Intermediation Efficiency and Profitability Performance: Quantitative Evidence from Nigerian Banking Sector

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Abstract
The study was a conscious effort at analyzing the relationship between intermediation efficiency and profitability performance within the Nigerian banking industry from 1990 to 2009 with a view to identifying the determinants of efficiency and profitability.The study utilized a combination of descriptive statistics such as graphical illustrations and pooled ordinary least squares regression techniques. An in-depth analysis of the trends of key profitability and efficiency indices revealed that Nigerian banks rank among the most profitable globally, while it exhibits a generally poor rating in terms of efficiency of financial intermediation. Tests of the relationship between intermediation efficiency and profitability exert significant causal effects on the efficiency of intermediation.Findings from the pooled ordinary least square (ols) regression results indicated that factors that positively determine the level of bank profitability performance include bank capital (bcp) (β = 0.53, t=2.04); Market Share (ms) (β = 0.31, t=1.81): bank concentration (bco) (β=0.74, t=1.72); white asset quality (ac) (β=0.52, t=2.15) negatively influenced it. Conversely, factors that stimulate intermediation efficiency include overhead costs (ovh) (β=0.42, t=2.21); equity (eq) (β=0.60, t=1.95); bank concentration (bco) (β=0.49, t=2.02); bank's profitability (roa) (β=111.23, t=5-21); while those that detract include loan intermediation (loan) (β=0.31, t= -1.81) and inflation (inf) (β= -0.92, t= -1.92). The results therefore established that individual bank characteristics, industry structure and the overall macroeconomic environment are significant determinant of bank profitability and efficiency performance in Nigeria banks.
Keywords: profitability, intermediation, efficiency performance, banking industry structure , macre-economic environment.

Introduction
Economic literature provides overwhelming evidence that a well-structured financial system is a *sine-qua non* for economic growth. Indeed, financial intermediation determines, among other factors, the efficient allocation of savings as well as the returns on savings vis-à-vis investment. King and Levine (1993) and Levine and Zervos (1998) in their respective studies have shown that measures of the size of the banking sector are highly correlated with per capital growth. In the same vein, Levine (2003) posited that emerging evidence suggested that the level of development in the banking sector exerts a causal impact on economic growth. It is widely accepted among economic theorists and banking practitioners that a country's banking system is the hub which propels the respective country's financial system. Similarly, banks, through financial intermediation, act as quality controller for capital intensive projects and facilitate capital formation via investment as well as promote economic growth.

In Nigeria, the banking system has undergone significant changes over the past decades through restructuring and privatization programmes; consolidation mergers and entry of new banks; overhaul of the legal framework and strengthening of regulatory and supervisory frameworks. However, these reforms, as desiring as they were, had not resulted in a deserving financial intermediation, compared to regional standards. It is arguable that the financial liberalization engendered the entry of new banks. For instance, Ecobank Group abridged annual report of 2009 reported that banks in Nigeria increased from 40 in 1985 to 107 in 1990. This proliferation was attributable partially to the existence of parallel foreign exchange regime arising from perceived overvaluation of the domestic currency, which invariably, allowed banks to make brisk profits from various arbitrage opportunities. Even though the contribution of the financial sector to GDP increased sequel to the financial deregulation, surpassing the hitherto preferred manufacturing sector share in GDP for most periods, the Nigerian financial sector, indeed witnessed, a financial disintermediation. This becomes explicable as a large number of the new banks were not disposed to intermediating funds from depositors to lenders but rather making brisk profits from the arbitrage and other illegal rent seeking activities. Arising from the high fragmentation and low financial intermediation, the regulators promulgated some prudential guidelines in 1990-1991, and a moratorium on new bank licenses' in 1991. As a result of serious fall in prices of stock market and manifestation of non-performing loan portfolios, the Nigeria Deposit Insurance Co-operation (NDIC) announced

in 1992-1993 that about twenty-four (24) banks were insolvent while about twenty-six (26) others were seriously troubled. Stein (1997) described these fifty (50) banks as having two-thirds of total banking assets and three-quarters of deposits in Nigeria's financial system. In their remarks, Capvio and Klingebiel (2003) posited that Nigeria faced a systemic banking crisis throughout the 1990s.

Following the inauguration of a civilian regime in 1999, the regulators introduced policies to improve the macroeconomic environment. Thus, the Central Bank of Nigeria (CBN) in July, 2004, directed banks to increase minimum capital requirement from ₦2 billion to ₦25 billion on, or before December, 2005. The interaction increased the average size of banks through merger and acquisitions and by 2006, the number of banks shrank from 89 to 25 banks.

Efficiency of Financial Intermediation
Efficiency of financial intermediation, otherwise known as interest rates spreads have been widely researched upon on regional basis as well as on country basis. Ho and Saunders (1981) empirically tested their model when analyzing the determinants of bank interest margins. It was argued that one of the best known models of bank behavior is the Hedging Hypothesis which views the bank as seeking to match the maturities of assets and liabilities in order to avoid the reinvestment or refinancing risks arising from inadequate assets or excess assets. This model assumes that the major portfolio risks emanates from interest rate fluctuation. Dougall and Gaumitz(1975) argued that the model indeed explained many aspects of actual bank portfolio behavior. Its weakness, however lies in the fact that its proponents usually fail to tie hedging behavior to the underlying objective of the decision maker. Nevertheless, Sharpe, (1967) infer an implicit assumption that the bank hedges in order to minimize the risks of shareholders wealth.

