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BANK RISKS AND CAPITAL ADEQUACY RELATIONSHIP: A STUDY OF DEPOSIT MONEY BANKS IN NIGERIA

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Abstract

Capital adequacy is a benchmark for measuring the safety of financial institutions against the risks attached to their operations and continuity as a going concern. This study is an attempt to examine the relationship between capital adequacy and bank risks. The proxy of the bank risksis made of risk-weighted asset ratio, deposit ratio and inflation rate for the purpose of this study. Twelve banks were sampled from the population of twenty-two deposit money banks in Nigeria. Secondary data were collected from the financial statements of these banks for the period, 2007 to 2011. The multiple regression analysis technique was used to analyze the data. The study found that there is a significant but negative relationship between bank risks and capital adequacy of the sampled banks. This implies that when risk level rises, capital adequacy falls. In line with this finding, it is recommended that banks should adopt a risk-based approach in the management of capital, rather than the current practice of focusing on the paid-up capital, reserves and retained earnings.

Keywords: Bank risks, capital adequacy, deposit asset ratio, inflation rate, risk weighted assets ratio.

1.1 Introduction

The Bank of International Settlements (BIS)increased the capital requirements of banks from 4% to at least, 7% of a bank's risk-weighted assets (Hanke, 2013). This is in a bid to strengthen the banking sub-sector and enhance the financial sector as a whole. This had motivated the Central Bank of Nigeria(CBN)to increase the minimum required capital base of Nigerian deposit money banks to twenty-five billion naira beginning from 2005 financial year. Capital adequacy as a concept had been in existence prior to the era of capital regulation in the banking sub-sector and there exist several literatures on the determination of capital adequacy ratio (CAR) as well as its determinants. The concept appeared in the middle of the 1970's because of the expansion of lending activities in banks without any parallel increase in its capital base; hence capital ratio is measured by total qualifying capital in place divided by total assets (Al-Sabbagh, 2004). This had lead to the evolution of international debt crisis and the failure of one of the biggest American banks, Franklin National Bank (Koehn & Santomero, 1980). These events forced regulatory authorities to stress more control procedures and to improve new criteria and methods to avoid bank's insolvency (Al-Sabbagh, 2004).

Capital adequacy generally affects corporate entities, but as a term, it is most often used in discussing the position of firms in the financial sector, as to whether firms have adequate capital to guard against the risks that they face. A balance needs to be struck between the often conf1icting perspectives of the various stake-holders and the lenders' required capital to ensure that there is a cushion against possible losses at the borrowing firm. For firms operating in the financial sector, the general public has a stake in the firm as failure may have implications for the financial stability of the system as a whole (Harold, 1999).

The motivation for this study stems out from the fact that, in Nigeria emphasis has been laid more on the regulation of capital adequacy rather than on the extent to which capital adequacy and bank risks are related and the determinants of the capital adequacy ratio. This view is in agreement with Williams (2011) who opinioned that despite the importance of banks as financial intermediaries, capital adequacy modeling has not been in the mainstream of research in the financial sector. This is because analyses of the banking sector had so far focused on the quantitative assessment of growth trends and sartorial behavior patterns in the banking industry. In line with this, banks are assumed not fully discharging their

functions of financing the various sectors of the economy and as a driver of economic growth and development in the country. The various sectors were starved of the requisite funding for their operations, which indirectly had lead to inadequate capital in the banking sector for adequate operations. From the above assumptions, the following hypotheses will be tested:

H_{01}: There is no significant relationship between risk-weighted average and capital adequacy.
H_{02}: There is no significant relationship between deposit-assets and capital adequacy.
H_{03}: There is no significant relationship between inflation rate and capital adequacy.
The proxy of the independent variable, bank risks is made up of risk-weighted average, deposit-assets and inflation rate while the dependent variable represents capital adequacy.

