assets; and

TA²=A measure of bank size

Linearizing equation (1) and expressing the model in log form yields:

$$\text{Log}E_{it} = \beta_1 + \beta_2 \text{Log}CA_{it} + \beta_3 \text{Log}LQ_{it} + \beta_4 \text{Log}TA_{it} + \beta_5 \text{Log}TA_{it}^2 + U_{it} \dots\dots (2)$$

Where; $i=1, 2, 3, 4$ (i stands for the i^{th} cross sectional units)
 $t=1,2,\dots, 10$ (t stands for the t^{th} year)

β_1 = intercept

$\beta_2, \beta_3, \beta_4,$ and $\beta_5,$ are the various slope coefficients.

On a priori, $\beta_2, \beta_3, \beta_4,$ and $\beta_5 > 0$

$\text{Log}E_{it}$ represents log of earnings (profit after tax): a measure of bank performance;

$\text{Log}CA_{it}$ represents log of capital adequacy (proxy by shareholder's funds);

$\text{Log}LQ_{it}$ represents log of liquidity (current assets of banks);

$\text{Log}TA_{it}$ represents log of total assets; representing bank size and

$\text{Log}TA_{it}^2$ represents the square of bank size, is included in the regression to capture the non linear relationship between profitability and bank size.

Equation (3) uses a pooled data on both weak and strong banks to analyse the relative impact of CA on performance. This produces a more efficient means of comparison than separate regressions for weak and strong banks. This is the naïve approach which assumes all coefficients constant across time and individual variables.

Equation (2) does not take into account the specific nature of the strong banks and the weak banks. It assumes constant coefficients across time and space. Given that this study focuses on analyzing the differential impact of capital adequacy (CA) across weak and strong banks, we introduce a dummy variable (DU) which when multiplied by Log of CA ($\text{Log}CA * DU$) produces a coefficient in the model that measures the differential impact of CA on profitability across weak and strong banks. By introducing the dummy variable into equation (2) we have;

$$\text{Log}E_{it} = \beta_1 + \beta_2 \text{Log}CA_{it} * DU + \beta_3 \text{Log}LQ_{it} + \beta_4 \text{Log}TA_{it} + \beta_5 \text{Log}TA_{it}^2 + U_{it} \dots\dots (3)$$

Where;

$$DU = \begin{cases} 1 & \text{Weak Bank} \\ 0 & \text{Strong Bank} \end{cases}$$

$DU = 1$ if the cross section unit is a weak bank and zero otherwise

Fixed Effect and Random Effects Component of the Model

To enable us take into account the fixed and random effect components of the model, equation (3) is compressed into a more compact form as follows;

$$\text{Log}E_{it} = \beta \text{Log}v_{it} + w_i \alpha + \epsilon_{it} \dots\dots\dots (4)$$

In equation (4), there are k regressors in v_{it} explaining bank performance excluding and intercept term. The heterogeneous effect is captured by $w_i \alpha$ where w_i contains a constant term and a set of individual company specific variables which may or may not be observed. The various cases can be considered in estimating equation (4)

(i) Pooled Regression; if w_i contains only a constant term cutting-across weak and strong banks yielding consistent and efficient estimates of the common α and the slope vector β .

(ii) Fixed Effects; if w_i is unobserved but correlated with v_{it} then, equation (4) becomes;

$$\text{Log}E_{it} = \beta \text{Log}v_{it} + \alpha_i + \epsilon_{it} \dots\dots\dots (5)$$

Where $\alpha_i = w_i\alpha$ is the group specific intercept.

(iii) Random Effects; if the unobserved individual heterogeneity is assumed to be uncorrelated with the individual variables, then equation (4) is formulated as;

$$\text{Log}E_{it} = \beta \text{Log}v_{it} + \alpha + u_i + \epsilon_{it} \dots\dots\dots (6)$$

Where, α represents the firms specific unobserved heterogeneity ($\alpha + u_i$) and u_i the idiosyncratic error

To enable us chose between the fixed effect (FE) and the random effect (RE), we need to apply tests to ascertain whether the Fixed effect should be indeed be included in the model. To do this, the standard F-test can be used to check fixed effect against the simple common constant OLS method or the naïve method. The null hypothesis is that all the constants are homogenous and as such, the naïve method is applicable

$$H_0: \beta_1 = \beta_2 = \dots = \beta_N \dots\dots\dots (7)$$

The F-statistics is;

$$F = \frac{(R_{FE}^2 - R_C^2)/(N - 1)}{(1 - R_{FE}^2)/(NT - N - K)} \dots\dots\dots (8)$$

Where R_{FE}^2 the coefficient of determination of the fixed effects is model and R_C^2 is the coefficient of determination of the Naïve model. If the observed F-statistics is bigger than the critical F-value we reject the null hypothesis. Alternatively, the study uses the Hausman (1978), specification test to guide in the choosing between the Fixed Effect model and the Random Effects model.

