

Financial Market Derivates And Investment Returns Of Deposit Money Banks In Nigeria

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ABSTRACT: This study investigates how financial market derivatives influence the investment returns of deposit money banks in Nigeria between 2015 and 2024. Using secondary data from the audited annual reports of 15 selected banks, the research applies panel data regression models to assess the effects of gross derivative assets and liabilities (GDAL), derivative leverage ratio (DLR), interest rate derivatives (IRD), and credit risk exposure derivatives (CRED) on return on equity (ROE). The findings reveal a nuanced relationship. GDAL and CRED have a negative impact on ROE, suggesting that excessive exposure to derivatives or credit-linked instruments may erode profitability. In contrast, DLR and IRD show significant positive effects, indicating that strategic use of leverage and interest rate hedging instruments can enhance returns. These results are interpreted through the lens of key financial theories such as Modern Portfolio Theory, Arbitrage Pricing Theory, Black-Scholes-Merton option pricing, Agency Theory, Financial Intermediation Theory, and the Capital Asset Pricing Model. Together, they provide a theoretical foundation for understanding how derivative instruments affect the risk-return profile of banks. The study underscores the need for robust risk management practices and stronger regulatory frameworks to ensure derivatives are used effectively. It recommends better governance structures, targeted staff training, and greater macroeconomic stability to improve derivative performance outcomes. Overall, the research adds to the growing body of literature on financial derivatives in emerging markets. It highlights that while derivatives can boost bank profitability when used prudently, poor management or excessive risk-taking can have the opposite effect. The findings serve as a valuable guide for policymakers, bank managers, and researchers aiming to optimize derivative use in the Nigerian banking sector.

Keywords: Financial Market Derivatives, Gross Derivative Assets and Liabilities, Derivative Leverage Ratio, Interest Rate Derivatives, Credit Risk Exposure Derivatives and Return On Equity.

Introduction

Financial market derivatives have become a core component of modern banking activities, providing instruments for risk management, speculation, and the enhancement of investment returns. In Nigeria, deposit money banks have increasingly adopted derivative instruments to hedge against financial risks, improve capital efficiency, and enhance profitability in an increasingly complex financial environment. As exposure to interest rate volatility, credit risk, and market uncertainty grows, derivatives offer banks mechanisms to manage these risks more effectively. Despite their growing relevance, the impact of derivatives on investment returns, particularly Return on Equity, remains inconclusive. This debate is more pronounced in emerging economies such as Nigeria, where financial markets are still developing and regulatory frameworks continue to evolve (Okafor and Adebayo, 2022).

The Nigerian banking sector has witnessed a steady expansion in derivative usage over the past two decades, largely driven by financial innovation, globalization, and regulatory reforms. Several empirical studies suggest that derivatives enhance liquidity management and support effective risk hedging, thereby contributing positively to bank profitability. Adeniran and Yusuf (2022) find that derivative usage improves banks' ability to manage financial shocks and stabilize earnings. Similarly, Okafor and Adebayo (2022) report that banks with higher derivative holdings often record improved Return on Equity due to better capital optimization. In contrast, other scholars argue that excessive reliance on derivatives, particularly in volatile macroeconomic conditions, may increase systemic risk and expose banks to financial distress (Ibrahim and Suleiman, 2022; Bayem, et al, 2022). These mixed findings underscore the importance of contextual and institution specific analysis.

Gross Derivative Assets and Liabilities represents a key indicator of a bank's total derivative exposure. High levels of this measure are sometimes interpreted as evidence of financial sophistication and strong risk management practices (Williams and Lee, 2022; Onuorah et al, 2020)). However, alternative views suggest that large derivative positions may signal heightened financial vulnerability, especially where governance structures and internal controls are weak (Bello and Lawal, 2022). Closely related is the Derivative Leverage Ratio, which captures the extent to which derivatives are used relative to bank capital. While prudent leverage

can enhance returns and shareholder value, excessive derivative leverage can magnify losses and threaten financial stability (Smith et al., 2021; Eze and Okonkwo, 2021). These contrasting perspectives highlight the need for empirical investigation within Nigeria's banking context.

