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Dynamic Portfolio Management and Deposit Money Banks' Performance in Nigeria: Panel Analysis

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Abstract: Financial institutions are economic pivotal that accelerate growth of a nation and serve as inter-connectivity with other sectors of the economy, in the absence of banks; economy may experience slow growth from lack of financial intermediation process. Banks were confronted with risk exposures which is injurious to banking that serves as catalyst for economic growth and development through financial intermediation, active portfolio management becomes inevitable, therefore this study examines the dynamic portfolio management and deposit money banks' performance in Nigeria spanning over 13years (2009-2021) The data set were collected from the banks' financial statements which was analysed using panel fully modified least squares and descriptive statistical methods, the normality test was also carried out with probability of 10.2 revealed that the residual is normally distributed. The result revealed that portfolio management has negative association with bank profitability. The challenges of optimal portfolio management and risk exposure is how to explore good risk measurement by banks to achieve optimal returns to the investors and likewise the banks by reducing the inherent risk in portfolio. Achieving vibrant performance by deposit money banks' aptly demand the adoption of advanced technology by banks into their operations. The combination of Capital Asset Pricing Model with the elements of fundamental analysis methods help business entities to avoid systematic risks and to receive adequate returns.

Keywords: Risk, Portfolio Management, Bank Performance, Capital Asset Pricing Model

1. Overview

Performance of deposit money banks is examined relative to dynamics of portfolio management.

Investments in a small number of securities are made as part of portfolio management, which helps spread out the portfolio risk. The combination of assets in a portfolio must be managed to optimize profits and reduce associated risks otherwise portfolio management will not be of use, [1].

The link between risk and return is reflected in portfolio management, which evaluates the relationship both at the individual and portfolio levels.

The process of integrating several classes of securities in a portfolio to lower overall risk without reducing portfolio returns is known as portfolio diversification [2, 3].

According to bank's portfolio management, it emphasizes generally the effective and prudent managing mix of assets and liabilities (bonds, derivatives, investments and others) that meet the long term financial goals and risk tolerance in order to maximize predictable returns and reduce risk, [4].

Risk reduction through asset diversification helps banks make more money, increase portfolio returns, and reduce hazards, [5]. Making financial resources available to numerous economic sectors, including agriculture, transportation, telecommunications, and manufacturing, banking is one of the most active economic agents. However, it also faces a variety of market risks when building its asset portfolio. Creating an effective portfolio can reduce bank's risks and increase rewards [6, 3].

For banks to provide services that maximize investors' value for a given acceptable risk level, taking liquidity, asset

quality, and safety into consideration, an efficient and well-structured financial system is desirable in an economy in order to maintain competitive advantages in the market and spur economic growth, [3, 7].

As part of the 2006 bank consolidation exercise, the 69 deposit institutions were reduced to 25 through merger, acquisition, and some liquidated due to their inability to meet the minimum capital requirements, bad corporate governance, illiquidity, high default risks, and asset mismanagement. In order to manage their operational risks and cut costs, banks operating in a volatile environment must adopt portfolio management as a cost-reduction strategy. Nigerian banks have transitioned from traditional banking to modern practices through technological innovation (information technology), but their statements of account have revealed non-performance loans and heavenly loaded loans defaults after extensive involvement in portfolio diversification as instrument in risk management. However, they have forgotten to understand in holding high quality and appropriately liquid assets to carry them for a long time as needed, they only see portfolio management as what the regulators want them to do. With the development of information technology and computers, several risk-reduction techniques have been adopted and utilized there still problem of investment delinquency. Today, portfolio management must be done skillfully and precisely in order to achieve sustainable returns while reducing portfolio risks.

The goal of portfolio theory is to identify portfolios that maximize expected returns while maintaining each individual's tolerable levels of risk. The theory provides the arrangement for calculating speculation exposure and establish linkages amongst risk and predicted investment returns. Financial investors typically want to maximize their returns at a given risk level according to the notion [8] Portfolio theory specifies ideal combinations of assets mix that increase expected returns rather how they perform in isolation. According to theory, vulnerability degree of assets selection depends on risk association with each benefit, the amount of assets distributed for each benefit, and the interactions between the benefits that make up the portfolio [9].