4. EMPIRICAL RESULTS

The coefficient covariance matrix, the residual covariance matrix and the residual correlation matrix are given in Tables 1, 2 and 3 respectively. The coefficient covariance matrix shows that the variance of the log of total assets is almost 80 times the value of the log of liquidity and the differential intercept coefficient. The residual correlation matrix shows the existence of perfect correlation between the two identifiers in the model signifying the presence of perfect

multicollinearity. However, we proceeded with the estimation because of the robustness of panel data estimation in taking care of collinearity problems.

We estimate the result of the panel data analysis for both strong and weak banks including OLS pooled regression (Naïve model) and the least square dummy variable method for the selected periods (2000-2003). The result of the naïve model (common intercept) is reported in column 1 of Table 4. The result shows that all the coefficients had the wrong signs with the exception of bank liquidity and bank size that had a positive impact on bank earnings. In the naïve model, we assumed that both the strong banks and the weak banks behave alike hence the common intercept. However, on the basis of the performance of the explanatory variables only the liquidity variable (LogLQ) passed the test of significance at the 1 percent level as indicated by the p-value of 0.0001. The R^2 and \bar{R}^2 values of 0.25 and 0.23 are quite low showing that over 75 percent systematic variation in bank earning is left unaccounted for by changes in the exogenous variables. The F-statistics value of 13.1 easily passed the test of significance at the 1 percent level of significance while the Durbin-Watson value of 0.91 shows clear indication of the presence of serial correlation.

Table 1 Coefficient Covariance Matrix

	C	LCADU	LLQ	LTA
C	38.81985	0.015015	-0.2503	-4.31975
LCADU	0.015015	0.000192	-0.00046	-0.00076
LLQ	-0.2503	-0.00046	0.006313	0.019134
LTA	-4.31975	-0.00076	0.019134	0.501434
LTA^2	0.132799	1.38E-05	-0.00061	-0.01551

Source: Authors Computations

Table 2 Residual Covariance Matrix

	SB	WB
SB	1.203081	1.203081
WB	1.203081	1.203081

Source: Authors Computations

Table 3 Residual Correlation Matrix

	SB	WB
SB	1	1
WB	1	1

Source: Authors Computations

Table 4: Least Square Dummy Variable Estimation of the Effects of CA on Bank Performance

	Common Constant	FE LSDV	FE LSDV
Constant Term (C)	12.29696 (1.861492)***	15.03629 (2.413314)**	16.70778 (2.793759)*
Log of Capital Adequacy (CA)	-0.010044 (-0.073704)		
Log of Liquidity (LQ)	0.386487 (4.287159)*	0.294807 (3.710418)*	0.170265 (2.658560)**
Log of Total Asset (TA)	-0.780556 (-1.066368)	-0.917919 (-1.296275)	-0.844939 (-1.237265)
Squared Log of Total Asset (TA ²)	0.028427 (1.243227)	0.030756 (1.398178)	0.027569 (1.354142)
Log Capital Adequacy (CA)*DU		0.037087 (2.674391)**	0.049859 (2.101429)***
AR(1)			0.586789 (8.616733)*
Fixed Effects (Cross)			
SB—C		-1.25E-15	1.25E-16
WB—C		-1.25E-15	1.25E-16
R-Squared (R ²)	0.252665	0.285809	0.520214
Adjusted R-Squared (R ²)	0.233379	0.262621	0.501150
SER	1.139966	1.118013	0.924860
F-Statistics	13.10093*	12.32572*	27.28732*
DW-Stat	0.910262	0.889721	1.923055

NOTE: CA =CAPITAL, E = EARNINGS, TA =TOTAL ASSETS, AND LQ =LIQUIDITY

(***), (**) and (*) represents 10 percent, 5 percent and 1 percent levels of significance