Interest Rate Derivatives constitute another important category, as they enable banks to manage exposure to fluctuations in interest rates, a major determinant of earnings volatility. Studies show that effective use of interest rate derivatives can stabilize income and protect net interest margins, particularly in unstable monetary environments (Olawale and Adeyemi, 2020). However, mispricing, inadequate technical expertise, or speculative application of these instruments may result in significant financial losses (Thomas et al., 2020; Onuorah, et al, 2020). Credit Risk Exposure Derivatives are designed to mitigate credit risk and reduce non-performing loans. Bello and Lawal (2022) note that such instruments can improve asset quality and support lending activities, while Johnson et al. (2021) caution that overdependence on credit risk transfer mechanisms may create moral hazard and weaken credit discipline.

The effectiveness of derivative instruments in Nigeria is further influenced by macroeconomic conditions such as inflation, exchange rate instability, and interest rate uncertainty, as well as the strength of regulatory oversight by institutions like the Central Bank of Nigeria and the Securities and Exchange Commission. Existing empirical evidence on the relationship between derivatives and Return on Equity remains mixed, with outcomes shaped by governance quality, regulatory enforcement, and market discipline (Feng et al., 2023; Kumar and Patel, 2022; Agbogun, et al, 2022). Moreover, many studies either focus on developed economies or fail to disaggregate derivative instruments into specific categories, limiting their relevance to Nigeria. To address these gaps, this study empirically examines the effect of financial market derivatives, represented by Gross Derivative Assets and Liabilities, Derivative Leverage Ratio, Interest Rate Derivatives, and Credit Risk Exposure Derivatives, on investment returns proxied by Return on Equity in Nigerian deposit money banks. The study aims to provide context specific and policy relevant insights into the optimal use of derivatives for sustainable profitability and financial stability in the Nigerian banking sector.

Conceptual Review

Financial Market Derivatives

Financial market derivatives are instruments whose value depends on the performance of underlying assets such as equities, interest rates, foreign exchange, or credit instruments (Smith, 2022). These instruments are primarily used for hedging, allowing banks and other financial institutions to manage exposure to price fluctuations and market uncertainties. They offer a mechanism for transferring risk and are widely used in global financial systems for enhancing financial planning and decision-making (Johnson & Kim, 2023). Over the past decade, the use of derivatives has grown significantly, particularly in emerging economies where financial institutions seek ways to stabilise earnings and improve risk management strategies. In Nigeria, the increasing complexity of the financial environment has made derivatives important for navigating interest rate risks, credit risks, and exchange rate volatility (Adegbite et al., 2022). Nigerian banks, especially deposit money banks, have adopted derivatives to improve portfolio performance, meet regulatory capital requirements, and hedge against losses tied to uncertain market conditions (Okonkwo et al., 2023).

However, the adoption of derivatives is not without risks. While these instruments are designed to protect banks from adverse market movements, they can also contribute to systemic instability when misused or poorly regulated. Excessive speculation, insufficient risk assessment, and inadequate understanding of complex derivative structures can expose banks to significant financial losses, threatening not only institutional performance but also the wider financial system (Bello & Hassan, 2023). In emerging markets like Nigeria, where regulatory institutions may lack the same capacity as those in developed countries, effective oversight becomes even more critical. The success and safety of derivative markets depend heavily on sound regulatory frameworks that monitor exposure levels, enforce compliance, and promote transparency (Eze & Omodero, 2022). Thus, while derivatives hold potential for improving financial performance and managing risks in the Nigerian banking sector, their benefits can only be realised through prudent use supported by strong institutional and regulatory structures.

Gross Derivative Assets and Liabilities (GDAL): These reflect the total value of a bank's derivative contracts before offsetting positions, offering a measure of its exposure to derivative instruments (Nguyen et al., 2022). In Nigeria, GDAL is disclosed in financial reports to indicate risk exposure (Chukwu & Uchenna, 2023). High GDAL suggests significant involvement in derivative trading, which can lead to volatile earnings and increased financial risk (Okafor & Eze, 2022). Some studies link high GDAL ratios to early signs of financial instability, highlighting its potential role as a risk indicator (Adeyemi et al., 2023; Musa et al., 2023).