Portfolio management is a methodical approach for allocating assets, diversifying assets, and rebalancing assets to boost bank profits. The portfolio theory emphasizes the necessity for the proper blend of asset classes in order to achieve larger returns than risk, [7]. Banks that implement dynamic portfolio management strategy can safeguard their investments from risk and provide the highest returns possible [10], while those that don't do badly. The streams of literature on performance of bank portfolios in emerging nations revealed a great deteriorating state amongst the Microfinance Institutions, [4, 11-15]. Studies conducted [16, 17] asserted how bank performance impacted by credit management in Nigeria as the author [18] studied Insurances in other countries and recent work on it are by [19] In Nigeria, the author [20] studied portfolio diversification and bank performance.

It now becomes necessary to examine portfolio management and Deposit Money Banks in Nigeria as it was done in Kenya, in light of a study [21] in Kenya 1990–2017. Since there haven't been many empirical studies on portfolio management and bank performance, most of them have focused on portfolio and asset diversification or asset allocation; this study analyzes the dynamics of portfolio management and bank performance in Nigeria.

Rebalancing also known as assets repositioning into their previous target given allocation at a time while maintaining an asset mix that reflects investors risk and return profile, is the process by which maximum asset allocation is set out to align portfolio into investment policy to reduce over concentration in a particular asset class. Portfolio rebalancing is a high-risk method of monetary policy of connecting with a particular asset acquisition plan [22]. Asset and liability (A-L) management aims at striking a balance between financial assets and non-financial assets that provide income to the profitability of banks.

Gap analysis or A-L sensitivity analysis paid particular attention to dynamic portfolio mix incorporating liabilities and Assets sensitivity in addition to weighted or unweighted liabilities and assets. Banks incorporate duration matching as average life of an asset or liability [10]. Duration analysis was first proposed by Fredrick Macaulay in 1938, as primary method by which banks defend themselves against risk due to changes in interest rates mismatch that arise between the maturity of assets and liabilities, represent weighted-average life of securities where the weights are the relative future cash flows of the securities discounted into their present value. Bond volatility and duration have a straight inverse relationship; the shorter the period, the less volatile the bond. Banks prefer assets with longer durations than liabilities, thus, an increase in interest rates decrease assets value in the financial statement positions in accordance to [10]. Banks utilize complex models and repricing rates accurately as advised by the research [23], as re-pricing of an asset or debt is apparent to market changes.

The study is 13-year time frame running from 2009 to 2021 covering the population of 21 banks with five banks been selected as sample size. These banks were selected for maintaining their financial and audited accounts up to date among the international and regional banks which are UBA, GTB, ACCESS, FIDELITY ZENITH and WEMA Bank. The deposit money bank performance is proxy by financial performance measured by profit after tax.

2. Literature Review

2.1. Conceptual Review

One area of economics where making decisions in the face of uncertainty is crucial is financial theory. Uncertainty as described as the research [6] as the lack of information, knowledge, or of predicting an outcome of an action, a decision, or an occurrence with accurate completeness.

Portfolio management is a complex process involving effective and sensibly handling assets and liabilities

combination in a portfolio that will meet long term investment objectives and risk tolerance of investors and the proportion distribution of those securities. A portfolio is a conceivable class of assets and liabilities combined in order to minimize investor's risk and maximize their returns.

Following are some of the tasks involved in portfolio management:

1) *Portfolio Analysis* is the process of reviewing or assessing the components of the entire portfolio of securities or products to meet investors' needs. It is a quantitative method of selecting best portfolio which strike a balance amid maximizing the return and minimizing the risk in various uncertain environment?
2) *Portfolio Selection*: portfolio selection provides doorway to evaluate combination of large securities among available alternatives that yields earnings within minimal risk tolerance.
3) *Portfolio Revision*: means of constantly monitoring constructed balanced portfolio by investor to ensure it continues optimal level.
4) *Portfolio Evaluation*: means of revising balanced portfolio regularly to confirm it earns maximum return with minimum risk level.
5) *Active Portfolio Management* is a strategy to generate greater return on investment above the market benchmark or index in an efficient market.

2.1.1. Theories

Modern Portfolio Theory (MPT) explains why rational investors build efficient portfolios. to optimize or maximize expected return at market risk level. It is use to achieve a higher return, combining portfolio of riskless and risky security to beats the market in the long run.

Risk Aversion Theory: says investors are reluctant to take risks and they prefer associating with riskless investments, to optimize their returns while minimizing their risk level. Rational investors desire to choose investment with the lowest risk.