The microeconomics models of banking exhibit a good deal of heterogeneity. These models assume that the banks seek to maximize either expected utility of profit or minimize the expected utility of loss (wealth). Pyle (1971) assumes that the bank is an expected utility of wealth maximizer. Pyle (1971) sought to determine the necessary and sufficient conditions for the existence of financial intermediation. The categories of assumptions with regard to time and asset opportunity sets clearly showed that if rates on deposits and loans were independent, intermediation would exist whenever a positive risk premium for loans and a negative premium for deposits were present. In retrospect, the Ho and Saunders model was an extension and integration of the Hedging and Expected Utility approaches in the determinants of bank spreads. The model simulates banks as operating as risk-averse dealers in setting bid-ask spreads in securities markets. It was demonstrated that an interest spread or margin would always exist as they arose, mainly, from transaction uncertainty faced by the bank. Moreover, it was shown that this pure spread depended on 4 factors namely: the degree of managerial risk aversion; the size of transactions undertaken; bank market structure and the variance of interest rates. The model implied that liability and asset structures had to be analyzed together since they were directly interrelated through transactions uncertainty. Itshows therefore that, due to transactions uncertainty, hedging behavior was perfectly rational within an expected utility maximizing framework.

The micro-economic literature perspective of banking also considered banks as dealers providing liquidities which allow other market participants to buy and sell securities in order to provide immediacy, dealers must hold an inventory of stocks and ensure compensation for the costs of operation by charging a spread between the selling and the buying prices. The costs have been categorized to 3 as Order-processing cost, Inventory holding cost and Adverse selection cost. Brock and Franken (2003) took consideration of the fact that the numerous purchases of the banks are more complex than the dealer's problem of just providing intermediacy. In their model, they identified the conceptual difference between empirical regression of spreads which are based on bank accounting identities and those which are motivated by maximizing models of bank behavior e.g. the Monti-Klein approach. A typical stylized bank balance sheet shown below would suffice:

Assets	Liabilities
Required Reserves (R)	Demand Deposits (DD)
Short Term Asset (AS)	Time Deposits (TD) Short Term
Long Term Asset (AL)	Equity (E)

The following three (3) types of spreads come out of the balance sheet:

Net Interest Margin NIM $= \dfrac{r_aA - r_aD}{A}$

Where A= As + Ad and $r_a = r_sA_s = \dfrac{r_L}{A}$

Average spread $= r_a - r_d$

Marginal spread $= r_s - r_d$

$r_l - r_d$

Note A = As + AL and D= D D + TD

Where rd = Marginal cost of funding out time deposit

rs – return on short term assets

rl – return on long term assets

The NIM measures an average return on assets relative to the explicit interest cost of funding those assets; the average return on asset is ra while the average cost of funding those assets is rdD/A. The average spread is the difference between average return on assets ra, and the marginal cost of funding out of time deposits, rd. It was noted that the NIM with its implicit inclusion of the demand deposits and equity as zero cost sources of funds is useful in demonstrating profitability that permits banks to cover their fixed costs of operation. The average spread, with its emphasis on the marginal cost of funding new assets, is a good measure of the marginal cost of financial intermediation between borrowers from Banks and marginal providers of funds.

Marginal costs reflect the bank's willingness to take duration risk (borrow short, lend long) with some fraction of the banks' assets, while matching asset and deposits maturities with the other fraction of the assets. The marginal spreads contain information that is not accessible by using the average spread or the NIM. As a result therefore, the marginal spread can give an additional perspective on the process and cost of intermediation. They then measure the NIM and the average spread using balance sheet and income statement figures, while the marginal spreads use actual loan rate and deposit rate data from banks. In the empirical estimation of interest margins and spreads, they started with the bank income statement.

raA=rd D + Noninterest expenses + costs + provision + re Equity

where Noninterest expenses refer to expenses spent on servicing demand accounts minus commissions banks receive for off-balance sheet activities costs refer to overhead costs, provisions are made for loan portfolios written off and re Equity is profits (return on equity x bank capital).

Beginning with the income identity, an expression for the NIM is easily derived

$NIM = raA − rdD/A = Noninterest expenses/A + Provisions/A + reEquity/A$

Furthermore, there are cost functional approaches to estimating spreads of which the most commonly cited is the Monti-Klein bank model originally developed by Klein (1971) and Monti (1972). The model is based on the assumption that there is a cost function for running a bank that depends on the aggregate value of the assets being managed by the bank as well as other factors of production, such as capital and labour (K,L): costs = C(A:K,L,). Assuming that a bank maximizes profits, the income accounting identity becomes:

Profits = raA-rdD – C(A; L, L) – Provisions – Noninterest expenses.

Profit maximization for a competitive bank leads to the following first order conditions (where dD = d A on the margin).

rd – rd = 2 c(A;K,L)/ ∂A

This condition states that a competitive bank will set the marginal cost of managing assets equal to the spread. All other components of the accounting identity drop out because they involve marginal profits if marginal costs are linear in assets, and then the spread equation becomes

ra – rd = β, A + β$_2$ K + β$_3$ L

If the banking industry is assumed to be a monopoly, then the profit maximization leads to the following condition.

$ra-rd = D (\partial rd)/\partial A − A(\partial ra/\partial A + \partial C(A; K, L)/\partial A$

$= 1/\pi d + 1/\pi a + \partial C(A;K,L)/\partial A$

where; $\pi d, \pi a$ are semi-elasticities of asset supply and deposit demand ($\pi a= - 1/A \times dA/dra$ and $\pi d = - 1/D \times dD/drd$)

In the banking industry characterized by oligopoly, the spread will be a function of the number of banks in the system. If under the assumption of a common factor cost function and cournot behavior, the spread will be given by the following expression:

$ra – ad = 1/N (I/\pi a + 1/\pi d) + β,A + β_2 K + β_3 L$

where N is the number of banks

Methodology

The study aimed at investigating and determining the efficiency of financial intermediation and corporate performance of the Nigerian banking industry between 1990 and 2009. The data were sourced from the list of pre and post consolidation banks in Nigeria. In order to ensure safe analysis, the 25 banks which succeeded in bridging the pre and post consolidation dichotomy were considered qualified for the generation of cross-sectional and time series data, mainly extracted from the end of year consolidated income statements and balance sheets of individual banks, irrespective of the observed differences in the choice of accounts and financial year by the selected banks.