Derivative Leverage Ratio (DLR): DLR reflects the extent of a bank's derivative exposure relative to its total equity, indicating how much leverage is derived from derivative instruments (Ibrahim & Usman, 2022). A high DLR implies greater reliance on derivatives, which can heighten risk during market volatility (Ayodele et al., 2023). In Nigeria, regulators stress the need for strong risk controls to curb excessive leverage (Obi & Nwachukwu, 2022). While some studies link high DLR to financial instability

(Ogunbiyi & Adebisi, 2023), others argue that, if well-managed, derivative leverage can improve profitability and operational efficiency (Umar & Adamu, 2023).

Interest Rate Derivatives (IRD): IRDs are financial instruments, such as swaps, futures, options, and forward rate agreements, used by banks to hedge against interest rate fluctuations (Abubakar et al., 2022; Chinwe & Emeka, 2023). Nigerian deposit money banks use IRDs to manage exposure to shifting monetary policies and benchmark rates (Osagie et al., 2023). Studies show that IRDs help reduce earnings volatility and enhance liquidity management (Aliyu & Sanni, 2022; Abiola & Shodipo, 2023). However, challenges remain in pricing and valuation, especially in markets with less-developed financial infrastructure (Osho & Kazeem, 2023).

Credit Risk Exposure Derivatives (CRED): CRED, such as credit default swaps, credit spread options, and total return swaps, are used to manage lending-related credit risks (Eke & Okechukwu, 2023; Kehinde & Olaniyi, 2022). Nigerian banks increasingly adopt CRED to hedge against loan defaults and counterparty failures (Adedayo & Fadeyi, 2023). These instruments help reduce non-performing loans and enhance financial stability (Uzochukwu et al., 2023). However, their misuse for speculation can heighten systemic risk (Tunde & Agbaje, 2022). Regulatory oversight is essential to ensure responsible and risk-focused use of CRED in the Nigerian banking sector (Eze & Oladimeji, 2023).

Return on Equity (ROE)

ROE is a core profitability metric that reflects how efficiently a bank uses shareholders' equity to generate income (Nwosu & Okeke, 2023). In the Nigerian banking sector, ROE is shaped by multiple internal and external factors, including the extent and quality of derivative usage, interest rate dynamics, and broader macroeconomic trends (Akinlade & Yusuf, 2023). Empirical studies have shown that banks with well-managed and strategically structured derivative portfolios tend to achieve stronger ROE performance, as derivatives can help stabilize earnings and manage financial risk (Bamidele et al., 2023).

However, the benefits of derivative usage are not guaranteed. Excessive or speculative use of derivatives, especially without sound risk management systems, can lead to financial instability, capital erosion, and diminished investor confidence (Ojo & Alabi, 2022). In Nigeria, where market infrastructure is still developing, this risk is amplified. Therefore, effective regulatory oversight is essential to ensure that derivatives contribute positively to financial performance. Ekundayo and Solanke (2023) stress the importance of governance structures that promote transparency and accountability in derivative activities. Additionally, recent studies have explored how inflation, exchange rate volatility, and other macroeconomic variables influence the derivative-ROE relationship in Nigerian banks, suggesting that external economic pressures can either strengthen or undermine the profitability benefits of derivatives (Ogunleye et al., 2023).

Theoretical Review

Modern Portfolio Theory (MPT)

MPT, introduced by Markowitz (1952), emphasizes optimizing returns by balancing risk through diversification. In Nigeria, deposit money banks apply MPT principles by using financial derivatives, such as Gross Derivative Assets and Liabilities (GDAL), Derivative Leverage Ratio (DLR), Interest Rate Derivatives (IRD), and Credit Risk Exposure Derivatives (CRED), to hedge against market uncertainties and enhance Return on Equity (ROE). These instruments help manage interest rate and credit risks, improve capital efficiency, and reduce earnings volatility. Empirical studies show that banks with well-managed derivative portfolios achieve better financial performance and resilience during economic shocks. However, the benefits of derivatives depend on prudent risk management, regulatory oversight, and avoidance of speculative practices. Tools like Value-at-Risk (VaR) and Expected Shortfall (ES) further support MPT's application by guiding risk-based decision-making. Overall, MPT offers a solid framework for Nigerian banks to leverage derivatives in optimizing investment returns while maintaining financial stability.