The t-test is in parenthesis

Source: Authors Computations

Allowing for the fixed effect, the equation was re-estimated by simply relaxing the assumption of a common intercept and introducing the differential intercept dummy LogCA*DU which measures the differential impact of capital adequacy (CA) across weak and strong banks we report the FE/LSDV result in column 3 of Table 4. The result shows bank liquidity (LQ), bank size (TA²) and the differential intercept dummy (CA*DU) impacted bank performance positively. However, bank total asset (TA) had a negative impact on performance and easily failed the test of significance at the 5 percent levels while the LogLQ and LogCA*DU passed the test of significance at the 1 percent and 5 percent levels respectively. The differential intercept dummy takes a positive sign and is statistically significant at the 5 percent level implying that the impact of capital adequacy on bank performance is stronger for weak banks than for strong banks. The

R² and R² values of 0.29 and 0.26 is an improvement over the naïve model. The F-statistics value of 12.3 easily passed the test of significance at the 1% levels while the Durbin-Watson value of 0.88 shows the likely presence of serial correlation. To generate a more robust estimate,

we test for inclusion of the fixed effect model, the presence of heteroscedasticity residual and serial correlation in the modal.

Hausman Test for Fixed Effect

The Hausman test is a general test procedure for determining whether there is any correlation between the regressors and the individual specific effects. If the regressors are uncorrelated with the error terms, random effect model is the appropriate model but if the regressors are correlated with the error term fixed effects model becomes the appropriate model. (Hausman, 1978). From Appendix 4, we can easily see that the regressors are correlated with the error term making the fixed effect model appropriate for this study. The result reported in appendix 3, also shows the observed R-squared statistics value of 12.98480 with a probability value of 0.4490. This is the equivalent of the White test for heteroscedasticity. By simply applying the EViews command window: = (@qchisq (.95, 13)) we obtain the 5% critical χ^2 value of 22.3620324948. Since NR² value of 12.98 is less than the 5% critical χ^2 value of 22.3620324948 we accept the null hypothesis of no heteroscedasticity. However, the Durbin Watson statistics value of 0.88 shows the presence of serial correlation in the model.

By applying the first order autoregressive scheme AR (1) to the least square dummy variable model we obtained a much more robust result with the autocorrelation coefficient (ρ) having a positive sign and statically significant at the 1 percent levels. The result is reported in the fourth column of Table 4. The result shows bank total asset to be negatively related to bank performance and failing the test of significance at the 5 percent levels. The Liquidity variable had a positive impact on bank earnings and easily passed the test of significance at the 5 percent levels of significance. Bank total size as measured by (TA²), although having the right sign failed the test of significance at the 5 percent levels of significance. The differential intercept dummy which measures the differential impacts of CA on profitability across weak and strong banks is statistically significant in explaining bank performance. The variable passed the test of significance at the 10 percent levels and is positively related to bank earnings which imply that the impact of capital adequacy on bank performance is stronger for weak banks than for strong banks. The R^2 value of 0.52 and adjusted R^2 value of 0.50 shows a significant improvement implying that over 52 percent systematic changes in bank earnings can be explained by the regressors. The test of the overall goodness of fit of the model-the F-test easily passed the test of significance at the 1% levels with f-values of 27.28. The result shows that all the slope coefficients are jointly significant. The Durbin-Watson value of 1.923 shows the problem of serial correlation was resolved.

5. DISCUSSION OF THE RESULTS

This study has examined the impact of capital adequacy on banks performance in line with the new capitalization policy. In the course of the study, the study found that bank's liquidity (LQ) which is measured by the current assets of banks had a positive and significant impact on bank's

Performance in Nigeria over the period under study. This is in line with Barth, Nolle, Phumiwasana, and Yago, (2003) that linked the performance of bank to the composition of its portfolios. Generally, a bank's portfolio consists of its assets and liabilities rather than just its assets. However, prior empirical evidence showed that the effect of liquidity on bank performance is mixed. While studies such as Demirgüç-Kunt and Huizinga (1998) and Kosmidou (2008) reported negative effect, others such as Hester and Zoellner (1996) reported positive effect. The positive impact of liquidity might be attributed to the huge amount of cash and short term deposits available to the banks as a result of recapitalization. Although, bank capital may be adequate, it may not have significant effect on its performance, revealing that it is not enough for banks to hold adequate capital, banks must be ready to identify and assume risky activities commensurate with such capital and this will help to enhance their performance (Al-Sabbagh, 2004). In support of this, Okpara (2009) emphasized that the N25 billion recapitalization exercise of the Central Bank of Nigeria was necessary but not a sufficient measure in the right direction. The sufficient measure must be one that controls all the identified critical factors. Other factors such as management factor and environment in which banks operate in Nigeria needs to be given appropriate consideration in order to enhance their performance. The problem with banks is not actually having or not having capital inadequacy, but the realization of the gaps in their internal measurement and management process.