Model Specifications

Following Ho and Saunders (1981), (Robinson, 2002, Valverde and Fernendez, 2007 Crowley, 2007), a general class of regression for the intermediation efficiency and profitability performance is determined as follows:

Model of Intermediation Efficiency Determination

The estimated form of regression takes the form for the intermediation efficiency model as:

$EV_{it} = \beta_0 + \beta_1 OVH_{it} + \beta_2 LI\varphi it + \beta_3 E\varphi it + \beta_4 LOAN it +$

$B_5 CCit + \beta_6 INF_{it} + \beta_7 EXC it + \beta_8 ROA_{it} + £it$

where:

EV_1 = net interest margin (NIM)

The banks specific variables are

OVH = Overhead cost ($\beta_1 < 0$)

$LI\varphi = Liquidity (\beta_2 > 0)$

EQ = Equity ($\beta_3 < 0$)

LOAN = Loan Intermediation ($\beta_4 > 0$)

The industry structure variable

CC = Bank concentration ($\beta_5 > 0$)

ROA = Return on Asset ($\beta_8 > 0$)

Macroeconomic variables are

INF = Inflation ($\beta_6 > 0$)

EXC = Exchange Rate Depreciation ($\beta_7 > 0$)

Dependent Variable(s)

(i)   Spread

Interest rate spread is defined as the difference between average lending and deposit rates.

Model of Bank Profitability

The estimated form of regression for bank profitability is considered as:

$IIit = \beta_Q + \beta_1 BC_{it} + \beta_2 CRit + \beta_3 MSit + \beta_4 CCit + \beta_5 AQit + \beta_6 INFit + \beta_7 + BCYit + \beta_8 EVitEit$

Where:

II = Commercial Banks profits measured by return on assets (ROA)

The Banks specific variables are:

BC = Bank Capital

CR = Credit Risk

AQ = Assets Quality

The industry structure variables are:

MS = Market Share

CC = Bank Concentration

EV = Financial Intermediation

The Macroeconomic variables are:

INF = Inflation

BCY = Business Cycle

Dependent Variables

(1)   ROA = Return on Asset

It is defined, for this research, as the banks' after tax profit over total assets. Rather than alternative return on equity (ROE), ROA is chosen as the key proxy for bank profitability, particularly because analysis of ROE disregards financial leverage and the risks associated with it.

Net Interest Income

All firms can divide the balance sheet into assets and liabilities. For banks the assets are commercial and personal loans, mortgages, construction loans and securities. The liabilities are deposits from customers. The net interest income is then the difference between the revenues on the assets and the cost of servicing the liabilities. Increases in the net interest income therefore reflect increased revenue of the banking system. This indicator for the Nigerian banking industry as presented in Figure1 showed that net interest income exhibited a consistent increasing trend from a modest amount of N22 billion naira in 1999 to N224 billion in 2004. However, periods following the bank consolidation exercise indicated a slightly deteriorating trend in this indicator, decreasing to N204 billion in 2006. The dramatic jump of net interest income to N616 billion in 2007 reflected the outcomes of a more virile financial institutions that emerge after the consolidation exercise. This however, continued till 2009.

Fig 1: Net Interest Income
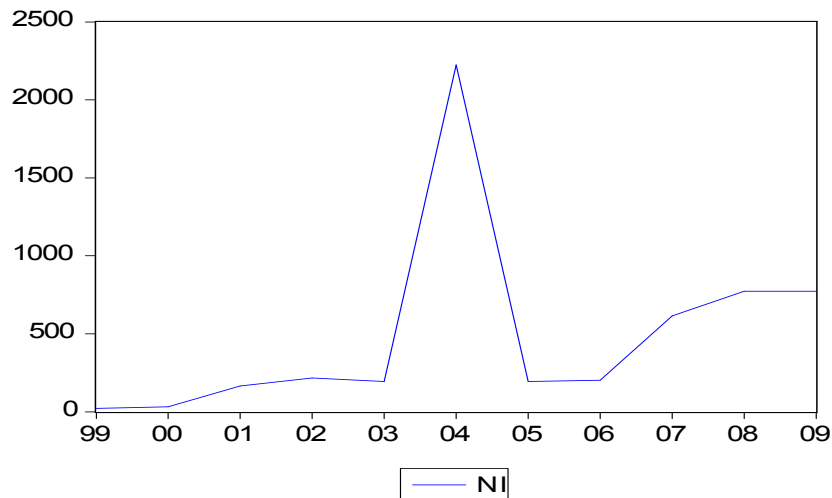
Source: Data Analysis, 2009

Non-Interest Income
One other measure of profitability performance is the non interest income. The primary types of non-interest income in a bank are revenue from sundry services, fiduciary fees, and deposit .service charges. Various sundry services include computer services, financial planning, brokerage, insurance, and others. Fiduciary services include trust and estate administration, securities safekeeping, corporate stock transfers, and many more. Deposit service charges are levied on various business and individual checking and savings accounts. Other sources of non-interest income include security gains and losses and fees from Off Balance Sheet Activity such as interest rate swap contracts.

As indicated in the chart below, the indicator suggests consistently profitable operations of the Nigerian banking industry. The chart revealed an upward movement in the trend of non interest income and became very high in the year 2007, but decline in 2008 and 2009.

Fig 2: Non Interest Income
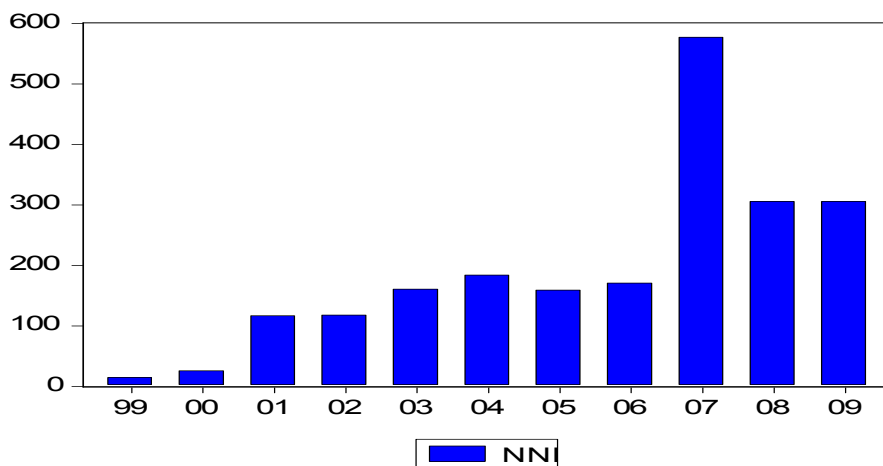
Source: Data Analysis, 2009

Operating income
Operating income is a measure of a company's earning power from ongoing operations, equal to earnings before deduction of interest payments and income taxes.