2.1 Empirical Review

The focus of financial stability is primarily upon banks because of the functions that they perform. Banks not only provide a significant proportion of the finance required by the economy but they also act as a conduit for payments. Further, the financial sector is used by central banks as a mechanism for transmitting changes in monetary policy through to the real sector and other sectors of the economy. The focus of financial stability is on the financial system itself rather than on individual institution, but the methods by which financial stability is achieved is through the review of individual institution (George, 1994). The value at risk (VaR)'s theory is in line with the Bessis (2002) as a theoretical framework whose concept is a foundation of risk-based capital. The methodology aims at valuing potential losses resulting from current risks, while recognizing that the loss over a portfolio of transactions could extend to the entire portfolio, but that this is an event that has a zero probability given the effective portfolio diversification of banks.

Capital adequacy ratio is measured by the ratio of total qualifying capital to total risk-weighted assets of a bank. As stated in the introductory section, the higher the capital adequacy ratio, the higher the level of soundness of bank. A high capital adequacy ratio means a bank could absorb losses without becoming insolvent (Mpuga 2002).

This measurement criterion was provided by the CBN in 2009 following the BASEL Accord. According to the circular, total capital is classified into 1st Tier Capital and 2nd Tier Capital. 1st Tie Capital comprises of ordinary share capital,

statutory reserves, share premium, general reserves, reserves for SSI, other reserves, retained profit and loss and interim (half year) audited profit approved by the Central Bank of Nigeria. 2nd Tier Capital consists of fixed assets revaluation reserves, forex revaluation reserves, general provisions, non-controlling interest and hybrid capital instruments. Risk-weighted assets in the denominator of the capital adequacy ratio represent the assets in the bank's balance sheet weighted by their attached risks.

The Value at Risk (VaR) concept is a foundation of risk-based capital or equivalently economic capital (Bessis, 2002). Thus, it is becoming impossible to discuss the concept of capital adequacy in the banking industry without referring to *VaR*,which states that bank's capital should match the risks. The central role of risk-based capital in regulations is a major incentive to the development of new management techniques. The *VaR* methodology aims at valuing potential losses resulting from current risk which is the upper bound of losses that should not be exceeded in more than a small fraction of all future outcomes, thus management and regulators define benchmarks for this small preset fraction, called the confidence level, measuring the appetite for risk of banks.

Economic capital is VaR based, and crystallizes the quantified present value of potential future losses for making sure that banks have enough capital to sustain worst-case losses. In a study by Madura and Zarruk (1993) which is consistent with Koehn and Santomero (1980),who examined a portfolio reaction to capital requirements by investigating the effects of capital ratio regulation on portfolio behavior of commercial banks. The study found that, an increase in variance of returns increases the probability of failure, while an increase in returns or capital ratio decreases failure risk.

Using an option theoretical framework for measuring fair capital adequacy holdings for a sample of depository institutions in Taiwan, during 1985-1992, Yu (1996) found adequate capital for banks as the level at which the deposit insuring agency would break-even in guaranteeing the deposits of individual bank with the premium the bank pays. Also, Sharpe (1977) in another study found that capital is the difference between assets and deposits. Therefore, the larger the ratio of capital to assets or the ratio of capital to deposits the safer the deposits. Sharpe (1977) idea was that if the value of an institution's assets increase, its deposits will generally be safer. Thus, larger the current value of assets is equivalent of the value of deposits in place.

Similarly, Dowd (1999) and Harold (1999) found that, the imposition by regulators of minimum capital standards on financial institutions can be seen as a

means of strengthening the safety of deposits and soundness of the banking system. Their study suggested that an information asymmetry between bank managers' and depositors' could produce market failure which could provide a rationale for government intervention in the financial system. This intervention would take the form of capital adequacy regulation to force banks to maintain a stronger capital position. Therefore, permitting banks to fail, indicates a possible conflict between capital adequacy, deposit protection and the perspectives of other stakeholders (Stone & Zissu, 1994).

