

Asset Liability Management and Deposit Money Banks Performance in Nigeria

Osuji Casmir Chinemerem (Phd)

Department of Banking and Finance
Faculty of Management Sciences
Delta State University, Abraka

Abstract: Using aggregated data, the study looked into the impact of asset-liability management on banking performance. The investigation was conducted from the year 2000 to the year 2020. Bank loans and advances, aggregate bank deposits, loan-to-deposit ratio, non-performing loan, and bank size are among the asset-liability management proxies that are taken into account. Meanwhile, the aggregate return on equity was used to assess bank performance. The study's data came from the Statistical Bulletin 2020 of the Central Bank of Nigeria. Using Econometric Views (E-Views) version 9.0, the researchers used the ARDL short and long run estimate technique. According to the study, bank loans and advances, aggregate bank deposits, and the loan-to-deposit ratio have a favorable short- and long-term impact on bank performance. In the long term, however, bank size did not sustain our short run negative sign, reporting a positive coefficient instead. Finally, non-performing loans have a detrimental long-term and short-term impact on bank performance. As a result, we argue that asset-liability management induces both at the aggregate and individual levels, with aggregate bank deposit and non-performing loan being the only important determinants of bank performance. As a result, we urge that bank management focus more on aggressive deposit mobilization approach in order to support improved asset-liability management. Non-performing loan monitoring, in particular, requires extra care.

Keywords: Asset-Liability Management, Deposit Money Bank's Performance, Deposit Mobilization, Aggregate Bank Deposit, Credit Risks.

1. Introduction

Essentially, banks' capacity to maximize earnings is highly dependent on the asset and liability structure of the banking industry, as well as the inherent risks involved with banking activities. These factors, on the other hand, are highly dependent on bank management's policy decisions. This is because the key goal of maximizing profit will be threatened if bank management does not analyze the amount to which credit risk exposure affects its performance. Banks, in particular, act as financial mediators between depositors and borrowers, whose liquidity requirements are occasionally at odds. They may be subject to a variety of hazards as a result of this process, including credit risk, transformation risk, operational risk, liquidity risk, reputational risk, interest rate risk, market risk, and funding risk. Asset-liability management emerged from the recognition of these risk factors (ALM). The fundamental reason for ALM, according to Ogbeifun and Akinola (2018), is to generate increased, consistent, and rising net-interest-income. Only an ideal asset-liability combination can help you reach this aim. Meanwhile, the four key reasons why banks and modern-day businesses engage in ALM are greater profitability, reduction of environmentally generated risk, maintaining adequate liquidity levels, and security.

Prior to 2015, most Nigerian banks preferred wholesale banking deposits over retail deposits. This provided numerous challenges to the business, as most banks were operating with poor profit margins. As a result, the industry's stability was jeopardized. The fundamental reason for this is that most wholesale deposits are extremely hazardous (volatile) and costly. Previously, the banking public monies had accumulated over 10,000 in various bank accounts across Nigeria. The unprecedented departure of public funds from Nigerian banks, along with rising demand for bank loans, resulted in an asset-liability maturity mismatch. As a result, maturity mismatches and changes in asset-liability levels raise both liquidity and interest rate risk. Given these imbalances, banks must continue to ensure that fresh funding replaces maturing funding in similar amounts and on time to maintain a relatively steady pool of assets.

A comprehensive examination of current events in the Nigerian banking industry reveals that the business is currently beset by a number of difficulties that threaten its very existence. This has increased the financial industry's vulnerability to insolvency to a great extent. As a result, it makes a significant contribution to the link between ALM and banking profitability in Nigeria.

There appear to be little investigations on the subject from an empirical standpoint. Even prior research tended to focus on bank-specific characteristics, with little or no attention paid to aggregate data. This study, however, stands out since it looked at the structures using aggregate data. In addition, unlike other research, this one lasted from 2000 through 2020. In light of these circumstances, the primary goal of this article is to empirically examine the impact of asset-liability management on bank performance in Nigeria.