2.1.2. Portfolio Theory

Prior to Portfolio Theory developed [24], investor focuses on maximizing anticipated return levels without considering the risk levels. Markowitz model calls investors' attention to portfolio diversification, preferring asset portfolios than individual assets. The hypothesis focused on the expected returns and risk level for a given level of return. Reduction in the level of risk exposure at high level of return is possible through a set of portfolio (diversification).

A well-diversified portfolio tends to have zero risk level and the only relevant risk is the systematic risk. The model has only one systematic risk factor that affects market movements' β, its "market risk" in "market portfolio" [10].

2.2. Review of Related Literature

Unsystematic or diversifiable risks are risks that are reducible in portfolio. Banks can reduce unsystematic risk and others cannot be reduced through diversification (Van [25]. Combining classes of assets (loans, securities, etc.) in a portfolio is one of the challenges most banks are facing today. Credible classes of securities must be included in a portfolio to ensure risk return expectation in decisions making. Risk management in banking operation is a logical development purposely taken to manage exposure to losses and protect the value of its assets achieving planned targets through operational restructuring and micro environment.

Portfolio Diversification: Portfolio Diversification as claimed [26] as cited in [20] alluded that portfolio diversification encompasses capital allocation strategically in a proficient and effective method purposefully at minimizing risk exposure to investment hazard. Portfolio diversification targets vulnerability reduction in similar organisation due to uncertainty by investing in diverse investment choices.

Bundle or a combination of individual securities or assets in a portfolio is refer to as diversification. The Portfolio theory guides investors as to investment decision making regarding their assets. The period an investors or investment managers allocate their funds widely into different investment opportunities, diversification is assumed. Lower risk is not a creation of diversification by banks rather it depends on large investment holdings which is well spread in the financial market [20]. The strategy that focused in minimizing risk exposure by reducing submission of funds into one investment preference and assets is diversification with assurance that revenue received will be reinvested to alternative investment available in the market [20].

Investor's portfolio decision should not rely excessively on a particular investment to avail diversification benefits. It means therefore, spreading investment into other alternative investment opportunities, would upturn performance in securities such as government investments, derivatives and private bonds.

1) *Risk*: is defined in terms of variability of returns. "Is the potential for variability in returns".
2) *Safety* is on investor desires to expect their capital back at maturity.
3) *Liquidity describes* the ease with which investment is saleable in the financial markets.
4) *Financial Performance* is the method organization used to assess complete degree to which financial purposes have been accomplished regarding financial health built on assets, liabilities revenues and profitability. Reflection of firms' results and overall financial outcomes as shown in the financial reports for a particular period, highly used for comparison and to draw conclusion between two or more firms in the same industry according to the author [26] cited in the article [20], posited, useful to show if company is running at loss, [27].

2.3. Empirical Reviews

Diversification of portfolio and Deposit Money Banks: performance in Nigerian was investigated, [20] The study revealed positive and negative correlation with returns on equity and long run relationship among the variables that

predict performance of DMBs in Nigeria.

The empirical investigation of [4], on loan portfolio management significantly affect deposit money banks performance validating [28] that deposit money banks positively affected by portfolio management. Banks' portfolio management on profitability was examined in Ghana [3] using Panel regression with a revelation that government securities have positive effect on banks loans and have negative effect on banks' profitability.

Effect of portfolio management on the financial performance in Kenya 2014- 2017 was investigated [7], descriptive design used. The study showed that liquidity, asset and deposit mix account for 63% non-conformities in banks profitability while bank concentration has no significant effect.

In the study examined [29], the empirical finding indicated efficient liquidity management among the banks is required on effectiveness of liquidity management and Nigeria banking performance using survey design method.

Research into banks performance and adoption of electronic banking in Nigeria, with judgmental sampling techniques used to collect data from four Nigerian banks [30]. Return on equity and return on assets were proxy for bank performance. The study revealed that electronic banking positively improved returns on equity (ROE) while it did not improve returns on assets (ROA) in Nigerian banks.

The study on diversification of products and market and corporate financial growth performance was carried out [31], which impacted significantly on performance and diversification not related negatively on performance.

The study on portfolio management and liquidity risk revealed liquidity shock on investors' behaviour and lack of investment [27] and that portfolio performance is as resultant effect of combined management strategies on investment limited.

3. Methods

3.1. Study Design

The study used ex post facto design, the dataset was from public published documents which is available for use generally.