Macroeconomic stability requires that macroeconomic policies must be able to maintain stable prices, ensure public sector deficits are minimal and external debt is sustainable(Adegbite, 2010). A stable macroeconomic framework is one where the level of national saving is high enough to prevent undue reliance on foreign borrowing, and thus the framework stability requires that both financial and macroeconomic institutions are stable, thus the nature of the regulatory and supervisory policies would be preventive. If however, the institutions are at the brink instability, then the nature of regulatory and supervisory policies would be remedial. However, if the institutions have become unstable, then we would have resolution policies.

3.1 Methodology and Model Specification

This study uses the survey research design which is consistent with that adopted by Al-Sabbagh (2004), Bokhari and Ali (2006) and Williams (2011) and Romdhane (2012). The population of the study consists of all the twenty two deposit money banks, operating in Nigeria with published annual financial statements during the period of study, 2007 to 2011. However, ten banks were filtered out because they failed to meet the selection criteria. Thus, a sample of twelve banks was selected on the basis of data availability and compliance with CBN disclosure guidelines. The secondary data sourced from published financial statements of the sampled banks were analyzed using the multiple regression analysis technique. The model of the study which will be used in testing the hypotheses is presented as:

$CAR = F(RWA, DAR, INF)$----------(1)

Transforming the above function into a linear equation, we have:

$CAR = \beta_0 + \beta_1 RWA + \beta_2 DAR + \beta_3 INF + e_{it}$----------(2)

Where: *CAR* = Capital adequacy ratio; *RWA* =Risk-weighted assets ratio; *DAR* = Deposit to asset ratio, and *INF* = Inflation rate.

Table 3.1: Variables Measurement

Variables	Description	Measurement
CAR	Capital adequacy ratio	Total qualifying capital divided by total risk-weighted assets (Mpuga, 2002).
RWA_{it}	Risk-weighted assets ratio	Ratio of total deposits to total assets of $bank_i$ at time $_t$(AI-Sabbagh, 2004).
DAR_{it}	Deposit to assets ratio	Ratio of total deposits to total assets of $bank_i$ at time $_t$(Maisel, 1980; Al-Sabbagh, 2004).
INF	Inflation rate	Annual inflation rate as reported by the *CBN* (2007-2011)

4.1 Result and Discussion of Findings

This study attempts to examine the relationship between capital adequacy ratio and its effects on bank risks in Nigerian. The bank risks indicators used in the model are:Risk-weighted assets ratio (*RWA*), Deposit to assets ratio (*DAR*) and Inflation rate (*INF*) as independent variables, while Capital adequacy ratio (*CAR*) as the dependent variable. The variables were analyzed using descriptive statistics, correlation analysis and the ordinary least square (OLS) estimation technique.

Table 4.1: Descriptive Statistics

Variables	Mean	Standard deviation
CAR	0.27	0.104
RWA	0.66	0.157
DAR	0.67	0.121
INF	0.11	0.031

Source: SPSS output

From table 4.1 above, capital adequacy ratio for the banks averaged 27%,which is higher when compared with the CBN's *r*equirement of 17.4% at 2011. This implies that the Deposit Money Banks (DMB) in Nigeria remained strong, despite the challenges within the banking sub-sector. However, the standard deviation of CAR at 10.4% shows a high disparity of capital adequacy of the various banks. RWA which is the ratio of risk-weighted assets to total assets with a mean value of 66% and a standard deviation of 15.7%, imply that substantial proportion of the total assets of DMB's in Nigeria are risky assets. The deposit to assets ratio on the other hand, is 67% with an average dispersion of 12.1 % represented by the standard deviation. This means that an average of 67% percent of total assets of

DMB' swill be required to pay depositors in the event of liquidation. The inflation rate which measures the variability of the price level in the economy and market risk averaged 11% with a standard deviation of 3.1%.

