

Financial Derivatives and Its Effects on Financial Performance of Deposit Money Banks in Nigeria

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Abstract

This study examined the relationship between financial derivatives and financial performance of deposit money banks (DMBs) in Nigeria from the period of 2013 to 2022 (10years). Financial derivatives [proxied with Financial Liabilities Derivatives (FLD), Foreign Exchange Derivatives (FED), Trading Income on Derivatives (TID), Loan and Advance to Customers (LADC) and Bank Size (BS)] (independent variables) and financial performance [proxied with Return on Assets (ROA)]. The Ex-Post Facto research design was used. Ex-Post Facto research design aids in answering the who, what, when, where, and how questions linked with a certain study problem. The ex-post facto research design is used to acquire information on the current state of a phenomenon and to define 'what exists' in terms of variables or conditions in a setting that is specifically relevant to the issue under investigation. Data on financial derivatives and financial performance were obtained from the annual reports and accounts of ten (10) DMBs listed in Nigeria Exchange Group that has international presence. The data set was described using descriptive statistics, followed by the correlation analysis was used to ascertain the co-movement of the independent variables in relation to the dependent variable and several diagnostics tests. Since the data are panel series that the unit root test was conducted to ascertain if the data are stationary in order to have accurate regression result followed by single equation co-integration test while the Multiple Regression analysis were employed with the aid of E-VIEW version 9.0 for the purpose of testing the research hypotheses raised in chapter one. It evident that measures of financial derivatives used has mixed effects on ROE of DMBs in Nigeria. However, majority of the independent variables such TID, LADC and BS has significant effects on ROE of DMBs while FLD and FED established an insignificant effects on ROE of DMBs in Nigeria. Hence, the study concluded that a financial derivative has significant effects on financial performance of DMBs in Nigeria. The study recommended that DMBs in Nigeria should minimize their financial derivative liabilities holdings, since it has detrimental effect on their ROE. Limit their financial derivative liabilities and ensure that financial derivative assets are better utilized.

Key Words: *Derivatives, Financial, Performance, Liabilities, Foreign, Exchange and Trading Income.*

Introduction

In pursuit of higher profits in their commerce function, deposit money banks (DMBs) have increased market globalisation, exposing them to various financial risks, including credit, interest rate, foreign exchange, commodity, operation, and systemic risks (Ogbonna, 2018). Poorly handled financial risks have hurt DMBs' financial performance, so they employ tradable products like financial derivatives to offset them. Derivatives trading began to support goods availability at the correct moment and eliminate value changes. This encouraged traders to contract to meet their needs. Different parties used derivatives to reduce losses. Farmers were always assured of income despite crop disasters, and merchants indemnified themselves to fund future trades (Sulaiman and Ibrahim, 2020). This supported market fairness (Waswa & Wepukhulu, 2018). Trading derivatives has expanded and become crucial to the global economy. The majority of global companies have heavily used derivatives to hedge against unpredictability. International Swaps Derivatives Association (2019) definitively declared that commercial banks decreased their mark-to-market exposure by participating in derivatives markets. Mark-to-market global exposure fell 77.9% in 2019 (ISDA). According to the Bank of International Settlements, derivatives over-the-counter balances rose to \$640 trillion in June 2019 from \$544 trillion in 2018.

A derivative is something with derived values rather than independent values. Financial derivatives are instruments whose value depends on underlying assets (Sathyamoorthi, Mogotsinyana, Mphoeng & Mashoko, 2019). Their value depends on another instrument, making them risk management and speculative. It is designed to hedge against interest rate, exchange rate, commodity, and stock price risk over a given period (Bakshi, Cao & Chen, 2018). Financial derivative instruments help banks manage credit, interest rate, and currency rate risks (Onyefulu, Okoye & Orjinta, 2019). Therefore, banks use derivatives to reduce cash flow volatility and distress costs. Derivatives are used by some institutions for hedging and rate and return speculating. Management of financial and other risks is crucial to corporate finance, especially banks, and financial derivatives can help.

Instead of the customary way, deposit money institutions now employ derivatives to make perceived gains. It can help DMBs maximise profits by managing systematic risks (Simamora & Oswari, 2019). Recent worldwide financial derivative use, particularly by banks, has grown (Bendob, Bentouir & Bellaouar, 2018). DMBs use various forms of financial derivative for asset-liability management, mostly off-balance sheet activities (including financial derivative assets and liabilities), to manage risk exposures and maximise profitability. Interest rate, exchange rate, credit, and other unsystematic risks that could jeopardise the firm's aim should be managed by financial institutions (Zakaria, 2018). Financial derivatives help firms manage financial risk exposures and DMBs manage interest rate uncertainty, which can boost lending and profit (Zakaria, 2018). Financial derivatives use by banks in rich nations has grown rapidly, whereas in developing countries it is low and information on its use is scarce (Chanzu & Gekar, 2018). Thus, DMBs need financial derivatives to protect them from unanticipated events that could affect their profits (Sinha & Sharma, 2018).