The research data set were secondary covering the period of 2009 to 2021 from annual reports of six deposit money banks (UBA, GTB, ACCESS, FIDELITY ZENITH and WEMA Bank) and Central Bank of Nigeria statistical bulletin 2021 which covers 13 years' period. Panel Fully Modified Least Squares was used to analyse the data, likewise Descriptive Statistics and Normality test were used.

3.2. Model Specification

The models established an econometric relationship between profit, interest rate, assets, provision for bad loans and customers' deposits.

$$Per = f(Lnc, Derv, Inv, Ch, Tas)$$

$$Prof = a_0 + a_1Lnc + a_2Derv + a_3Ch + a_4Inv + a_5Tas + e_2$$

Where: Bank Performance = proxy by profit after tax (PAT), CDP=customers' deposits, derv= Derivatives, Inv = Investment at fair value, Ch = Cash. LOCUS = loan to customers, e_2 = error term.

Banks performance indicates the amount of income that can be earned using their assets during a specific period. The model assumes that banks performance (profit) is influenced by portfolio management (risks).

4. Data Analysis and Discussion

Table 1. *Descriptive statistics of portfolio management and deposit money banks.*

	PAT	LCUST	INV_FV	DERIVATES	CDP	CASH
Mean	52342.54	1012070.	257129.2	68455.56	1605918.	393854.7
Median	36163.50	809818.0	153359.5	30228.50	1321436.	263878.0
Maximum	257167.0	3256073.	1553458.	494253.0	5517069.	1503245.
Minimum	-7966.000	28637.00	2465.000	137.0000	94791.00	2393.000
Std. Dev.	55971.54	756311.1	309395.8	98021.25	1274044.	385542.0
Skewness	1.476720	0.953545	2.279728	2.277818	1.183775	1.212274
Kurtosis	4.892620	3.430860	8.776902	8.559406	3.873202	3.836750
Jarque-Bera	39.99065	12.42355	176.0240	167.8977	20.69526	21.38038
Probability	0.000000	0.002006	0.000000	0.000000	0.000032	0.000023
Sum	4082718.	78941466	20056074	5339534.	1.25E+08	30720666
Sum Sq. Dev.	2.41E+11	4.40E+13	7.37E+12	7.40E+11	1.25E+14	1.14E+13
Observations	78	78	78	78	78	78

From table 1, the period under assessment, Profit (PAT) averaged ₦52343.54 billion, with maximum value of 257167 and minimum of (7966) while the standard deviation is 55971.54 revealing portfolio value with high degree of risk. LCUST has average value of 1012070 with maximum and minimum value of 3256073 and 28637 respectively. Investment at fair value and derivatives has mean value 257129.2 and 6455.56 respectively. There minimum and maximum values are 28637, 2465 and 3256073 and 1553458. Customer deposit (CDP) and cash with mean value of 1605918 and 393854.7. They have minimum and maximum value of 94791, 2393 and 5517069 and 1503245 respectively. The variables have high standard deviations signifying high degree of risk. The probability values for all variables are

significance. The Jarque-bera statistics indicates that none of the variables show a departure from normality, the variables are considered to have a normal distribution.

Table 2. *Panel Fully Modified Lease Squares on portfolio management and deposit money banks.*

Dependent Variable: PROFIT				
Method: Panel Fully Modified Least Squares (FMOLS)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LCUST	0.055970	0.004156	13.46649	0.0000
INV_FV	-0.014168	0.004910	-2.885292	0.0053
DERIVATES	-0.037881	0.012061	-3.140864	0.0025
CDP	-0.003319	0.003310	-1.002679	0.3196
CASH	0.018969	0.005965	3.180002	0.0022
R-squared	0.535567	Mean dependent var		55658.76
Adjusted R-squared	0.507840	S.D. dependent var		56965.10
S.E. of regression	39963.38	Sum squared resid		1.07E+11
Long-run variance	90343432			

Source: Researchers' computation, 2023

From Table 2, four of the independent variables as statistically significant except customers' deposit (CDP). Cash deposit, derivatives and investment with fair value have negative coefficient with the profit, which means they are negatively correlated with profit while Cash and loan to customers' (Locust) have positive coefficient which signify positive relationship with profit. There is long run covariance denoted by banks' profit after tax with the independent variables as they move in the same direction; enhancing banks' profit. This result validates the work of [20] which revealed positive and negative correlation with returns on equity and long run relationship among the variables that predict performance of DMBs in Nigeria.