The result showed that the size of a bank as measured by the square of the bank's total asset had a positive impact on the performance of banks in Nigeria but not significantly so. The policy implication of this finding is that rather than having all banks in Nigeria as 'mega banks' (as is the case with the recapitalized banks in the wake of the 2004 banking system reform), small banks which are ready to drive SMEs, informal sector and other real sectors of the economy should be in operation with minimal capital base requirement. This is in accordance with the report of Olugbenga, and Olankunle (1998); Claessens, Demirgüç-Kunt, and Huizinga (2001) and Bernauer and Koubi (2002). In line with this finding, it was discovered that bank total asset (TA) has a negative impact on bank's performance and easily failed the test of significance at the 5 percent significance level. This result seems to agree with the reasons put forward by the Central Bank of Nigeria (CBN) in July 2004, that over 69 out of the 89 licensed banks in the country were undercapitalized and operating marginally with poor quality assets (Soludo, 2005; Afolabi, 2006). The result of the study also revealed that the differential intercept dummy takes a positive sign and is statistically significant at 5 percent significant level, implying that the impact of capital adequacy on bank performance is stronger for weak banks than for strong banks. This finding concurs with the fact that most of the banks that were considered as weak banks were unable to meet up with the 25 billion asset base which led to their either being merged with other banks or being acquired by 'strong' banks resulting to a total of 25 banks in 2004 out of the licensed 89 banks. The strategy of merger and acquisition adopted by banks to meet up with the new capitalization policy in line with the CBN directives will actually help banks to achieve the objective of capital adequacy.

6. CONCLUSION AND IMPLICATIONS

The paper has examined the impact of capital adequacy on banks performance across weak and strong banks in Nigeria in the pre consolidation era with the aid of panel regression. The study defined strong banks using quantitative measures of the 10 banks listed amongst the first 20 companies with the highest market capitalization (NSE FACTBOOK, 2004). It was found that the single most significant variable driving bank performance is liquidity while variables such as total bank assets and bank size had relatively insignificant impact on bank performance. The differential intercept dummy which measures the differential impacts of CA on profitability across weak and strong banks shows that the impact of capital adequacy on bank performance is stronger for weak banks than for strong banks. This result is interesting as it supports the reasons adduced for the 2004 bank consolidation and recapitalization in Nigeria, that banks in Nigeria were prone to persistent illiquidity problem, weak corporate governance, poor assets quality, insider abuse, weak capital base and unprofitable business (Abdullah, and Ab-Manan, 2005). The study concludes that the raising of the bank capital base from N2 billion to N25 billion by end of 2005 was a step in the right direction to transform the banking sector and strengthen the country's overall economic stability however, the study suggests an effective regulatory framework in the management of liquidity and in ensuring that banks develop indigenous initiative approach to forecasting their capital position into the future. This will help banks to understand the underlining processes and dynamism of its industry as well as obtaining accurate and reliable predictions of their capital needs. The basic limitation of this study is that it focused basically on the pre consolidation era where the country had over 89 banks. Most of the banks examined in the study have either merged with other banks or distressed. A future research study is required to examine bank performance in the post consolidation era.

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Appendix 1

CBN report with Relation to distress banks, Loss sustained on account of fraud and forgeries and Gross domestic product.

Year	No of distressed banks	Ratio of non-performing loans and advances	Amount required for recapitalization on (N billion)	Total deposit of distressed banks (N billion)	Loss sustained on account of fraud and forgeries (N billion)	Gross domestic product
1990	9	73	2.00	6.40	0.80	90342.1
1991	8	77	2.40	2.60	0.39	94614.1
1992	16	75	5.50	15.90	0.41	97431.1
1993	33	63	13.60	20.80	1.42	100015.2
1994	55	65	23.40	41.60	3.40	101330.0
1995	60	69	30.50	42.60	1.01	103510.0
1996	50	75	43.90	48.00	1.60	107020.0
1997	47	82	42.80	31.20	8.78	110400.0
1998	40	73	39.50	23.10	7.75	112950.0
1999	35	75	27.60	21.90	6.45	116400.0
2000	5	70	12.30	6.23	10.11	120640.0
2001	3	71	9.50	4.20	6.75	125351.0

Sources: Nigerian Deposit Insurance Corporation and Central Bank of Nigeria 2004.