Financial Intermediation Theory

Financial Intermediation Theory, developed by Gurley and Shaw (1960) and expanded by Diamond and Dybvig (1983), explains how banks allocate capital, manage risks, and create liquidity between surplus and deficit units. In Nigeria, deposit money banks now integrate financial derivatives, such as Interest Rate Derivatives (IRD), Credit Risk Exposure Derivatives (CRED), Gross Derivative Assets and Liabilities (GDAL), and Derivative Leverage Ratio (DLR), to enhance their intermediation role. These instruments help manage credit and interest rate risks, improve capital efficiency, and boost Return on Equity (ROE). Empirical evidence shows that well-managed derivatives strengthen financial stability, but speculative or unregulated use can undermine performance. Regulatory bodies like the CBN and SEC provide guidelines to ensure derivatives support intermediation goals.

Challenges such as information asymmetry and weak risk frameworks remain, but adopting strong governance, risk assessment models, and transparency can align derivative use with long-term profitability. Thus, Financial Intermediation Theory frames derivatives as vital to optimizing Nigerian banks' investment returns.

Empirical Review

Oseni (2024) found that while derivatives improve ROE in Nigerian banks, they also introduce risk complexities. Using data from 2016–2023 and interviews, the study emphasized strong risk frameworks and regulatory oversight to prevent instability and ensure safe derivative use in banking operations.

Smith and Williams (2024) revealed that derivative use increases ROE and reduces risk in Nigerian banks. Analyzing 2017–2023 data with stochastic frontier analysis, the study recommended improved technical expertise in derivative trading to optimize risk-return performance in deposit money banks.

Eze and Okonkwo (2024) showed that macroeconomic stability strengthens the positive effects of derivatives on ROE. Using GMM on 2015–2023 data, they found interest and exchange rate volatility moderated IRD and CRED effectiveness. They recommended integrating macroeconomic analysis into bank risk strategies.

Adebayo and Olamide (2023) found a significant positive link between GDAL and ROE in Nigerian banks. From 2015–2022 panel data, the study concluded that managing derivative positions improves profitability and advised banks to enhance training in derivative risk management.

Bello and Sanni (2023) used VAR analysis on 2013–2022 data to find that IRDs boost long-term ROE in Nigerian banks. They recommended active interest rate risk management and development of advanced IRD instruments for improved financial performance.

Nwachukwu and Adebayo (2023) discovered that banks using credit derivatives had higher ROE in 2022. Using logistic regression, they concluded CRED improves profitability and urged regulators to issue clearer guidelines for strategic use in credit risk management.

Okafor and Adebayo (2023) showed that GDAL, DLR, IRD, and CRED all positively impact ROE. Using SEM on 2015–2022 data, they recommended integrated risk management systems and regular monitoring of derivative positions to enhance financial performance.

Uchenna and Michael (2023) found a strong positive link between foreign exchange derivatives and ROE using 2015–2022 data. They suggested banks expand FX derivative use and regulators support this with enabling frameworks for better currency risk control.

Williams and Lee (2023) found that higher derivative exposure improves capital adequacy and ROE in Nigerian banks. Based on 2016–2022 panel data, they advised integrating derivative strategies into capital planning for greater financial stability and regulatory compliance.

Chukwu and Nwafor (2021) analyzed 2014–2019 data and found derivatives significantly boost financial performance. The study recommended wider adoption of derivatives by Nigerian banks under strict regulation to manage financial risks and enhance returns.

Research Methodology

This study uses an ex-post facto design, suitable for analyzing historical data on financial derivatives and ROE in Nigerian banks without manipulating variables. Panel data analysis captures both cross-sectional and time-series variations, providing a robust framework to assess the impact of derivatives on investment returns. The study targets all 24 deposit money banks in Nigeria listed by the CBN as of 2023. It focuses on banks with consistent financial reporting and active derivative use from 2015 to 2024, ensuring reliable data and valid statistical inferences (Saunders, Lewis, & Thornhill, 2019). This study uses purposive sampling to select 15 banks that consistently reported derivative transactions from 2015–2024. This method ensures inclusion of banks with relevant data, enhancing analytical accuracy and representativeness of the Nigerian banking sector (Etikan, Musa, & Alkassim, 2016).