Figure 3 indicated that except for slight downward swing in the consolidation years 2005 - 2006, this indicator also suggest that the industry consistently posted impressive operating income with a peak of N 1.3 trillion in the year 2007.

Fig 3: Operating Income
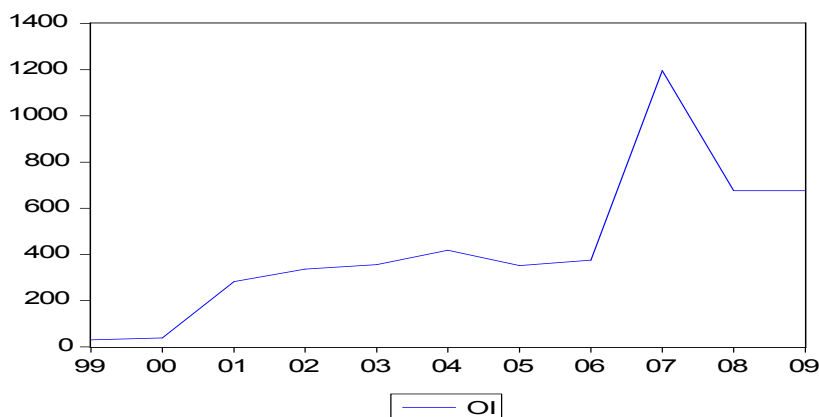
Source: Data Analysis, 2009

Profit before Tax

Profit before tax is a profitability measure that looks at a company's profits before the company has to pay corporate income tax. This measure combines all of the company's profits before tax, including operating, non-operating, continuing operations and non-continuing operations. PBT exists because tax expense is constantly changing and taking it out helps to give an investor a good idea of changes in a company's profits or earnings from year to year.

Figure 4 indicates the trends in this measure of profitability performance. Although with remarkable cyclical swing, the banking industry recorded a generally impressive profitability performance over the period of analysis.

Fig 4: Profit before Tax
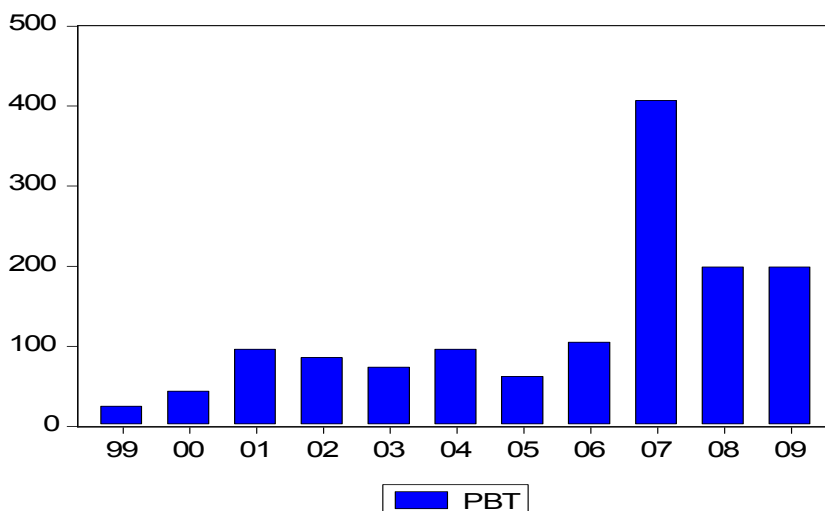
Source: Data Analysis, 2009

Return on Assets

Return on asset is an indicator of how profitable a company is relative to its total assets. ROA gives an idea as to how efficient management is at using its assets to generate earnings. Calculated by dividing a company's annual earnings by its total assets, ROA is displayed as a percentage. Sometimes this is referred to as "return on investment". The assets of the company are comprised of both debt and equity. Both of these types of financing are used to fund the operations of the company. The ROA figure gives investors an idea of how effectively the company is converting the money it has to invest into net income. The higher the ROA number, the better, because the company is earning more money on less investment. The figure below revealed an inconsistent trend in return on asset but with a high swing 2001and 2007 there about.

Fig 5: Return on Asset
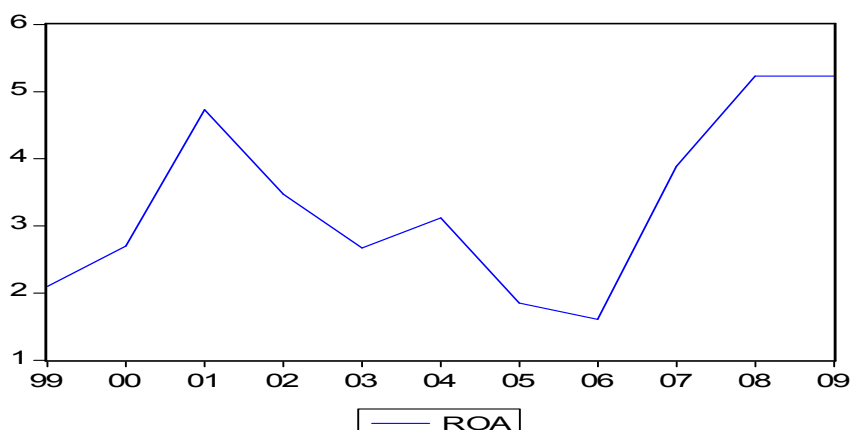
Source: Data Analysis, 2009

Return on Equity

Return on equity is an alternative indicator of company's profitability. It is the amount of net income returned as a percentage of shareholders equity. Return on equity measures corporation profitability by revealing how much profit a company generates with the money shareholders have invested.