Appendix 2
SAMPLE OF BANKS USED FOR THE STUDY

BANK	YEAR	STRONG BANKS			
		CA	E	TA	LQ
		N'000	N'000	N'000	N'000
STB	2000	2883248	1175025	40296786	31257615
STB	2001	4303287	1857539	60522125	33260303
STB	2002	6551382	2308755	69945954	39749104
STB	2003	9284000	2472764	91578364	56573993
GTB	2000	3117328	1052593	35597119	8401508
GTB	2001	4123792	1604975	45471565	16683322
GTB	2002	8016492	2187059	65021201	23223202
GTB	2003	9638925	3144182	9052179	31256470
FIRST	2000	15265000	4739000	194744000	135472000
FIRST	2001	18170000	5066000	224007000	151648000
FIRST	2002	19406000	4776000	29059300	203573000
FIRST	2003	27006000	11010000	409083000	312978000
UNION	2000	9825383	692956	158874000	119611333
UNION	2001	10596000	1258929	158874000	190050445
UNION	2002	24768444	1704572	252794667	225270000
UNION	2003	32183481	1831013	328716222	275267000
INTER	2000	3410972	1432810	34146127	19932699
INTER	2001	7434140	1808197	53313744	26814113
INTER	2002	8568459	2000790	64107026	41551328
INTER	2003	32532946	3408960	96857882	98062718
CHART	2000	1286025	86800	18950696	10391611
CHART	2001	1775732	62675	23869598	14589692
CHART	2002	3215594	178305	33015901	17050622
CHART	2003	4241117	370368	444504039	22453225
TRADE	2000	698085	3758000	6729523	2999992
TRADE	2001	774390	5008000	10791864	5575393
TRADE	2002	1665730	5424667	11303712	5760684
TRADE	2003	2065559	6982889	15277822	7059040
HALL	2000	1906726	690974	22751806	5079838
HALL	2001	2588249	1031523	38810562	9019013
HALL	2002	3616374	1133125	44101146	15578912
HALL	2003	4638413	1022040	13447377	10002664
OCEAN	2000	1501099	972040	230924468	16006417
OCEAN	2001	3563933	2062834	31661559	20928857

OCEAN	2002	5155201	2186268	40274806	34298432
OCEAN	2003	7073082	2817881	21525127	43892919
UBA	2000	7336000	100601	7193556	88561000
UBA	2001	9067000	97438	10104012	135544
UBA	2002	10627000	149627	8782058	134138000
UBA	2003	14901000	410063	22709999	124447000

WEAK BANKS					
BANK	YEAR	CA	E	TA	LQ
		N'000	N'000	N'000	N'000
WEMA	2000	2314016	251498	188032	12347877
WEMA	2001	2596062	619554	200196	23284626
WEMA	2002	3768119	1481667	203196	24501809
WEMA	2003	7215393	1477775	212024	35015518
EIB	2000	788707	1269000	32321403	3741625
EIB	2001	869491	1566000	53294127	5057435
EIB	2002	1266564	3280000	64978495	3944944
EIB	2003	1895129	4525000	4186482	90698829
UTB	2000	2168856	879492	30097928	13460861
UTB	2001	2780266	1052425	32499700	19039627
UTB	2002	3294829	1142612	32128729	17606288
UTB	2003	3452846	370664	9868652	17332713
INLAND	2000	2017641	118456	13834228	4395967
INLAND	2001	2258667	258065	16646054	6636048
INLAND	2002	2299169	490502	24578922	6685466
INLAND	2003	2444234	295065	8466041	9294206
GULF	2000	973634	358436	13090454	5904855
GULF	2001	1678644	596418	13974754	7957660
GULF	2002	2408976	930332	18856550	7180617
GULF	2003	5535253	779893	12799297	8764243
NAL	2000	2547474	492467	17479878	4506237
NAL	2001	2970413	370038	21467983	5559699
NAL	2002	3012532	39810	24608856	2781772
NAL	2003	3352819	178923	4522675	4506534
MANNY	2000	1130663	302000	5539168	2305970
MANNY	2001	1341885	286222	7446622	2320005
MANNY	2002	1595770	343886	8840453	3618245