Financial risks including exchange and interest rate volatility increase when financial service organisations' operations get more sophisticated (MacCarthy, 2018). Risk management is crucial to Nigerian financial services organisations' performance. Every business takes risks. However, money market organisations are more exposed to business risks than service and product-centric firms (Gibson, 2017; Fadun, 2018). To avoid financial losses and insolvency, risks must be hedged to achieve profitability. Money market enterprises and financial institutions employ financial derivatives to control and hedge business risks (Hon, 2018). Derivative instruments are increasingly used in corporate risk management due to global financial deregulations and the evolution of higher-weighted risks in financial activities of financial firms during and after the global economic recession, according to Cole (2019). Due to credit, interest rate, and currency rate risks, banks use financial derivative products to manage them. Derivatives help banks decrease cash flow volatility and distress costs (Sulaiman & Ibrahim 2020). It can be used to manage systematic risks in firms to maximise deposit money bank profits. Recent worldwide financial derivative use, particularly by banks, has grown (Bendob, Bentouir & Bellaouar, 2018). Thus, DMBs need financial derivatives to protect them from unanticipated events that could affect their profits (Sinha & Sharma, 2018).

The usage of derivatives increases liquidity period by cutting transaction costs. Valdex (2018) claims that financial derivatives minimise big funds compared to associated asset derivatives. Promoting Nigerian and African economic growth will improve the financial system. Trading financial derivatives including swaps, options, forwards, and futures enriches financial firms. Banks employ these transactions to hedge against unanticipated business conditions and earn money. Because global and domestic financial markets are uncertain and volatile, DMBs are embracing financial derivatives to hedge systemic risks and find new ways to make money. Commercial banks can achieve their preferred risk exposures without affecting their business goals by managing risks with financial derivatives, or off-balance sheet activities. Cheap derivatives can replace expensive capital. Although financial derivatives contracts improved the profitability of Nigerian DMBs, listed banks nevertheless faced poor profitability concerns (CBN, 2018). ETD, ETF, and OTC derivatives markets were still developing. Banks had to trade only a few futures derivatives, thus commission fees from forwards, options, and swaps derivatives constituted an opportunity cost. Listed DMBs performed poorly due to risks that could have been minimised by hedging.

Derivatives are less common in poorer nations like Nigeria. Financial derivatives have helped industrialised countries mitigate financial crises by spreading risk among financial firms. Derivatives are only understood and traded in South Africa and barely elsewhere. Ghana 2012 Global Analytics. The CBN published foreign exchange derivatives rules on 22 March 2011 to develop Nigerian derivative markets (Orie, Obiora & Orie, 2022). CBN regulates, develops, and secures Nigeria's financial markets. Derivatives let firms hedge systemic and non-systemic risks. A thorough understanding of derivatives market, products, and participants is needed. Financial derivatives have been studied by several authors with mixed results. Between 2014 and 2018, Efang et al. (2019) evaluated how derivative instruments affected risk management in Nigerian banks. Financial derivatives improved risk management in Nigerian banks, according to the inferential result. John (2018) studied how financial derivatives affect Ghanaian financial firms. A

high positive link exists between financial derivatives and regulated business risks, according to Sulaiman and Ibrahim (2020), who study the profitability of selected Nigerian deposit money institutions. Model results show positivity and significance. In 2018, Waswa and Wepukhulu explored how derivative financial instrument use affects Nairobi Securities Exchange-listed nonfinancial enterprises. In price stabilisation, derivatives are statistically significant, but in price discovery, they do not affect firm financial performance. Over the study period, NSE non-financial enterprises performed 8.13 with a standard deviation of 10.67. As shown by DMBs' yearly financial statements, most banks today use financial derivatives as assets and/or liabilities to change cash flows and maximise profit. Financial derivatives and deposit money bank profitability have been studied, however most employ primary data like Lenee and Oki (2018) and Chanzu and Gekara (2018), requiring a new approach. Despite the call for financial derivatives, the question is whether they have affected Nigerian deposit money institutions' profitability. The study explores how financial derivatives affect Nigerian deposit money bank profitability. Based on existing literature using Nigerian data, this study examined the effect of financial derivatives (FLD, FED, TID, LADC, and BS) and financial performance (ROA) on DMBs in Nigeria. This study attempts to fill the gaps and contribute to Nigerian literature on the issue.