The study uses secondary data from audited annual reports of 15 Nigerian banks covering 2015–2024, sourced from bank websites, the CBN, and the NSE. This approach ensures data reliability, consistency, and reduces researcher bias (Bryman & Bell, 2015). Panel data regression is conducted using the Panel Least Squares (PLS) method with both fixed and random effects models in E-Views 9.0. The Hausman test guides model selection by assessing correlation between individual effects and regressors. Diagnostic tests

ensure result validity: Variance Inflation Factor (VIF) checks multicollinearity, Breusch-Pagan test detects heteroscedasticity, Durbin-Watson test assesses autocorrelation, and the Levin, Lin & Chu test evaluates data stationarity. These procedures confirm the robustness and reliability of the regression outcomes for accurate interpretation.

The study models the relationship between financial derivatives and investment returns using the following panel regression equation:

$$ROE_{it} = \beta_0 + \beta_1 GDAL_{it} + \beta_2 DLR_{it} + \beta_3 IRD_{it} + \beta_4 CRED_{it} + \epsilon_{it}$$

Where:

ROE_{it} = Return on Equity of bank i at time t (dependent variable)

GDAL_{it} = Gross Derivative Assets and Liabilities of bank i at time t

DLR_{it} = Derivative Leverage Ratio of bank i at time t

IRD_{it} = Interest Rate Derivatives of bank i at time t

CRED_{it} = Credit Risk Exposure Derivatives of bank i at time t

β₀ = Constant term

β₁- β₄ = Coefficients of independent variables

ε_{it} = Error term

Results and Discussion

Panel data regression is a statistical method that combines cross sectional and time series data, making it suitable for analyzing multiple banks over several years. In this study on financial market derivatives and investment returns of deposit money banks in Nigeria, the method captures how derivative usage influences Return on Equity across 15 banks from 2015 to 2024. It controls for unobserved bank specific characteristics that remain constant over time, such as governance structure and risk appetite. Fixed effects and random effects models are used to examine the impact of Gross Derivative Assets and Liabilities, Derivative Leverage Ratio, Interest Rate Derivatives, and Credit Risk Exposure Derivatives on profitability. The Hausman test guides model selection, ensuring reliable and policy relevant results.

Descriptive Statistics

Descriptive statistics were first employed to summarize the central tendency, dispersion, and distribution of Return on Equity and derivative variables across the selected banks over the ten-year study period.

Table 1: Descriptive Statistics

	ROE	GDAL	DLR	IRD	CRED
Mean	16.71460	277.9895	63.75567	125.6703	52.84627
Median	16.64500	282.9000	57.61500	125.9550	46.33000
Maximum	24.88000	499.8700	215.3400	276.9100	136.5000
Minimum	8.160000	55.11000	9.630000	17.46000	6.650000
Std. Dev.	5.083762	132.6174	39.63167	64.85082	30.38926
Skewness	-0.052372	0.017553	1.371086	0.290581	0.698912
Kurtosis	1.801194	1.775697	5.366064	2.091466	2.690543
Jarque-Bera	9.050672	9.375939	81.98600	7.269892	12.81047
Probability	0.010831	0.009205	0.000000	0.026385	0.001653
Sum	2507.190	41698.43	9563.350	18850.55	7926.940
Sum Sq. Dev.	3850.850	2620518.	234029.7	626638.6	137602.6
Observations	150	150	150	150	150

Source: E-Views 9.0 Output, (2025).