MANNY	2003	2803919	167203	13082404	4156174
TRANS	2000	1022754	226228	13135014	7150955
TRANS	2001	1236832	429838	144833311	8193241
TRANS	2002	2227990	423757	19366634	6653046
TRANS	2003	2377160	149169	8434560	9763706
ACCESS	2000	841750	130079	8027957	37504657
ACCESS	2001	919493	77743	11342941	3666360
ACCESS	2002	1943784	-55245	22582040	5464076
ACCESS	2003	2365356	556573	68062000	9542669
AFRI	2000	3529000	-597000	78630500	29385000
AFRI	2001	4554000	1180000	83210000	32259000
AFRI	2002	6268000	1801000	98055000	31148000
AFRI	2003	6969000	988000	6309276	44381000

Source: Nigerian Stock Exchange 2004 Fact Book
 NOTE: CA =CAPITAL, E = EARNINGS, TA =TOTAL ASSETS, AND LQ =LIQUIDITY

Appendix 3

Heteroskedasticity Test: White

F-statistic	0.983700	Prob. F(13,66)	0.4766
Obs*R-squared	12.98480	Prob. Chi-Square(13)	0.4490
Scaled explained SS	12,64006	Prob. Chi-Square(13)	0.4760

Test Equation:

Dependent Variable: RESID²

Method: Least Squares

Date: 09/07/10 Time: 07:00

Sample: 1 80

Included observations: 80

Collinear test regressors dropped from specification

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	376.0695	1888.734	0.199112	0.8428
LCA	-15.44451	43.20165	-0.357498	0.7219
LCA ²	-0.111635	0.404475	-0.275999	0.7834
LCA*LLQ	0.256712	0.264230	0.971545	0.3348
LCA*LTA	1.380057	4.759153	0.289980	0.7727
LCA*(LTA ²)	-0.032501	0.140846	-0.230756	0.8182
LLQ	23.53228	37.04063	0.635310	0.5274
LLQ ²	0.145102	0.132134	1.098140	0.2761
LLQ*LTA	-3.330986	4.117811	-0.808922	0.4215
LLQ*(LTA ²)	0.084705	0.118324	0.715872	0.4766
LTA	-125.9736	464.7244	-0.271072	0.7872
LTA ²	14.53243	43.07090	0.337407	0.7369
LTA*(LTA ²)	-0.648552	1.769284	-0.366562	0.7151
(LTA ²) ²	0.010034	0.027131	0.369848	0.7127
R-squared	0.162310	Mean dependent var		1.258912
Adjusted R-squared	-0.002690	S.D. dependent var		1.885505
S.E. of regression	1.888038	Akaike info criterion		4.266582
Sum squared resid	235.2695	Schwarz criterion		4.683437
Log likelihood	-156.6633	Hannan-Quinn criter.		4.433711
F-statistic	0.983700	Durbin-Watson stat		1.712493
Prob(F-statistic)	0.476643			

Appendix 4

Redundant Fixed Effects Tests

Pool: Untitled

Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	0.000000	(1,151)	1.0000
Cross-section Chi-square	0.000000	1	1.0000

Cross-section fixed effects test equation:

Dependent Variable: LE

Method: Panel Least Squares

Date: 09/08/10 Time: 13:45

Sample (adjusted): 2 80

Included observations: 79 after adjustments

Cross-sections included: 2

Total pool (balanced) observations: 158

Convergence achieved after 9 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	16.70778	5.960688	2.802995	0.0057
LCADU	0.049859	0.023648	2.108376	0.0366
LLQ	0.170265	0.063833	2.667349	0.0085
LTA	-0.844939	0.680659	-1.241356	0.2164
LTA^2	0.027569	0.020292	1.358618	0.1763
AR(1)	0.586789	0.067874	8.645219	0.0000
R-squared	0.520214	Mean dependent var		13.57335
Adjusted R-squared	0.504432	S.D. dependent var		1.309457
S.E. of regression	0.921813	Akaike info criterion		2.712286
Sum squared resid	129.1603	Schwarz criterion		2.828587
Log likelihood	-208.2706	Hannan-Quinn criter.		2.759517
F-statistic	32.96164	Durbin-Watson stat		1.923055
Prob(F-statistic)	0.000000			

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