Literature Review

Conceptual Review

A Brief Overview of Derivatives

The use of derivatives increased in the early 1970s due to corporate instability. The mid-1900s saw exchange rate, interest rate, and commodity price uncertainties rise. After the Breton forests exchange rate regime was abandoned in 1973, market instability continued. High volatility followed (Gupta, 2018). Thus, many derivatives exist. Many emerging markets have long-term derivatives exchange plans (Lien & Zhang, 2018). Early derivative trading began in Venice in the 12th century. At that time, credit derivatives were loans to fund ship expeditions with insurance against ship disappearance. Later in the 16th century, commodity derivatives appeared. Slow communication and expensive transit costs plagued traders at the time. Using derivatives contracts, merchants allowed farmers to lock in the price of a standardised grade of their produce for later delivery. Financial market growth in derivatives increased the effectiveness of monetary policy by spending up transmission and affecting expectations, giving the process power or credibility (Gupta, 2018). Derivatives are a large range of financial instruments that include options and futures. Price and other variables of the underlying asset determine the value of these instruments. They have no value other than the claim they provide their owners to hold other financial assets or securities. Butter, made from milk, is a derivative. Milk demand and supply determine butter prices. By definition, derivatives are derived from something else. This could also signify a financial instrument based on another securities. The underlying asset of a derivative can be commodity or financial. Financial instruments called derivatives are based on other assets. The price of gold in two months will rely on numerous factors, including its current and predicted price (Vashishtha & Kumar, 2018).

Financial derivatives

Financial institutions often use derivatives to reduce risk and loss (Lenee & Oki, 2018). Some use it to hedge risks and speculate. All derivatives in deposit money institutions are for trading and

risk management. Banks may trade derivatives on their own behalf, for customers, or both. Derivative comes from the English word ‘derive’, meaning to get something from something else. They are instruments whose value comes from another object. They hedge risks from their underlying instruments. Osuoha, Martin, and Osuoha (2018) define derivatives as financial products whose value comes from another. Financial and commodity derivatives exist. Financial derivatives come from interest rates, exchange rates, shares, bonds, and treasury bills, whereas commodity derivatives come from agricultural produce, precious metals, oil, and gas. IFRS 9 (2018), which replaced IASB 39, defines derivative as a financial instrument whose value changes with interest rates, prices, exchange rates, and credit ratings.

Financial derivatives are financial instruments whose prices are tied to principal assets including bonds, shares, monetary exchange, and interest rates, according to Muhia (2018). Certified Financial Analysts Institute (2018) highlighted that financial derivatives were valued by principal securities or indices, not intrinsic cash flows. This study defined financial derivatives as contracts whose values were generated from attached main assets and utilised to mitigate financial market risks from outmoded lending and borrowing undertakings. Swaps, options, forwards, and futures were the main derivatives. In a swap, two parties agreed to exchange periodic payments in the agreed currency (FRBNY, 2019; RBA, 2018). Financial derivative instruments called options gave owners the right but not the obligation to buy or sell an indicated amount of an underlying asset at a strike price or exercise price at or before the expiration date.

An identified risk can be traded in the financial market using financial derivatives. The price of this instrument is tied to another asset. They help banks manage risk and avoid unexpected events that could reduce profits (Osayi, Kasimu and Nkwonta, 2018).

Over time, financial derivatives contracts evolved with various speculative and hedging assets. Derivatives owners gained from stakes on asset value changes while speculating (Sulaiman & Ibrahim, 2020). Insurance over the assets was needed for hedging. Trading derivatives over the counter and on exchange forums was prevalent. Over the counter derivatives were unregulated and risky, and parties were victims of price hikes, while exchange forum derivatives were standardised. Traders were always advised to recognise derivative principal asset, price, and expiration risks. Over-the-counter credit swaps were blamed for the 2008 financial crisis because they encouraged excessive hedging, which proved disastrous (European Commercial Bank, 2019). Many banks closed due to poor financial performance. This is a contract between two parties for future payments of different types. Interest rate, currency, and credit swaps are the main types. Two parties agree to trade interest rates of the same currency over a period in an interest rate swap. However, a currency swap is an agreement between two persons to exchange funds in one currency for another. Exchange swaps between domestic and international banks are also currency swaps. The domestic bank deposits domestic currency in the foreign bank while the foreign bank deposits foreign currency. Eliana (2018) defines credit swap as a tool used to transfer credit risk of an individual or organisation. Party buys security against loss from credit granted to another. Each is a trading derivative instrument.

ETDs, ETFs, and OTC derivatives make derivative trading possible. ETDs are derivatives traded on recognised exchanges. Public prices and non-negotiable terms. An ETF tracks the performance of an underlying asset. Exchange-traded shares and the underlying asset they follow give them value. However, OTCs are customised contracts for participants. The parties agree on terms and can exchange them without an intermediary (Onyefulu, Okoye & Orjinta, 2019). In March 2011, the Central Bank of Nigeria issued a guideline for FX derivatives in the Nigerian financial market to promote financial stability and smooth derivative trade in light of global derivative market adoption. criteria covered permitted derivative products, prudential criteria, trade-backed requirements, and more. FX options, forwards (outright and non-deliverable), and cross-currency interest rate swap trading liquidity are authorised derivatives. The guideline allows authorised dealers to use call and put options (CBN, 2018). DMBs must document financial derivative activity in accordance with the International Financial Reporting Standard. Profit and loss and balance sheets must reflect trading proceeds gains or losses. DMBs represent their financial derivatives as derivative financial assets and liabilities, indicating whether they are asset- or liability-based. Financial derivatives should help banks maximise profits, as they should for any other company (Chanu & Gekaru, 2018; Lenee & Oki, 2018).