2. Literature Review

2.1.1. Conceptual Clarifications

The asset-liability maturity mismatch paradigm has grown into a more complex architecture over time. ALM is a well-structured and meticulously managed credit position method that aims to shield depositors and creditors from asset/liability mismatches. To put it another way, asset-liability management entails conscious actions taken by stakeholders in the Nigerian banking industry to ensure that there is no mismatch between the banking industry's largest asset, loans and advances, and its largest liabilities, aggregate bank deposits, as opposed to demand deposits, savings, time, and foreign currency deposits. Furthermore, Owusu (2020) defined ALM as a strategic management method for managing bank assets and liabilities in order to maximize bank profit.

Performance, on the other hand, is the ability of those in charge to make the best use of the limited resources at their disposal in order to maximize profits. Financial and non-financial proxies are used to express bank performance. Our focus, on the other hand, is on financial performance as measured by aggregate return on equity. This proxy is calculated as the ratio of the banking industry's net income to the funds held by its shareholders. AROE, by extension, measures how well management uses its shareholders' funds to achieve large profits. This means that a high AROE suggests efficient bank management, while a low AROE shows inefficient bank administration.

2.2. Theoretical Underpinning

The asset-liability theory (ALT) as advocated by Redington (1952) & Haynes and Kirton (1952) emphasised that one of the ways banks can maintain appropriate cash reserves is by accumulating liabilities from various sources. These sources include, but are not limited to: certificate of deposit issue, borrowing from other banks and discount windows, share issuance, and profit reinvestment.

Furthermore, this theory acknowledges that the bank's asset structure provides the liquidity required to satisfy all maturing loan commitments. This hypothesis is regarded as a more aggressive deposit mobilization strategy than previous bank mobilization strategies (Osifisan, 2020).

Second, this research is based on Harry Markowitz's portfolio theory (portfolio balanced method) from 1952. The targeted portfolio diversification strategy (asset-liability mix) of a bank is linked to some policy decisions made by bank management on the amount of portfolio returns and risk exposure, according to this idea (Nzongang & Atemnkeng, 2019).

2.3. Empirical Studies

From 2005 to 2018, Abdul-Rahman and Kolawole (2020) investigated the impact of asset-liability on a bank's earning capacity in Nigeria. Loans and advances (LAD), demand deposits (DED), bank size (BAS), non-performing loans (NPL), and borrowing (BOR) were among the asset-liability management proxies analyzed, while performance measurements only considered 14 listed banks in Nigeria. The researchers discovered that LAD and BAS have a positive impact on ROA. Non-performing loans, on the other hand, reduce bank profits. Furthermore, the study discovered that DED and BOR have a positive impact on return on investment, however bank size has a negative impact. According to the findings, Nigerian banks must prioritize LAD, DED, NPL, and BOR in order to effectively manage their asset-liability mix.

From 2007 to 2015, Owusu (2020) investigated the impact of asset-liability management on bank performance in Ghana. The study used the SCA profit model. Higher liability costs diminish bank profit margins, according to the report. Asset management, on the other hand, boosts bank efficiency. As a result, it is proposed that bank management select assets that would increase profits.

In Nigeria, Ogbeifun and Akinola (2018) looked at how ALM affected DMB performance. The asset-liability and portfolio theories were used in this research. The banking industry's total asset and profit after taxes are among the variables evaluated. The study found that using suitable asset liability strategies helps DMBs in Nigeria perform better. As a result, the study recommends that most banks maximize their resources or risk becoming illiquid.

Tee (2017) used a panel data methodology to investigate the impact of asset-liability management on the profitability of seven Ghanaian publicly traded banks. The research took place between 2008 and 2012. Asset management banks (bank size) have a positive substantial effect on bank profitability, according to the study. Liability management, on the other hand, has a considerable negative impact on bank profitability.

Njogo and Ohiaeri (2014) investigated the impact of asset-liability management on bank performance in Nigeria using the same methodology and time frame. They discovered that asset-liability management proxy vis-à-vis bank loans and advances, bank size, borrowings, and other factors have a positive significant effect on bank performance. In contrast, Ajibola (2016) investigated the effects of ALM on bank performance in Nigeria from 2012 to 2015 and found that asset management proxy (loans and advances) is

positively related to return on equity, whereas liability management proxy (aggregate bank deposit) is negatively related to return on equity.