Fig 6: Return on Equity
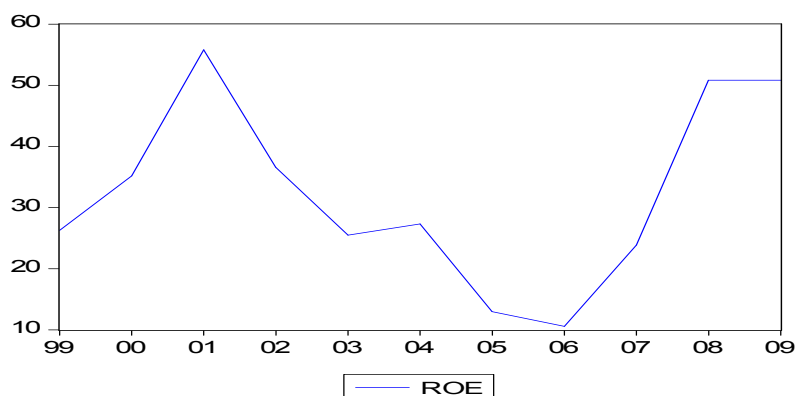
Source: Data Analysis, 2009

Figures 5 and 6 respectively present the trend in returns on assets and on equity within the Nigerian banking industry over the period of analysis. The period 1999 to 2001, which can be regarded as years of banking bubble in Nigeria, recorded consistent increases in both the ROA and ROE profitability indices. These indices increase from 2.1 % and 26.3% in 1999 to 4.73 and 55.81% in 2001 respectively. The trends of these indicators however reflected the bubble burst experienced in the industry in the periods immediately preceding bank consolidation, as the banking industry witnessed a consistent decline in both measures from 2002 to 2004. The continued decline in this ratio in the period following bank consolidation however reflected the increase in mandatory capital in the industry during this period. The years 2007 to 2009 indicated remarkable improvements in banks returns on assets and equity indicators, as banks continued to deploy their capital for profitable investments.

Yield on Earning

Earning Assets consists of interest-bearing financial instruments, comprising of commercial, real estate, and consumer loans; investment and trading account securities; money market investments; lease finance receivables; and time deposits in foreign banks. The Yield on Earning Assets is a banking efficiency ratio figure that shows how much a bank generated from its earning assets. An analysis of this performance indicator revealed a range of 4.74 and 7.8 percent in the period preceding the bank consolidation exercise, with a peak of 14.17 percent in 2004. The periods following bank consolidation have however witnessed a consistent deterioration of this indicator.

Fig7: Yield on Earning
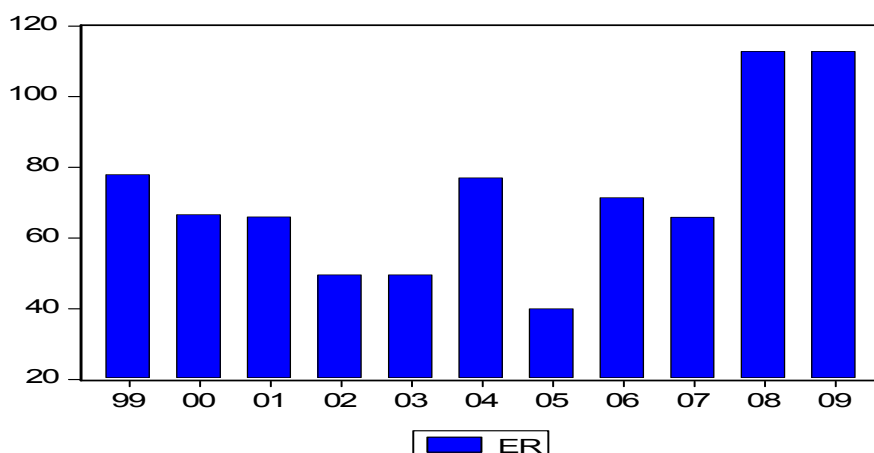
Source: Data Analysis, 2009

Net Interest Margin

This tells the average interest margin that the bank is receiving by borrowing and lending funds Net Interest Margin (NIM) is a measure of the difference between the interest income generated by banks or other financial institutions and the amount of interest paid out to their lenders (for example, deposits), relative to the amount of their assets. It is usually expressed as a percentage of what the financial institution earns on loans in a time period and other assets minus the interest paid on borrowed funds divided by the average amount of the assets on which it earned income in that time period. Net interest margin is similar in concept to net interest spread, but the net interest spread is the nominal average difference between the borrowing and the lending rates, without compensating for the fact that the earning assets and the borrowed funds may be different instruments and differ in volume. The net interest margin can therefore be higher or occasionally than the net interest invested spread.

Fig 8: Net Interest Margin
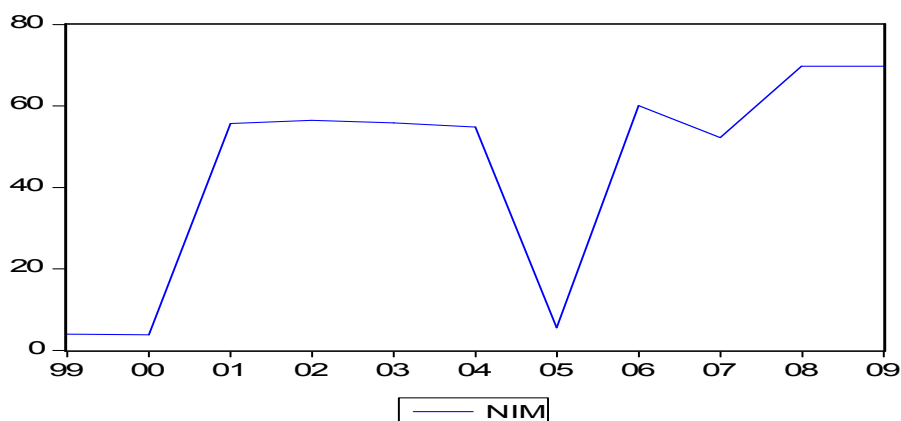
Source: Data Analysis, 2009

Efficiency Ratio

Efficiency Ratio is used to calculate a bank's efficiency. Not all banks calculate the efficiency ratio the same way. For all versions of the ratio, an increase means the company is losing a larger percentage of its income to expenses. If the efficiency ratio is getting lower, it is good for the bank and its shareholders. It is also referred to as the "overhead burden" or "overhead efficiency ratio". The efficiency ratio in the Nigerian banking industry, as shown in Table 4.1, has remained relatively very high, peaking at 77 percentage point in 1999 and 2004.