Financial performance

Financial performance, as described by Greenwood and Boyan (1990) in Onyefulu, Okoye, and Orjinta (2019), is an organization's income after using its resources. According to Delaney et al. (2018), it was an independent measure of a firm's use of core business methods to generate returns. Financial performance in this study was defined as an organization's legitimate operational income without purposeful financial risk. Commercial banks were required by the government to accept savings, receive client payments, and lend money, according to Ernst & Young (2018). Financial service viability was the goal for banks. Using plans that reduced costs and risks while maximising revenues made them viable (ADB, 2018; Chepkorir, 2018). DMBs' performance is their annual trading goals exceeded. Financial statements from such banks demonstrate this. Despite some years of diminishing profit growth, Nigeria's DMBs have become Africa's second most profitable banking sector (Omotunde, Sunday & John-Dewole, 2017). According to Joseph (2017), banks' performance should start with management and stockholder goals. Banks aim differently. Some desire to develop faster and achieve long-term growth, while others choose a peaceful existence, limiting risk and projecting a good bank image with modest shareholder earnings (Abaenewe, Ogbulu, & Ndugbu, 2017). Most stock prices reflect firm performance. Not all market indicators are reliable. Performance measures including bank size, deposit volume, and profitability may be superior. ROE is used to assess bank performance (Abaenewe, Ogbulu and Ndugbu, 2017 & Joseph, 2017). Performance, which assesses a firm's financial goals, has long attracted managerial researchers. Firm financial performance is subjective judgements of how successfully a firm uses its major assets to make money. Firm value was defined by Oluyi and Abioye (2020) as the cost of projected future coin flows after chance correction at the desired rate of return. According to Eyenubo (2017), Nyiranzabamwita and Harelimana (2019) define it as accomplishing goals, objectives, and purposes within a set timeline. Qureshi (2017) offered four methods corporate finance literature has appraised firm cost, according to Nyiranzabamwita and Harelimana (2019). Economic management evaluates cash flows and investment levels before identifying and

assessing the effect of financing assets on company price; capital shape studies the effect of capital shape adjustments on company price and how different factors affect the debt and equity factor of the company capital shape; and resource-based approach, which is why the cost? Financial performance was measured by ROA, ROE, and NIM in this study. Since CBN recognised ROA, ROE, and NIM as financial performance quotas in Nigeria (CBN, 2018), this was the case. Sari (2019) said NIM quantified sales that generated net income. Banks' investment gains were measured by ROA (Sari, 2019). ROE measured the bank's ability to generate income from its capital (Sari, 2019). Using average earning assets, NIM measured a bank's potential to generate interest income minus interest expenses (Yao et al., 2018). This study measured DMB financial performance using ROE.

Theoretical Framework

Modern Portfolio Theory (MPT)

Edwin & Martins' 1997 MPT improves investment models. It advances finance mathematical models. The MPT promotes asset diversification to mitigate market and company risk. The MPT, also known as Portfolio Management Theory, helps investors classify, assess, and regulate risk and return. Quantifying risk and return and assuming investors must be rewarded for risk are key to portfolio theory (Efanga, Umoh, Essien & Umoh, 2019). Traditional security analysis focuses on individual assets, but the MPT examines the statistical correlations between the portfolio's securities. Diversification in investing is mathematically formulated by the MPT to select a group of assets with lower risk than any particular item. Because different assets change value differently, this is intuitively possible. Diversification reduces risk even if asset returns are positively correlated.

Empirical Review

From 2015 to 2021, Orié, Obiora, and Orié (2022) examined how financial derivatives affected Nigerian stock exchange DMBs. The study evaluated how loans and advances affect Nigerian stock exchange DMBs. Determine how exchange rates effect Nigerian stock exchange DMBs. Determine how financial derivatives effect Nigerian stock exchange deposit money bank performance. Data was evaluated using Panel Least Squared. The variables were from the Nigeria stock exchange-listed deposit money bank's annual report. Using exchange rate, loan and advances, and financial derivatives. Study used secondary data. Advances and borrowing did not effect deposit money bank performance on the Nigerian stock exchange. Nigerian stock exchange deposit money bank performance is affected by exchange rate. Financial derivatives effect deposit money bank performance on the Nigerian stock exchange. Risk management procedures and regulations should precisely define risk management duties, according to the report. DMBs need risk measurement and limits.

According to Sulaiman and Ibrahim (2020), financial derivatives damaged selected Nigerian DMBs' profitability. Nigeria's eight multinational banks' yearly financial reports were used to develop a 2012–2017 panel regression model. Financial derivative liabilities (FDL) and assets (FDA) proxied the independent variable while loan and advances to customers (LTC) controlled. To identify the best estimator, variables were examined with pooled OLS, fixed effects, random effects, and Hausman. Model results are significant and positive. FDA and LTC boost Nigerian

DMBs' profits, but not FDL. According to the report, financial derivatives improve Nigerian deposit money institutions' earnings. The study reveals DMBs increase loan assets to increase earnings. Optimise financial derivative asset use and reduce liabilities.