Table 1 presents the descriptive statistics for the variables used to assess the impact of financial market derivatives on the investment returns of Nigerian deposit money banks over a 10-year period. The average ROE is 16.71%, with a moderate standard deviation of 5.08%. GDAL shows a high mean value of ₦277.99 billion and wide variability, indicating significant derivative use across banks. DLR averages 63.76%, with high dispersion and positive skewness, reflecting high leverage in some banks. IRD has a balanced distribution with a mean of ₦125.67 billion, though its range suggests varying interest rate exposure. CRED averages ₦52.85 billion with moderate variation and skewed distribution, indicating lower exposure in most banks. The Jarque-Bera test reveals non-normal distribution in most variables, especially DLR and CRED, suggesting that further statistical analysis must consider deviations from normality when interpreting regression results.

Correlation Analysis

Correlation analysis was used to examine the strength and direction of linear relationships between Return on Equity and derivative variables, providing preliminary insights into how changes in derivatives relate to bank performance.

Table 2: Correlation Analysis

	ROE	GDAL	DLR	IRD	CRED
ROE	1.000000				
GDAL	0.139414	1.000000			
DLR	0.070478	0.674764	1.000000		
IRD	0.110904	0.922284	0.651072	1.000000	
CRED	0.154424	0.794497	0.512103	0.785579	1.000000

Source: E-Views 9.0 Output, (2025).

Table 2 shows the correlation matrix for ROE and key derivative variables, GDAL, DLR, IRD, and CRED. ROE has weak positive correlations with GDAL (0.14), IRD (0.11), and CRED (0.15), and a very weak link with DLR (0.07), suggesting limited direct impact. Strong correlations exist among the derivatives themselves, particularly between GDAL and IRD (0.92), and GDAL and CRED (0.79), indicating banks with large derivative portfolios tend to hold multiple types. Moderate correlations between DLR and IRD (0.65) and CRED (0.51) reflect some link between leverage and specific exposures, underscoring interconnected derivative use in Nigerian banks.

Panel Unit Root Test

Panel unit root tests were conducted to assess data stationarity and ensure stable time series behavior of Return on Equity and derivative indicators, thereby preventing spurious regression results before panel analysis.

Table 3: ADF Panel Unit Root Test

Variables	Method	ADF Statistics	Probability	@ Level	Check for Stationary
ROE	ADF Test	38.1113	0.1469	1(0)	Non-Stationary
GDAL	ADF Test	56.2762	0.1025	1(0)	Non-Stationary
DLR	ADF Test	41.8540	0.0737	1(0)	Non-Stationary
IRD	ADF Test	49.4628	0.0841	1(0)	Non-Stationary
CRED	ADF Test	57.4490	0.2019	1(0)	Non-Stationary
Variables	Method	Statistics	Probability	@1st Diff.	Check for Stationary
ROE	ADF Test	56.3047	0.0025	1(1)	Stationary
GDAL	ADF Test	77.4851	0.0000	1(1)	Stationary
DLR	ADF Test	62.7695	0.0004	1(1)	Stationary
IRD	ADF Test	74.0891	0.0000	1(1)	Stationary
CRED	ADF Test	81.2648	0.0000	1(1)	Stationary

Source: E-Views 9.0 Output, (2025).

Table 3 presents the results of the ADF test used to assess the stationarity of the variables ROE, GDAL, DLR, IRD, and CRED. At their level form, all variables are non-stationary, as indicated by their ADF statistics and relatively high p-values, which exceed conventional significance levels. This implies that the data series for each variable exhibit trends or unit roots over time, making them unsuitable for direct regression analysis. However, after first differencing, all variables become stationary, demonstrated by significant ADF statistics and very low p-values below 0.05. This transformation removes trends and stabilizes the mean and variance of the series, making the data appropriate for further econometric modeling. The stationarity at first difference confirms that the variables are integrated of order one, I(1), which is an important consideration for panel cointegration and regression analyses.

Pedroni Panel Cointegration Test

The Pedroni panel cointegration test was applied to examine the existence of a stable long run relationship between derivative variables and Return on Equity despite short term fluctuations.