Table 2 showed that the coefficient of determination which is the adjusted R-squired is 51% and R-squired is 54 which indicates the independent variables considered and the residual variations that are captured by error term, therefore, we conclude that our estimated model is of good fit and reliable in making investment policy. If there is 1-unit reduction in deposit it reduced PAT by 0.3% while 1-unit reduction in investment and derivatives will reduce profit by 1.4% and 3.7 % respectively. According to the empirical data in table 2, portfolio management has a negative effect on deposits, which suggests that bad portfolio management lowers banks' deposits and properly managed portfolio increases bank profit after tax.

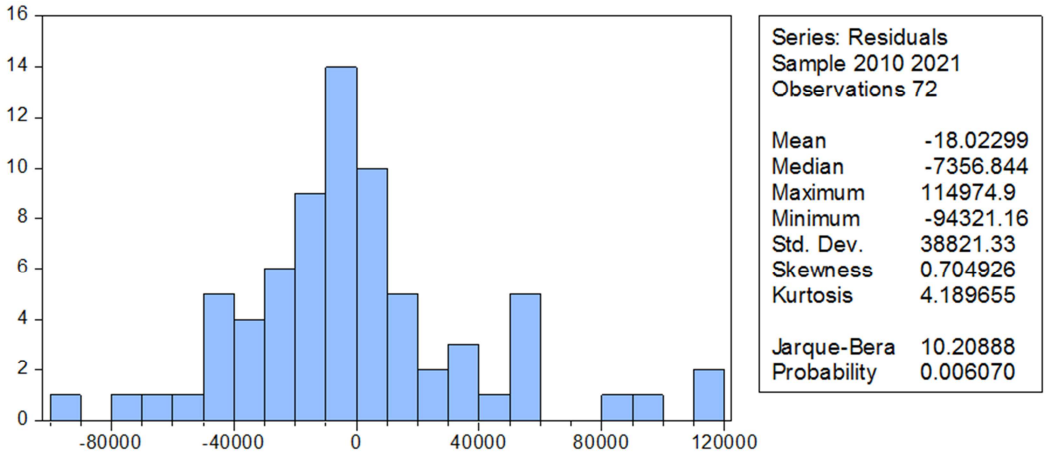

Figure 1. *Normality Test on portfolio management and money deposit banks.*

From figure 1, the diagnostic test of normality done was well distributed, and residual of normality is normally distributed, proof by the probability value 0.006 and the Jarque-Bera of 10.2 which is greater than 5% significance level.

Table 3. *Correlation coefficient of portfolio management and deposit money banks.*

	LCUST	**INV_FV**	**DERIVATES**	**CDP**	**CASH**
LCUST	1.72741372	6.070168961	-2.834543144	-1.15187750	1.05294327
INV_FV	6.07016896	2.41110423	3.15066838	-6.85663726	-2.37315889
DERIVATES	-2.83454314	3.15066838	0.00014546	-6.37713504	1.39864386
CDP	-1.15187750	-6.85663726	-6.37713504	1.09544408	-9.69316546
CASH	1.05294327	-2.37315889	1.39864386	-9.69316546	3.55824534

Source: researchers' computation, 2023

From Table 3, Loan to customers have positive relationship with investment and cash deposit and negative relationship with derivatives and cash, means that they move in opposite direction. Investment has positive with loan to customers, derivatives and negative relationship with cash and customers' deposit. Customers deposit have negative correlation with LCUT, INV FV, Derivatives and cash indicating reduction in customers; deposit reduces cash in banks' possession and impede banks' power to carry out their effective banking operations resulting in negative consequential effects on profit after tax of banks. Cash has negative relationship with investment and customers' deposit but positive association with loan to customers and derivatives. Cash with bank can be used to create loan and effect investment in derivatives.

5. Conclusion and Policy Implications

The dynamic portfolio management and deposit money banks performance in Nigeria as well as other factors (bank loan, investment, profit after tax, loan to customers and bank deposits) is investigated in this study. Portfolio management invariably can produce different results on bank's performance, conditional on the variations in the variables.

Banks should adopt proactive monitoring of portfolio on regular basis and invest in securities with shorter duration due to its less volatility. Application of advanced technology in portfolio management and constant review of portfolio mix by expertise should be encouraged to minimize risk. Integrating capital asset pricing model (CAPM) with elements of free risk asset in the capital market.

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