Financial risk management in Botswana commercial banks was examined by Sathyamoorthi, Mogotsinyana, Mphoeng, and Mashoko (2019). Performance was measured by Return on Assets and Equity. Interest rates, inflation, D/A. Equity, total equity to total assets, and loan deposit ratios were used as financial risk proxies for Botswana's 10 commercial banks from 2011 to 2018. The Bank of Botswana Financial Statistics database provided monthly secondary data for this descriptive study. The data was examined using descriptive statistics, correlation, and regression. Interest rates decreased return on assets and equity in regression research. Return on assets was negatively and insignificantly impacted by total debt to assets. Total debt to assets increased ROE and was negligible. Loan deposit ratio affected ROA and equity considerably. The findings suggest that banks should balance financial risk management and financial performance by using market, credit, and liquidity risk management to ensure safety and profit.

In 2019, Onyefulu, Okoye, and Orjinta investigated the financial risk and performance of twenty Stock Exchange-listed DMBs (DMBs) in two West African countries. We examined 2009–2018. Ex-Post Facto research collected secondary data and analysed it using multiple regression and correlation. Three aims and hypotheses were examined using descriptive statistics, Pearson correlation, and panel regression. Performance was measured by Return on Assets and Equity, while Financial Risk was measured by Liquidity Risk, operational Risk, and interest rate Risk. ROA model showed that liquidity risk negatively impacts bank performance in Ghana and Nigeria at 1%. Credit risk had no statistically significant effect on bank performance using ROE. West African banks performed better with positive coefficient values for operational risk in Nigeria and Ghana, but liquidity risk did not. This study advises Nigerian and Ghanaian DMBs to implement the updated Banks and Other Financial Institutions Act (1999) and Prudential Guidelines. DMBs should be adequately capitalised for their loan portfolio and regulatory obligations to offset non-performing loans.

Additionally, Simamora and Oswari (2019) examined how credit, operational, and liquidity risk affect Indonesian stock exchange-listed banks' financial performance. Five of Ethiopia's 43 licenced banks' 2009–2017 financial reports were used for the study. Predictors included credit risk (non-performing loan ratio), liquidity risk (loan to deposit ratio), and operational risk (operational expense to operational income). Financial performance was measured by ROA. Operational and liquidity risk negatively affected financial performance, according to multiple linear regression analysis. Credit risk did not affect financial performance.

Between 2014 and 2018, Efanga, Umoh, Essien, and Umoh (2019) evaluated how derivative instruments affected Nigerian banks risk management. Data from Central Bank of Nigeria and Nigerian Stock Exchange Statistical Bulletins of 2018 were analysed and inferred using the ordinary least squares (OLS) model. Foreign exchange derivative proxied derivative instruments (independent variable), whereas exchange rate measured risk management in Nigerian banks

(dependent variable). Financial derivatives improved risk management in Nigerian banks, according to the inferential result.

Research Methodology

Using Ex-Post Facto research after an occurrence, this study design is used. It was planned to analyse secondary data from ten Nigerian banks' annual reports and accounts using relevant techniques. The 18 banks listed in the Nigeria Exchange Group as of August 31, 2022, according to CBN Press Release, are the study's population. Due to challenges in collecting the annual reports and accounts of the 18 banks listed in the Nigeria exchange group and time constraints for this research endeavour, a sample of 10 banks was picked for the study. These 10 banks were chosen for the study since they make up the majority of Nigeria Exchange Group banks. Secondary data was used for this investigation. The Nigeria Exchange Group's 10 banks' 2013–2022 annual reports and accounts were used to measure the dependent variable (Return on Asset proxied for financial performance) and the independent variable (financial derivatives). A quantitative data analysis was used in this investigation. To determine the independent-dependent relationship, descriptive statistics and correlation analysis were utilised. The study tests time series data for stationary characteristics using unit roots. It also performed numerous diagnostics tests before the unit root test and single equation co-integration test, employing panel least squares regression analysis with OLS method and pooled multiple regression in E-VIEW 9.0. Panel least squares regression was used to explain shifts in the dependent variable based on changes in independent or explanatory variables utilising longitudinal data. The model assumes a linear relationship between independent and dependent variables. The model which specifies that Financial derivatives [proxied with Financial Liabilities Derivatives (FLD), Foreign Exchange Derivatives (FED), Trading Income on Derivatives (TID), Loan and Advance to Customers (LADC) and Bank Size (BS)] (independent variables) and financial performance [proxied with Return on Assets (ROA)] (dependent variable) of DMBs in the Nigeria, will be formulated as follows;

$$ROA = f(FLD, FED, TID, LADC, BS)$$

$$ROA = \beta_0 + \beta_1 \text{LogFLD} + \beta_2 \text{LogFED} + \beta_3 \text{LogTID} + \beta_4 \text{LogLADC} + \beta_5 \text{LogBS} + E$$

Where; E = Error Term, β_0 = Intercept β_1 – β_5 = Coefficient of the Independent Variables and The a priori expectation is $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$, is greater than 0.