Fig 9: Efficiency Ratio
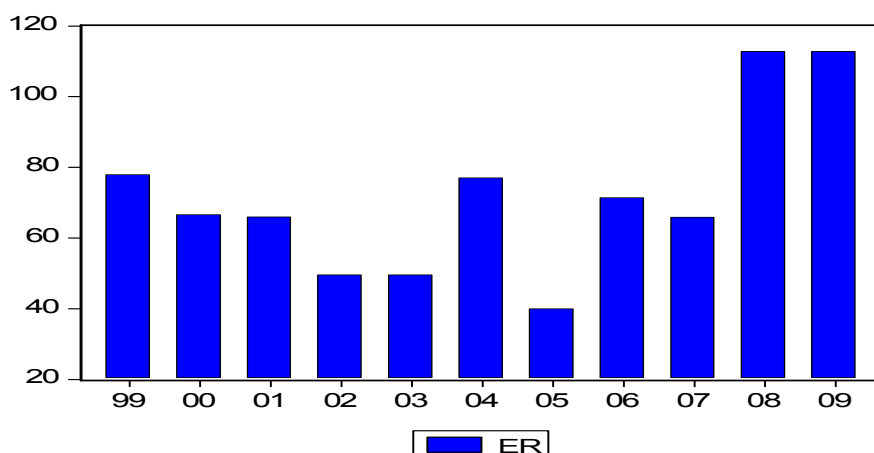
Source: Data Analysis, 2009

Causality Tests
A test of causality between corporate profitability and working capital management is important in establishing the nature of the causal nexus between the two performance variables in the Nigerian banking system. It also serves to validate the choice of dependent and independent variable for the preceding specification of the profitability and intermediation model.

The Granger causality test requires that all data series involved are stationary. Otherwise, the inference from the F-statistic might be spurious because the test will have nonstandard distributions. Accordingly, the first-difference series are used to perform the Granger causality tests. The results of the tests are reported in Table 2.The pair wise causality tests between profitability and measure of intermediation efficiency as shown by the test statistics presented in rejected the null hypothesis for causal nexus from profitability to efficiency, while it accepts the null for causality nexus from efficiency to profitability indicating that profitability performance caused efficient financial intermediation in the Nigerian banking industry. The causality between the variables is uni-directed, with no feedback from efficiency to profitability.

Table 2: Pairwise Granger Causality Tests(1999 2009)

Null Hypothesis:	Obs	F-Statistic	Probability
ROE does not Granger Cause NIM	9	0.12375	0.88686
NIM does not Granger Cause ROE		0.15548	0.86094

In summary, the foregoing trend analysis of key profitability and efficiency index generally indicated consistently improving trends in profitability performance, confirming the claim that the Nigerian banking industry remains one of the most profitable globally. Also in terms of intermediation efficiency, while some indicators such as yield on earning assets and net interest margin indicate satisfactory performance, others such as interest rate spreads indicate a poor rating of efficiency in funds intermediation.

Econometric Option of Analysis
The study attempts to estimate both the spread and profitability equations with Panel Least Squares (PLS) and Fixed Effects Regression (FER) where control is placed on time-specific effects. For both PLS and FER, a discount is made for clustered standard errors across observation of the same bank. One other major consideration which involve time series data was the non-stationarity of underlying data. Where non-stationarity is not accounted for in the estimation process, it may lead to spurious regression with serious negative consequences for inferences. Thus, one unit root test within a panel framework was conducted using Pesaran and Shin (1997, 2003), augmented by Dickey and Fuller (1979), Philips and Perron (1988) and Levin and Lin (1992, 1993) tests. Following this, a test for cointegration among the variables was conducted. Initially developed panel cointegration tests applied panel and root tests directly to the residuals from an Engle Granger type two-step methodology. But the recent opinion in literature suggests that the tests statistics using this approach would be biased towards accepting stationarity. Pedroni (1995) shows that applying panel unit root tests directly to regression residuals is inappropriate for several reasons such as the lack of exogeneity of regressors and the dependency of the residuals on the distribution of estimated coefficient. Consequently, it is important to have a test procedure for cointegration which is robust to the presence of heterogeneity in the alternative.

Determinants of intermediation Efficiency and Profitability Performance: Panel Least Squares Estimation
The two models earlier developed with respect to intermediation efficiency and bank profitability will be adopted to test for unit roots of the variables and cointegration of the equations and their results as presented in Table 1. The pooled OLS regression model results and their interpretation is shown in Table 2 for the intermediation efficiency model while Table 3 presents results and interpretation for the profitability model.

Panel Unit Root and Cointegration Results
The panel unit root test results indicated in Table 1 shows evidence on non-stationarity in levels.