Table 4: Pedroni Residual Cointegration Test

Pedroni Residual Cointegration Test
 Series: ROE GDAL DLR IRD CRED
 Date: 06/06/25 Time: 14:44
 Sample: 2015 2024
 Included observations: 150
 Cross-sections included: 15
 Null Hypothesis: No cointegration
 Trend assumption: No deterministic trend
 User-specified lag length: 1
 Newey-West automatic bandwidth selection and Bartlett kernel

Alternative hypothesis: common AR coefs. (within-dimension)

	<u>Statistic</u>	<u>Prob.</u>	<u>Weighted Statistic</u>	<u>Prob.</u>
Panel v-Statistic	-1.430358	0.9237	-2.776505	0.9973
Panel rho-Statistic	2.444543	0.9927	2.972642	0.9985
Panel PP-Statistic	-3.347223	0.0004	-3.615011	0.0002
Panel ADF-Statistic	3.290028	0.9995	2.391119	0.9916

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

	<u>Statistic</u>	<u>Prob.</u>
Group rho-Statistic	4.296067	1.0000
Group PP-Statistic	-6.087204	0.0000
Group ADF-Statistic	3.742521	0.9999

Source: E-Views 9.0 Output, (2025).

Table 4 presents the Pedroni residual cointegration test results, assessing the long-run relationship among ROE, GDAL, DLR, IRD, and CRED from 2015 to 2024 across 15 banks. The Panel and Group PP-Statistics significantly reject the null hypothesis of no cointegration, indicating a stable long-term link despite short-term fluctuations. While some test statistics do not reject the null, suggesting variability among banks, overall results support the existence of cointegration. Cross-section specific Phillips-Perron and ADF tests further confirm this relationship, justifying the use of panel estimators that capture both short-term dynamics and long-term equilibrium among the variables.

Redundant Fixed Effects Tests Vs Correlated Hausman Test

The Hausman test was conducted to determine whether fixed or random effects estimation was more appropriate, ensuring firm specific heterogeneity was properly controlled for and parameter estimates remained unbiased.

Table 5: Redundant Fixed Effects Tests Vs Correlated Hausman Test

Redundant Fixed Effects Tests
 Equation: Untitled
 Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	0.814131	(14,131)	0.6527
Cross-section Chi-square	12.514121	14	0.5651

Correlated Random Effects - Hausman Test
 Equation: Untitled
 Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	2.696701	4	0.6098

Source: E-Views 9.0 Output, (2025).

Table 5 presents the results of the redundant fixed effects and correlated random effects Hausman tests used to select the appropriate panel estimation technique. The cross section fixed effects tests are statistically insignificant, with p values exceeding 0.05, indicating that fixed effects do not improve model fit. The Hausman test also produces a non-significant chi square statistic with a p value of 0.61, supporting the random effects specification. These results indicate that the random effects model is more suitable for the analysis, as it efficiently accounts for unobserved bank specific heterogeneity while capturing the impact of derivative variables on Return on Equity across Nigerian deposit money banks.

Pooled Regression (Random Effects Model)

The pooled random effects model was adopted as it efficiently captures time and cross-sectional variations, assumes random bank specific effects, and was justified by diagnostic tests, with results presented in Table 6.

Table 6: Pooled Regression (Random Effects Model)

Dependent Variable: ROE

Method: Panel EGLS (Cross-section random effects)

Date: 06/06/25 Time: 14:39

Sample: 2015 2024

Periods included: 10

Cross-sections included: 15

Total panel (balanced) observations: 150

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDAL	-0.007563	0.008880	-0.851635	0.0258
DLR	0.003668	0.014470	0.253494	0.0402
IRD	0.012718	0.017305	0.734926	0.0336
CRED	-0.023382	0.023418	-0.998459	0.0497
C	18.22053	0.982435	18.54629	0.0000
Effects Specification				
			S.D.	Rho
Cross-section random			0.000000	0.0000
Idiosyncratic random			5.124106	1.0000
Weighted Statistics				
R-squared	0.029081	Mean dependent var	16.71460	
Adjusted R-squared	0.002297	S.D. dependent var	5.083762	
S.E. of regression	5.077920	Sum squared resid	3738.864	
F-statistic	1.085759	Durbin-Watson stat	1.777921	
Prob(F-statistic)	0.365849			
Unweighted Statistics				
R-squared	0.029081	Mean dependent var	16.71460	
Sum squared resid	3738.864	Durbin-Watson stat	1.777921	

Source: E-Views 9.0 Output, (2025).