Table 4.2: Correlation Matrix

Variables	CAR	RWA	DAR	INF
CAR	1.00			
RWA	-0.355	1.00		
DAR	-0.412	0.054	1.00	
INF	0.146	0.359	-0.053	1.00

Source: SPSS output

Table 4.2 above shows the correlation coefficients which is used to determine the relationship between the variables in addition to the results of the VIF and tolerance values (Chandrasekharan, 2009).This table shows a negative relationship between RWA, DAR and CAR, with the correlation coefficients of -0.355 and -0.412 for *CAR* and *RWA,* as well as CAR and DAR respectively. This finding is similar to the results of Al-Sabbagh (2004). The negative correlation between CAR and DAR implies that capital adequacy of the banks reduces with increases in deposits by customers. Furthermore, the correlation between INF and CAR of 0.146 is not significant.

Table 4.3: Regression Results

Variables	Coefficient	t-Statistics	Significance	Tolerance	VIF
Constant	0.568	6.988	0.000		
RWA	-0.288	-3.769	0.000	0.866	1.155
DAR	-0.320	-3.449	0.001	0.866	1.155
INF	0.952	2.448	0.018	0.991	1.009
R	0.592				
R-Square	0.350				
Adj. R-Square	0.315				
F-Statistics		10.059	0.000		
Durbin Watson	1.969				

Source: SPSS output

The table 4 above shows the coefficients of the models, the model summary and the degree of significance of the coefficients. The coefficient of correlation reveals an absence of multicolinearity between the variables in the study. The regression results reveals an overall correlation coefficient of 0.592 which shows a relationship between the variables as R^2 which measures the percentage of the change in the dependent variable that is explained by changes in the independent

variables is 35% with an F- statistics value of 10.059 with a significance of 0.000. This suggests that the model is fitted. The Durbin Watson (DW) statistics which is approximately 2 indicates the absence of serial correlation.

The model is estimated as: $CAR=0.568- 0.288RWA_{it}- 0.320DAR_{it} + 0.952INF + e_i$
The regression results shown in table 4above reveals that, the coefficients of risk-weighted assets (RWA)ratio and deposit assets (DAR) ratio are significant at the 1% level of significance, while the coefficient of inflation (INF)rate is significant at the 5% level of significance. Furthermore, the result salso reveal negative but significant relationship between risk-weighted assets and capital adequacy with a coefficient of -0.288 for risk-weighted assets. This means that, for every 1% increase in risk-weighted assets of the sampled banks, capital adequacy will decrease by 0.288%. This result provides a basis for us to fail to accept $H_{01,}$ which states that there is no significant relationship between bank risks and capital adequacy. This result supports the findings of Mpuga (2002) and Al-Sabbagh (2004) that hypothesized a significant negative relationship between capital adequacy and risk-weighted assets. They concluded that a bank should increase its capital adequacy by shifting its portfolio into less risky assets, because an increase in risky assets will lead to a reduction in the capital adequacy ratio.

The results also show a negative relationship between capital adequacy and deposit-asset ratio with a coefficient of -0.320. This result is in contrast to Mpuga (2002) and Al-Sabbagh (2004). As deposits increase, capital adequacy reduces, thus this negative relationship implies that deposits do not necessarily guaranty an increase in capital. The study therefore fails to accept H_{02} which states that there is no significant relationship between deposit assets ratio and bank risks, which is the evidence of a relationship between capital adequacy and deposit-assets. Similarly, there is also a significant relationship between INF and CAR, in that for every 1% increase in inflation rate, brings about an increase in capital adequacy ratio by 0.952%, as such the study fails to accept H_{03} which states that inflation rate has no significant relationship with bank risks.

5.1 Conclusions

The study has provided empirical evidence on the effects of the relationship between capital adequacy and bank risks of deposit money banks in Nigerian. In line with the findings of this study, it is recommended that DMB's in Nigerian should adopt a risk-weighted assets based approach in managing capital, in place of focusing on paid-up capital and retained earnings.It is also recommended that DMB's in Nigerian should guarantee the safety of deposits though the increase in deposits does not necessarily result in an increase in capital adequacy. Finally, the CBN as the apex regulatory financial institution should be guided by the level of deposits in addition to other macro-economic indices in fixing the minimum required capital adequacy ratio for DMB'sbanks in Nigeria.

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