Table 1: Panel Unit Root Tests- (Individual effects, individual linear trends) Test Methods

Variables	D-Value	LLC	P - Value	IPS	P - Value	ADF	P - Value	PP	P - Value
EV	0	-4.92	0.000	-3.22	0.000	54.78	0.000	59.65	0.000
	1	-13.96	0.000	-8.67	0.000	115.22	0.000	140.95	0.000
Π	0	-11.59	0.000	-7.29	0.000	102.48	0.000	110.36	0.000
	1	6.93	1.000	3.29	0.999	56.06	0.001	93.07	0.0000
LIQ	0	-22.36	0.000	-9.01	0.000	102.95	0.000	121.07	0.000
	1	-10.98	0.000	-12.04	0.000	172.00	0.000	236.51	0.000
EQ	0	-0.50	0.305	0.34	0.636	28.29	0.344	30.31	0.2548
	1	-9.89	0.000	-8.21	0.000	105.74	0.000	134.50	0.000
LOAN	0	-1.04	-1.044	0.101	0.540	30.70	0.330	31.81	0.2822
	1	-11.59	0.000	-7.29	0.000	102.48	0.000	110.36	0.000
INF	0	4.14	1.000	5.18	1.000	11.84	0.996	12.89	0.9934
	1	-3.69	0.000	-3.30	0.000	69.32	0.000	105.93	0.0000
EXC	0	-8.95	0.000	-7.96	0.000	108.21	0.000	135.36	0.000
	1	-20.55	0.000	-13.31	0.000	178.84	0.000	219.42	0.000
BC	0	-7.34	0.000	-3.08	0.001	50.72	0.005	25.59	0.595
	1	-6.92	0.000	-3.43	0.000	54.26	0.002	42.88	0.035
CR	0	-7.69	0.000	-3.02	0.001	50.30	0.006	28.53	0.436
	1	-3.64	0.000	-4.40	0.000	71.01	0.000	35.29	0.161
MS	0	2.03	0.982	14.36	1.000	3.73	1.000	150.30	0.865
	1	-19.27	0.000	-9.33	0.000	-19.37	0.000	672.32	0.000
CC	0	-0.20	0.421	-4.55	0.000	-9.47	0.000	369.05	0.000
	1	-200.7	0.000	-11.97	0.000	-32.63	0.000	848.49	0.000
AQ	0	-103.9	0.000	-2.01	0.020	-55.04	0.000	298.79	0.000
	1	-45.57	0.000	-7.10	0.000	-11.28	0.000	552.79	0.000
BCY	0	-40.06	0.000	825.74	0.000	1242.0	0.00	11.97	0.000
	1	-31.99	0.000	1216.9	0.000	5480.5	0.000	13.60	0.000

According to LLC, LPS, ADF and PP test results; the null of non-stationarity is accepted for all the critical values at lag order 1. One of the ways to deal with 1(1) variable is to investigate cointegration relationship between variables. Except for panel variance statistics in the bank profitability model and panel ADF statistics in the financial intermediation model, all of the panel cointegration test statistics developed by Pedroni rejects the null of no cointegration at 5 percentage significance level as shown below in Table 2.

Table 2: Pedroni Residual Cointegration Test
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
Lag selection: fixed at 1
Newey-West bandwidth selection with Bartlett kernel
Model: Bank Efficiency
Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-3.093554	0.0033	-3463476	0.0010
Panel rho- Statistic	3.170962	0.0026	3.410842	0.0012
Panel PP- Statistic	-3.112600	0.0031	-5.294239	0.0000
Panel ADF- Statistic	-2.067169	0.0471	-4.083724	0.0001

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho- Statistic	5.277694	0.0000
Group PP- Statistic	-4.626897	0.0000
Group ADF- Statistic	-3.321199	0.0016

Model: Bank profitability
Alternative hypothesis: common AR coefs (within dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-2.202074	0353	-3.306564	0.0017
Panel rho- Statistic	2.799177	0.0079	2.993428	0.0045
Panel PP- Statistic	-4.222 1 11	0.0001	-5.24956 1	0.0000
Panel ADF- Statistic	-3.532066	0.0008	-4.903417	0.0000

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho- Statistic	4.686099	0. 0000
Group PP- Statistic	-5.991867	0.0000
Group ADF- Statistic	-4.923666	0.0000

Consequent upon the support for the existence of cointegrating relationships in the model indicated by the Pedroni (1995) tests, the results of panel least squares in error correction form for the efficiency and profitability models are presented in Table 3 and 4 respectively.

In the final analysis, the regression models have good statistical fit with the values significant for most variables. The adjusted R^2 were sufficiently high indicating that the independent variables explained sufficient quantity of the variations in the dependent variables. The financial intermediation model indicated 61% explanatory power, while the profitability model indicated 54% explanatory power. The coefficient on the error correction term is negative and significant as expected, with the results indicating that the error correction terms stand to correct 37% and 44% respectively of the errors in case of any shock to the models in the long run. The overall goodness of fits of the models is also confirmed by the significance of the f-statistics.

Table 3: Determinants of intermediation Efficiency in Nigeria Banks (1990-2009)
Estimation Technique: Panel Least Squares: Error correction models
Dependent variable: Net Interest Margin (EV)

Constant	(-4.55) **
	(-3.22)
Overhead cost (OVIT)	1.42**
	(1.99)
Liquidity (LIQ)	0.23**
	(0.44)
Equity (EQ)	0.60**
	(2.66)
Loan Intermediation (LOAN)	0.55**
	(2.33)
Bank concentration (CC)	-0.49**
	(-6.02)
Inflation (INF)	-11.12
	(-2.02)
Exchange Rate Depreciation (EXC)	-4.11
	(-1.24)
ROA	111.23**
	(5.21)
ECM (-1)	-0.37**
	(-2.78)
Summary of Statistics	
Adj R-Square	0.72
Durbin-Watson Statistic	1.98
F-statistic	117.22
Prob (F-statistic)	0.00
Cross Sections included	25
*Significant at 5%, ** significant at 1%	

t-statistic in parenthesis
*significant at 5%, **significant at 1%

The results from the intermediate efficiency model indicated a positive and statistically significant relationship between spread and overhead costs, suggesting that less efficient banks, indicated by higher overhead costs, exhibit greater interest margins. The coefficient of the banks liquidity variable is positive, but not statistically significantly. The positive coefficient of liquidity ratio shows that an increase in liquidity leads to an increase in the spread; and suggest that banks with high holding of liquid assets bear higher opportunity costs, and they pass on these costs to borrowers by charging high interest. The degree of loan intermediation turns out to be a significant factor driving down interest rate spread in the Nigeria banking industry, and this confirms the thesis that the degree of loan intermediation by a bank indicates the competitiveness and preparedness of such banks to charge lower spreads. An examination of the relationship between profitability and efficiency indicated that profitability performance exercised a statistically significant positive influence on the level of efficiency of intermediation in the Nigerian banking industry. This finding however seem to contradict anecdotal evidence that characterized the Nigerian banking system as profitable, but not efficient.