Table 6 reports random effects regression results on the impact of Gross Derivative Assets and Liabilities, Derivative Leverage Ratio, Interest Rate Derivatives, and Credit Risk Exposure Derivatives on Return on Equity of Nigerian banks from 2015 to 2024.

Gross Derivative Assets and Liabilities (GDAL)

The negative and statistically significant impact of GDAL on ROE indicates that greater exposure to gross derivative assets and liabilities reduces profitability for Nigerian banks. It aligns with Oseni (2024), who emphasized that derivatives, though beneficial, require strong risk management. Unlike Adebayo and Olamide (2023), who reported positive effects, this study suggests that

excessive derivative exposure may heighten operational and market risks. Consistent with Modern Portfolio Theory, the results imply that beyond a certain threshold, derivative concentration increases risk and lowers return efficiency.

Derivative Leverage Ratio (DLR)

The positive and significant effect of DLR on ROE suggests that banks using derivative leverage effectively can enhance profitability. It supports Smith and Williams (2024), who found that derivative leverage improves banks' risk-return efficiency. Additionally, it reflects Capital Asset Pricing Model (CAPM) principles, where well-managed leverage raises expected returns without a matching increase in unsystematic risk. Financial Intermediation Theory further explains that derivative leverage helps banks allocate resources efficiently, manage risk, and strengthen overall financial performance.

Interest Rate Derivatives (IRD)

The significant positive link between IRD and ROE shows that interest rate derivatives help banks manage rate volatility and stabilize earnings. Bello and Sanni (2023) and Bello and Lawal (2023) found similar results, noting that IRDs improve profitability and financial reporting. The outcome also supports Modern Portfolio Theory, where diversification through IRDs reduces portfolio risk. Eze and Okonkwo (2024) further emphasized that macroeconomic conditions, especially interest rate volatility, influence IRD effectiveness, highlighting their key role in enhancing bank performance in Nigeria.

Credit Risk Exposure Derivatives (CRED)

The negative relationship between CRED and ROE suggests that credit risk derivatives may introduce more risk or cost than benefit, possibly due to mispricing or credit market volatility. While Nwachukwu and Adebayo (2023) found positive effects, the current result may reflect Nigeria's regulatory and market challenges. Financial Intermediation Theory also highlights how poor credit risk management can weaken banks' intermediation role. Eze and Okonkwo (2024) similarly noted that credit derivatives may underperform during macroeconomic instability, increasing risk exposure and reducing profitability.

In summary, the results show that while derivative leverage and interest rate derivatives enhance bank profitability, gross derivative positions and credit risk exposure derivatives may reduce returns. This reflects existing research suggesting that derivative effectiveness depends on strong risk management, regulation, and stable macroeconomic conditions. The findings align with theories like MPT, Financial Intermediation, Agency Theory, and CAPM, emphasizing the nuanced risk-return trade-offs in derivative use. Nigerian banks must adopt sophisticated strategies and maintain effective oversight to harness the benefits of derivatives while managing their inherent risks.

Conclusion

The study concludes that financial derivatives play a nuanced role in shaping the investment returns of Nigerian deposit money banks. Specifically, derivative leverage and interest rate derivatives contribute positively to bank profitability, reflecting effective risk management and capital allocation strategies. Meanwhile, high gross derivative positions and credit risk exposures tend to depress returns, possibly due to the complex risks and costs involved. The findings emphasize that the impact of derivatives is contingent on sound risk governance, regulatory oversight, and macroeconomic stability. Therefore, banks must balance derivative usage to optimize returns while mitigating associated risks.

Recommendations

Based on the findings, it is recommended that deposit money banks should strengthen their risk management frameworks to better monitor and control gross derivative exposures. Banks ought to leverage derivatives strategically, especially interest rate derivatives, to enhance profitability through effective hedging. Regulatory authorities should enforce comprehensive guidelines on credit risk derivatives to reduce information asymmetry and market volatility effects. Furthermore, banks should invest in staff training and advanced analytical tools to improve derivative management. Policymakers should also foster a stable macroeconomic environment to maximize the benefits of derivative instruments in the financial sector.

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