Results and Discussion

Under this sub-heading, various analyses was conducted, this was done below;

Table 4.1: Descriptive Statistics

	ROA	LOGFLD	LOGFED	LOGTID	LOGLADC	LOGBS
Mean	0.027559	7.504177	5.539062	5.886061	6.841691	7.648276
Maximum	0.540292	9.943955	8.015449	8.312030	9.611123	9.985011
Minimum	-0.091003	5.205929	2.540329	3.449633	3.439648	5.430754
Std. Dev.	0.058280	1.337333	1.085310	1.427222	1.762747	1.359364
Skewness	1.847788	0.321407	-0.235708	0.171399	-0.190250	-0.003628
Kurtosis	3.159485	1.474755	2.746533	1.725030	2.055126	1.533278
Jarque-Bera	15087.19	11.41493	1.133976	7.117490	4.323194	8.963859
Probability	0.000000	0.003321	0.567231	0.028475	0.115141	0.011312

Observations	100	100	98	98	100	100
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Source: EVIEW, 9.0 Outputs, 2023.

Descriptive statistics are in Table 4.1. ROA mean value was 0.0276 with standard deviation 0.0583. FED had a mean of 5.5391 and a standard deviation of 1.0853, TID had 5.8861 and 1.4272, LADC had 6.8417 and 1.7627, and BS had 7.6483 and 1.3594. Each variable's standard deviation is more than its mean, indicating broad data dispersion. It of three implies no fat or thin tails in the usual distribution. An observed distribution with a kurtosis larger than three has heavy tails compared to the normal distribution. RoA, FLD, FED, TID, LADC, and BS have thin tails relative to the normal distribution because all kurtosis coefficients in Table 4.1 are less than 3. Examining after the fact. Using this study design after an event. The goal was to examine secondary data from ten Nigerian banks' annual reports and accounts using suitable methods. CBN Press Release says the study's population is the 18 Nigeria Exchange Group banks listed as of August 31, 2022. For this study, 10 banks were selected due to time restrictions and difficulties obtaining the annual reports and accounts of the 18 Nigeria exchange group banks. Since they dominate Nigeria Exchange Group banks, these 10 were studied. Used secondary data for this study. Nigeria Exchange Group's 10 banks' 2013–2022 annual reports and accounts measured the dependent variable (Return on Asset proxied for financial performance) and the independent variable (financial derivatives).

Table 4.2: Correlation Matrix

	ROA	LOGFLD	LOGFED	LOGTID	LOGLADC	LOGBS
ROA	1.000000					
LOGFLD	0.053653	1.000000				
LOGFED	0.130604	0.629736	1.000000			
LOGTID	0.267821	0.782305	0.721393	1.000000		
LOGLADC	0.021352	0.879760	0.512504	0.598466	1.000000	
LOGBS	0.080318	0.829980	0.705319	0.954386	0.669963	1.000000

Source: EVIEW, 9.0 Outputs, 2023.

The correlation test is presented in Table 4.2 and it shows the absence of multi-co linearity among the variables since the correlation values are less than 0.7. Furthermore, the result shows the explanatory variables namely; FLD, FED, TID, LADC and BS has positive strong correlation with ROA of DMBs in Nigeria.

Table 4.3: Variance Inflation Factors Multicollinearity Test

Variance Inflation Factors

Date: 09/22/23 Time: 06:12

Sample: 1 100

Included observations: 93

Variable	Coefficient Variance	Uncentered VIF	Centered VIF

LOGFLD	0.000109	286.0713	8.450637
LOGFED	3.97E-05	57.90290	2.137351
LOGTID	0.000140	53.21557	2.155640
LOGLADC	3.52E-05	78.66202	4.914464
LOGBS	0.000174	73.46652	4.114347
C	0.001508	69.62877	NA

Source: EVIEW, 9.0 Outputs, 2023.

Table 4.3 shows the multicollinearity test for the panel series data. Data sets with highly associated independent variables in multiple regression models called multicollinear. For this study's validity, the variance inflation factor (VIF) was computed as stated in Table 4.4. Additionally, FLD, FED, TID, LADC, and BS have Centred Variance Inflation Factor (CVIF) figures between 8.4506, 2.1374, 2.1556, 4.9145, and 4.1143. The cut-off value of VIF is 10, indicating no multicollinearity issues. VIF values over 10 indicate multicollinearity.

Test			
F-statistic	0.154934	Prob. F(2,85)	0.8567
Obs*R-squared	0.337800	Prob. Chi-Square(2)	0.8446

Source: E-VIEW, 9.0 Outputs, 2023.

To test serial correlation, variable residuals were determined before estimating models. This was done by serial correlation LM. In Table 4.4a, the serial correlation LM test shows that the models have no serial correlation because the f-statistics p-values are insignificant at 5%.

F-statistic	2.928039	Prob. F(5,87)	0.01172
Obs*R-squared	13.39567	Prob. Chi-Square(5)	0.2199
Scaled explained SS	322.5687	Prob. Chi-Square(5)	0.2130

Source: E-VIEW, 9.0 Outputs, 2023.