Tamiru (2013) investigated the impact of asset-liability management on Ethiopian banks' profitability. Return on asset (ROA) was used to model profitability versus balance sheet and macroeconomic proxies by the researcher. The study found that while ROA is positive, it varies depending on asset composition; however, this study lacks theoretical support. Sohela, Mehrzed, and Hadi (2020) investigated if mathematical models may be utilized to manage banks' assets and obligations in Malta. The study found that mathematical models can be used to help banks in Malta manage their assets and liabilities more efficiently. According to the study, a bank's asset-liability mix is heavily influenced by its capacity to manage assets and liabilities. The influence of asset-liability mix on the banking industry, however, was not considered in the study.

Arising from the above, we hypothesize:

3. Methodology

The ex-post-facto study strategy was deemed most appropriate for this paper because the source data are historical in nature and it may not be possible to modify their outcomes due to the fact that they occurred in retrospect. Over the analyzed periods, we gathered information from the CBN bulletins and the World Bank data bank. For the sake of clarity, we divided the asset and liabilities management regression into five different sub-variables. The operationalization of research variables includes these sub-variables. Our data set included the years 1990 to 2019. Major reforms in the Nigerian banking industry, such as cooperative restructuring (financial consolidation), cashless policy, adherence to best banking standards, and the like, occurred during these times. Given the stochastic nature of time-series data, we ran different diagnostic tests on the variables (multicollinearity and heteroscedasticity tests) before assessing the study hypotheses that had been proposed previously.

Accordingly, the narrowed its model to the below captured:

$$AROE = f(BLA, ABD, LDR, NPL, BSZ).....Eqn.1$$

AROE = Aggregate Return on Equity

BLA = Bank Loans and Advances

ABD = Aggregate Bank Deposits

LDR = Loan-To-Deposit Ratio

NPL = Non-Performing Loan

BSZ =Bank Size (Natural logarithm of total asset)

Explicitly, our model was re-modified as:

$$AROE = \beta_0 + \beta_1 BLA_{it} + \beta_2 ABD_{it} + \beta_3 LDR_{it} + \beta_4 NPL_{it} + \beta_5 BSZ_{it} + U_{it} \quad Eqn. 2$$

Operationalization of Study Variables

Consistent with existing studies, this study operationalized both the regressor being asset-liability management and regressed being bank performance measured by the aggregate return on equity of in figure 1 below;

Table 1: Variables' Operationalization alongside their apriori expectation

Variables	Proxy	Symbol	Source	Expectation
Bank Performance	Aggregate Return on Equity	AROE	CBN Statistical Bulletin	NIL
Asset-Liability Management	Bank loans and Advances	BLA		Positive
	Aggregate Bank Deposit	ABD		Positive
	Loan-to-Deposits Ratio	LDR	Positive	

	Non-performing Loan	NPL		Negative
	Bank Size	BSZ		Positive

Source: Researcher's Compilation (2021).

4.2. Data Analysis

Table 1: Summary of Unit Root Test

AT LEVELS					
Target Variables	ADF Test Statistics	MacKinnon Critical Value @ 5%	P-value	Order of Integration	Decision
Aggregate Return on Equity	-2.802329	-3.020686	0.0757	1(0)	Non-Stationary
Bank Loans and Advances	-1.765521	-2.951125	0.3906	1(0)	Non-Stationary
Aggregate Bank Deposit	-3.039372	-2.617434	0.0418	1(0)	Stationary
Loan-to-Deposits Ratio	-2.839370	-2.951125	0.0634	1(0)	Non-Stationary
Non-performing Loan	-0.969205	-2.951125	0.7530	1(0)	Non-Stationary
Bank Size	-1.483979	-2.951125	0.9989	1(0)	Non-Stationary
AT FIRST DIFFERENCE					
Target Variables	ADF Test Statistics	MacKinnon Critical Value @ 5%	P-value	Order of Integration	Decision
Aggregate Return on Equity	-7.238614	-3.029970	0.0000	1(1)	Stationary
Bank Loans and Advances	-7.675072	-2.954021	0.0000	1(1)	Stationary
Aggregate Bank Deposit	-7.368475	-2.960411	0.0000	1(1)	Stationary
Loan-to-Deposits Ratio	-6.769886	-2.954021	0.0000	1(1)	Stationary
Non-performing Loan	-5.389926	-2.954021	0.0000	1(1)	Stationary
Bank Size	-4.085235	-2.954021	0.0000	1(1)	Stationary

Source: Econometric Views Version 9.0 (2021)

The ADF test in table above clearly revealed that only aggregate bank deposits attained stationary at its natural level (that is, they are integrated at order 1(1) while the rest study variables attained stationary at their first difference (that is, they are integrated at 1(1)).