Table 4: Determinants of profitability performance in Nigerian Banks (1999-2009)
Estimation Technique: Panel Least Squares: Error correction models
Dependent variable: Returns on Assets (ROA)

Constant	0.66
	(1.23)
Bank capital (BC)	1.33**
	(3.21)
Credit Risk (CR)	-1.45
	(-1.15)
Market Share (MS)	0.62**
	(3.71)
Bank Concentration (CC)	0.71
	(1.31)
Asset Quality (AQ)	-2.12*
	(-1.99)
Inflation (INF)	-2.12**
	(-7.52)
BUSINESS Cycles (BCY)	0.11
	(0.54)
Intermediation Efficiency (EV)	2.13
	(0.336)
ECM (-1)	-3.13**
	(-6.98)
Summary of Statistics	
Adj R-Square	0.54
Durbin-Watson statistic	1.68
F-statistic	45.2
Prob (F-statistic)	0.00

Cross section included   25

*significant at 5%, **significant at 1%

The first explanatory variable of interest in the profitability model is bank capital. As expected, it coefficient turned out positive and statistically significant. The result was similar to the outcome of similar studies conducted for European banking industry by Molyneux and Thornton (1992) and Demirgue-kunt and Huizinga (2000). This suggests that the sound capital position of Nigeria banks, especially post-consolidation period enabled them to pursue business opportunities more effectively and affords them more time and flexibility to deal with problems arising from unexpected losses, invariably leading to increased profitability. The results also show that concentration positively affects bank profitability. The insignificance of concentration variable failed to provide support for the relevance of SCP hypothesis within the Nigerian banking industry. Asset quality was found to have a significant negative impact on banks' return on assets. As discussed in the literature, though banks tend to be more profitable when they are able to undertake more lending activities, but arising from the quality of credit or lending portfolios, a high level of provisions against total loans in fact depresses banks' return on assets significantly. With respect to the influence of the wider operating environment on banks' performance, the results showed that among the macroeconomic determinants, only inflation rate has an impact on banks' return on assets. Expected inflation has a negative significance on profitability probably due to the ability of management to predict future inflation and make appropriate adjustments to achieve higher profit. Movement in overall fortune of the economy turned out to be unimportant in determining banks profitability in Nigeria.

Similarly, efficiency of financial intermediation variable turned out not to be an important determinant of profitability performance in the Nigeria banking industry.

Findings

There is no doubt that the incentive to become a share holder in a bank is driven mainly by profitability. Banks are therefore in business for the primary objective of profit-making. A bank that is not making profit will soon have its share capital eroded with losses which can easily precipitate its demise. Also, shareholders/investors are not likely to be willing to invest in the banking system if the existing banks are known to be unprofitable. It thus follows that as a prerequisite for the banking system to be stable, the industry should be profitable and the existing banks should be making profit through legitimate business. On the other hand, the primary function of the banking sector is financial intermediation, which is defined as the process of channeling funds mobilized

from the surplus sectors of the economy (savers), towards the deficit sectors (investors). The efficiency of performing this basic function is gauged by the' cost of financial intermediation. High cost of financial intermediation is undesirable as it increases the cost of borrowing for investors and renders some of the profitable investment activities economically unfeasible. Moreover, high cost of financial intermediation increases the cost of managing risk for individuals by increasing their cost of maintaining smooth consumption patterns over time.

Conclusions

It is generally agreed that a strong and healthy banking system is a prerequisite for sustainable economic growth. Banks in Nigeria have been undergoing major challenges in the dynamic operating environment over the past decades. In order to withstand negative shocks and maintain financial stability, it is important to identify the determinants that mostly influence the overall performance of banks in Nigeria.

The study confirmed the claim that the Nigerian banking industry remains one of the most profitable globally, while much is still left to be desired in terms of the efficiency of the financial intermediations roles in Nigerian banking industry.

The study also concluded that individual bank characteristics, industry structure and the overall macroeconomic exert significant influence on bank profitability and efficiency performance in Nigeria. In addition, bank profitability exerts significant causal effects on the efficiency of intermediation in Nigerian banks.

Based on the findings of this work, the following recommendations are suggested for the consideration of policy makers.

The need to vigorously enforce adherence to existing prudential guidelines to ensure cost effectiveness in bank operations is underscored in order to close widening gaps in interest margins in the Nigerian banking industry.

The improvement of the profitability and intermediation efficiency of Nigerian commercial banks need to be further strengthened by a reinforcement of the capitalization requirements of banks through regulatory programmes, especially by reducing the proportion of non-interest bearing assets to the benefit of bank loans and be reducing the size of large banks to optional levels.

The need to further strengthen the prudential and risk management framework in Nigerian banks by the regulatory authorities in order to improve asset quality in the banking sector is underscored by the findings of this study. Although an improved lending activities contributes positively to profitability, yet due to the credit quality of lending portfolios a higher level of provision is required. Such a high level of provisions against total loans in fact depresses banks' return on assets significantly.

The need for Nigerian banks to improve their efficiency and management quality, in order to maintain banking stability is important as a policy target. In addition to improving management quality and efficiency, Nigerian banks should be encouraged to expand their business lines. Such action will strengthen the profitability of Nigerian commercial banks, diversify their business risk, and reduce their tremendous reliance on traditional credit business, which will become less lucrative in the future.

The need for policies to instill and promote competition in the banking sector, which have an important role in the overall development of the economy, is emphasized by the study. Specifically, policies directed towards infusing greater competition in the banking industry together with a proactive supervision are the key elements that will help in reducing banking spreads.

Macroeconomic policies are important. Inflation contributes to higher net interest margins. Therefore, policies aimed at controlling inflation should be given priority in fostering financial intermediation.

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