The heteroskedasticity problem occurs when a variable's variability is unequal over the range of a second variable that predicts it. The Breusch-Pagan-Godfrey heteroskedasticity test ensured model estimation homoscedasticity. The models have no heteroskedasticity issues because the f-statistics p-values are trivial at 5%.

Equation: UNTITLED			
Specification: ROA LOGFLD LOGFED LOGTID LOGLADC LOGBS C			
Omitted Variables: Squares of fitted values			

	Value	Df	Probability
t-statistic	14.45117	86	0.1023
F-statistic	208.8362	(1, 86)	0.1243
Likelihood ratio	114.5828	1	0.0912

Source: E-VIEW, 9.0 Outputs, 2023

From the Table 4.4.1c indicates that the model is homoskedastic since the probability values of three parameters are greater than 0.05 level of significance. Ramsey test result reveals that our model is correctly specified and is stable for regression analysis.

Table 4.5: Augmented Dickey-Fuller Unit root Test

Test Variables	ADF Test Statistic Value	Mackinnon Critical Value @ 5%	Order of Integration	P-Value	Decision
@Level					
ROA	-2.874026	-5.890926	1(0)	0.1834	Non-Stationary
FLD	-2.402727	-2.890926	1(0)	0.1436	Non-Stationary
FED	-2.924429	-3.893589	1(0)	0.0728	Non-Stationary
TID	-2.086065	-2.893230	1(0)	0.2508	Non-Stationary
LADC	-2.507694	-2.890926	1(0)	0.1167	Non-Stationary
BS	-2.030268	-2.890926	1(0)	0.2736	Non-Stationary
@1st Difference					
ROA	-9.779968	-2.891871	1(1)	0.0000	Stationary
FLD	-9.758965	-2.891234		0.0000	Stationary
FED	-11.41635	-2.895109	1(1)	0.0001	Stationary
TID	-11.58756	-2.893230	1(1)	0.0001	Stationary
LADC	-9.894824	-2.891234	1(1)	0.0000	Stationary
BS	-9.111480	-2.891234	1(1)	0.0000	Stationary

Source: E-VIEW, 9.0 Outputs, 2023.

ADF unit root test output in Table 4.5 showed that ROA, FLD, FED, TID, LADC, and BS are not stationary but contain unit root test at their first difference 1(1). Their ADF statistics exceed the

crucial value of 5%. Additionally, the p-value for all variables is less than 5% and greater than 95% confidence, indicating stationary series. They all reached stationarity at first difference (order one), making them eligible for regression.

Table 4.6: Single Equation Co-integration Test

Date: 09/22/23 Time: 08:10				
Series: ROA LOGFLD LOGFED LOGTID LOGLADC LOGBS				
Sample: 1 100				
Included observations: 93				
Null hypothesis: Series are not cointegrated				
Cointegrating equation deterministics: C				
Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
ROA	-8.802934	0.0000	-83.17042	0.0000
LOGFLD	-4.060952	0.0278	-27.21967	0.0220
LOGFED	-2.026196	0.0444	-8.715154	0.0450
LOGTID	-5.499064	0.0113	-46.84065	0.0068
LOGLADC	-3.825326	0.0462	-24.42530	0.0313
LOGBS	-4.478571	0.0208	-34.95823	0.0183

Source: E-VIEW, 9.0 Outputs, 2023.

The result from Table 4.7, the single equation co-integration test indicates a probability values that are less than 0.05 (5%) level of significant, which implies that the variable are co-integrated and suitable for multiple regression

Table 4.7: Multiple Regression Analysis

Dependent Variable: ROA

Method: Least Squares

Date: 09/22/23 Time: 06:10

Sample: 1 100

Included observations: 93

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.184110	0.038835	4.740812	0.0000
LOGFLD	-0.009083	0.010459	-0.868407	0.3876
LOGFED	-0.003793	0.006300	-0.602008	0.5487
LOGTID	0.093419	0.011815	7.907112	0.0000
LOGLADC	0.007758	0.002930	2.647782	0.0142
LOGBS	0.087523	0.013179	6.641086	0.0000

R-squared 0.429834 Mean dependent var 0.030913

Adjusted R-squared	0.397066	S.D. dependent var	0.057801
S.E. of regression	0.044882	Akaike info criterion	-3.307218
Sum squared resid	0.175253	Schwarz criterion	-3.143824
Log likelihood	159.7856	Hannan-Quinn criter.	-3.241244
F-statistic	13.11744	Durbin-Watson stat	1.950894
Prob(F-statistic)	0.000000		

Source: EVIEW, 9.0 Outputs, 2023.