This is because the ADF test statistics of Aggregate Bank Deposits were higher than the Mackinnon critical value at their normal level. As a result, the Autoregressive Distributed Lag model Bound co-integration test was performed to determine whether the regressor and regressed had a long-term relationship.

Table 2: ARDL Bounds Test

Date: 06/12/21 Time: 00:10		
Sample: 2001 2020		
Included observation: 20		
Null Hypothesis: No long Relationships exist		
Test Statistics	Value	K
F-statistics	3.819856	5
Critical Value Bounds		
Significance	10 Bound	
5%	2.62	

Source: Econometric Views Version 9.0 (2021)

The ARDL Bound test in table 2 above reported an estimated f-statistics value of 3.81956 an estimated upper critical bound value of 3.79 @ 5% level. This indicates that the asset-liability management impact on DMBs’ performance on the long run. This further justifies the need for ARDL short run relationship.

4.3. Regression Results: Hypothesis Testing and Discussion

The ARDL model estimates both the short and long run forms of the model. However, we first of all considered the Model Selection Criteria Table. The Model Selection Criteria table, short and long run estimates are summarized below.

Table 3: Model Selection Criteria Table

Dependent Variable: LOG (AROE)

Date: 06/12/21 Time: 00:08

Sample: 2000 2020

Include observations: 20

Model	LogL	AIC*	BIC	HQ	Adj.R-sq	Specification
1	-10.5110054	1.751005	2.099512	1.819038	0.378492	ARDL(1,0,0,0,0,0)

Source: Econometric Views version 9.0 (2021)

The model selection Criteria table above clearly specified the ARDL (1,0,0,0,0,0).

Table 4: ARDL Cointegrating And Long Run Form

Dependent Variable: LOG(AROE)

Selected Model: ARDL(1, 0, 0, 0, 0, 0)

Date: 06/12/21 Time: 00:08

Sample: 2000 2020

Included observations: 20

Cointegrating Form				
Variables	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(BLA)	-1.011047	1.178788	0.857700	0.4066
DLOG(ABD)	2.213410	0.607156	3.645535	0.0030
DLOG(LDR)	0.068147	1.396394	0.048802	0.9618
DLOG(NPL)	-2.767929	0.860939	-3.215013	0.0068
DLOG(BSZ)	-0.788936	1.134846	-0.695192	0.4992
CointEq(-1)	-1.503046	0.250988	-5.988517	0.0000

Long Run Coefficients

Variables	Coefficient	Std. Error	t-Statistic	Prob.
LOG(BLA)	0.672666	0.801514	0.839244	0.4165
LOG(ABD)	1.472616	0.312835	4.707328	0.0004
LOG(LDR)	-0.045339	0.928939	0.048808	0.9618
LOG(NPL)	-1.841547	0.594097	-3.099743	0.0085
LOG(BSZ)	-0.524891	0.768899	-0.682654	0.5068
C	7.313027	3.740108	1.955298	0.0724
R-squared	0.638076	F-statistic		3.819856
Adjusted R-squared	0.471034	Prob(F-statistic)		0.020378
Durbin-Watson stat	2.128461			

Source: Econometric View version 9.0 (2021)

The study reported that bank loans and advances, aggregate bank deposits, loan-to-deposit ratio exert positive effect on bank performance on the short and long run, the implication of the ARDL short run estimate is that if bank loans and advances, aggregate bank deposits, loan-to-deposit ratio is increased by 1%, aggregate return on equity will increase by 1.011047, 2.213410, 1.472616, and 0.045339. However, bank size did not maintain its short run negative sign on the long run in that it reported a positive coefficient instead. On this note, it can be concluded that the size of the banking industry reduces the banking industry's performance on the short run only but on the long run it improves bank performance.

Furthermore, non-performing loan exerted negative effect on bank performance both on the short and long run. The implication of this result is that if the banking industry must perform better, credit risk exposure vis-à-vis non-performing loan must be reduced, in terms of statistical significance, only aggregate bank deposit and non-performing loan passed the test of significance. This indicates that only aggregate bank deposit and non-performing loan were statistically significant in examining the effect of asset-liability management on profitability of DMBs in Nigeria.

The foregoing findings reaffirmed the findings of Abdul-Rahman and Kolawole (2020), Ogbefun and Akinola (2018), Tee (2017) but deviated sharply from the findings of Njogo and Ohiaeri (2014); a & Tamiru (2013).

5. Conclusion and Recommendations

Using aggregated data, the study looked into the impact of asset-liability management on the banking industry's performance. The time frame for this research was 2000 to 2020. Bank loans and advances, aggregate bank deposits, loan-to-deposit ratio, non-performing loan, and bank size are among the asset-liability management proxies evaluated. Meanwhile, financial institutions' aggregate return on equity was used to evaluate performance. The ARDL short and long run estimate technique was used in this investigation. We conclude that at the aggregate level, asset liability management influences bank performance, but at the individual level, only aggregate bank deposit and non-performing loan are major determinants of bank performance, based on the findings of this study reported in earlier chapters. As a result, we urge that bank management focus more on aggressive deposit mobilization approach in order to support improved asset-liability management. They should, once again, issue more loans to the lending public. More importantly, appropriate attention must be paid to non-performing loan monitoring, and every bank in Nigeria must establish a comprehensive, dynamic, and proactive asset-liability management committee to ensure that the banking industry's asset-liability mix is meeting shareholders' value.

REFERENCE

- Abdul-Rahman, .O.A. (2020). Asset liability management and performance of listed deposit money banks in Nigeria. *Asian Journal of Economics, Finance and Management*, 2(4), 40-58
- Ajibola J.O. (2016). Effects of assets and liability management on financial performance of some selected Nigerian banks. *Journal of Accounting and Financial Management*, 2(2), 44-63.
- Ajibola, A., John, O., & Lezaasi, T. (2013). Financial statement management liability reduction and asset accumulation: an application of good programming model to Nigeria bank, *International Journal of Financial Research*, 1(2), 1-10.
- Haynes, A.T. & Kirton, R.J. (1952). The structure of a life office. *Transaction of the Faculty*, 21(1), 1-10.
- Njogo, B.O., & Nomisakin J.O. (2014) Analysis of asset and liability management on performance of some selected Nigerian commercial banks. *Research Journal of Finance*, 2(11). 1-10.
- Nzongang, T., & Atemnkeng, J. (2019). *Market Structure and Profitability Performance in the Banking Industry of CFA Countries: the Case of Commercial Banks in Cameroon*.

Ogbeifun, I.E, & Akinola, A.O. (2018). A Comparative Study of Asset-Liability Management Framework in the Banking Industry in Nigeria. Available at <https://www.researchgate.net/publication/343084984>

Okerekeoti C, & Okoye E.I (2017), Treasury Single Account (TSA) in Nigeria: A theoretical perspective Chapter 38 in the Proceeding of the 2017 International Conferences on African Entrepreneurship and Innovation for Sustainable Development (AEISD)

Osifsan, A.O. (2020). An asset portfolio management model for Nigerian Commercial Banks: A case study, Department of Economic, *University of Ibadan, MBA Project Report*.

Owusu, F.B. (2020). Asset liability management and bank profitability: statistical cost accounting analysis from an emerging market. *International Journal of Finance and Economics*, 26(1), 1458-1502.

Redington, F.M.(1952). Review of the Principles of Life Office Valuations. *Journal of the Institute of Actuaries*, 78(3), 286-340.

Soheyta, N. Mehized, M. & Hadi, P. G. (2020). Asset and Liability Optimal Management Mathematical Modeling for Bank. *Journal of Basic and Applied Scientific Research*, 3(1), 484-493.

Tamiru, H. (2013). Asset Liability Management and Commercial Banks Profitability in Ethiopia, *Research Journal of Finance and Accounting*, 4(10), 77-87

Tee e. (2017), Asset Liability Management and the Profitability of Listed Banks in Ghana. *JOSR. Journal of Economic and Finance (ISORJEF)*, 8(3), 09-14.