Table 4.8 shows that FLD has a coefficient of -0.0091, a t-value of -0.8684, and a sig. value of 0.3876. FLD seems to negatively impact ROA insignificantly. Since the p-value of 0.3876 is greater than 0.05 (5%) level significance, the alternate hypothesis is rejected and the null hypothesis is accepted, indicating that FLD does not affect DMB ROA in Nigeria. FLD has a negative trend with ROA because its coefficient is -0.0091. DMB ROA in Nigeria drops 0.91% for every 1% FLD change. This risk management theory-based study argued that banks needed hedging strategies to lower external funding costs. In an unfriendly environment, banks may negotiate high external capital costs. The bank avoided refinancing by hedging exchange and interest rate risks, reducing funding costs. These findings agree with Sulaiman and Ibrahim (2020) but disagree with Orié, Obiora, and Orié (2022).

According to Table 4.9, the multiple regression findings have a FED coefficient of -0.00038, a t-value of -0.6020, and a p-value of 0.5487. This implies that FED negatively affect ROA less than significantly. The p-value of 0.5487 is more than 0.05 (5%) level significance, hence the null hypothesis that FED does not affect DMB ROA is accepted and the alternate hypothesis is rejected. FED has a positive trend with ROA since its coefficient is 0.0268. DMBs in Nigeria would lose 0.038% ROA for every 1% FED change. The market exchange rate behaviour hypothesis helped determine how exchange rate volatility may affect derivatives use, with an emphasis on Nigerian commercial banks, who handle most foreign currency transactions. This supports Ahmad (2018) but opposes John (2018).

Table 4.7 shows that the coefficient of TID is 0.0934 with a t-value of 7.9071 and a sig. value of 0.0000. TID may improve ROA significantly. The null hypothesis that TID does not affect DMB ROA is rejected since the p-value of 0.0000 is less than 0.05 (5%) level significance. The alternate hypothesis is accepted. With a value of 0.0934, TID shows a positive trend with ROA. Nigerian DMB ROA would rise 9.34% with 1% TID movement. To mitigate market and company risk, the MPT recommends asset diversification. Portfolio Management Theory (MPT) is a complex investment decision technique that helps investors identify, estimate, and monitor risk and return. The portfolio theory quantifies risk and return and assumes investors must be rewarded for risk. The findings are consistent with Orié, Obiora, and Orié (2022), Efanga, Umoh, Essien, and Umoh (2019), and Sulaiman and Ibrahim (2020), but not Ahmad (2018).

In multiple regression Table 4.7, LADC coefficient is 0.0078, t-value is 2.6478, and p-value (sig. value) is 0.0142. It appears that LADC boost ROA. The null hypothesis that LADC does not affect DMB ROA is rejected because the p-value of 0.0142 is less than 0.05 (5%) level significance. The alternate hypothesis is accepted. LADC's coefficient on ROA is 0.0078, indicating a positive trend. DMBs in Nigeria would gain 0.78% ROA for every 1% LADC movement. This study employed

financial intermediation theory to reduce allocation charges that motivated lending since hedging certified banks to gain exceptional proceeds from divergence. In addition to calculating economies of scale, allocation monitoring explained why shareholders did not need to oversee the bank. The bank's risk decreases as it grows and disappears with portfolio divergence. It agrees with Sulaiman and Ibrahim (2020) but disagrees with Ahmad (2018).

Finally, the multiple regression findings in Table 4.7 show a BS coefficient of 0.0875, a t-value of 6.6411, and a sig. value of 0.0000. BS may boost ROA significantly. Given that the p-value of 0.0000 is less than 0.05 (5%) level significance, the null hypothesis that BS does not affect DMB ROA is rejected and the alternate hypothesis accepted. Its coefficient is 0.0875, indicating a positive relationship with ROA. DMB ROA in Nigeria would rise 8.75% for every 1% change in BS. This study used financial intermediation theory to show that bank risk goes down as risk grows and disappears with portfolio dispersion. It agrees with Efanga, Umoh, Essien, and Umoh (2019) but disagrees with Ahmad (2018).

Conclusion

Financial derivatives and deposit money bank performance in Nigeria from 2013 to 2022 were investigated in this study. The effect of financial derivatives and financial performance on Nigerian DMBs was examined using FLD, FED, TID, LADC and BS as independent variables. The annual reports and accounts of ten Nigeria Exchange Group DMBs with overseas operations provided financial derivatives and performance data. The data show that financial derivatives have diverse effects on DMB ROE in Nigeria. However, most independent variables like TID, LADC, and BS affect DMB ROE in Nigeria, but FLD and FED do not. Thus, the study found that financial derivatives affect Nigerian DMBs' financial performance.

Recommendations

Based on aims and findings, we suggest:

1. Nigerian DMBs should reduce financial derivative obligations because they lower ROE. Reduce financial derivative liabilities and optimise financial derivative assets.
2. To reduce financial sector risk, the government could create local derivative financial products to hedge foreign exchange risk for Nigerian banks.
3. Financial authorities should host seminars and symposia for DMBs to improve their derivatives understanding. Holding trade income derivatives will raise banks' trading income, thus improving the performance of DMBs in Nigeria.
4. The study suggests DMBs expand loan assets to boost profits.
5. Finally, banks should grow their total assets to absorb risk and boost profitability.

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