Does Leverage affect Profitability and Firm Value of Nigerian Firms? A Panel Modeling of Nigerian Banking Industry

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Abstract

The study examines how financial leverage affect the profitability and firm value of deposit money banks in Nigeria. Using an ex post facto design with panel data, the research focused on 13 deposit money banks listed on the Nigerian Exchange Group (NGX) as of 2024, from which nine were purposefully selected. Data for the period from 2008 to 2023 were sourced from the banks' audited financial statements and the NGX Factbook. The panel data analysis utilized the Feasible Generalized Least Squares (FGLS) regression technique to assess the effect of financial leverage on profitability and firm value. The findings show that financial leverage such as the debt-to-equity ratio (DER) and the debt ratio (DR) have a significant positive effect on the banks' profitability. Furthermore, this study reveal that financial leverage has a significant negative effect on firm value of the DMBs. The results suggest that when DMBs increase their debts, they potentially amplify their profitability, but if the increased debts are not managed properly, it may adversely affect their firm value.

Keywords: Financial leverage, profitability, firm value, Nigerian banking industry

1. Introduction

The selection of the ideal balance between debt and equity capital that forms a company's capital structure is a crucial financial decision that businesses typically encounter. This decision can be challenging for managers to make, as it requires ensuring that the organization operates with an optimal combination of equity and debt financing (Abdul & Adelabu, 2015; Afolabi et al., 2019). The ideal capital structure, which involves the balance between debt and equity, remains a subject of extensive debate (Fosu, 2013). A strategic increase in debt, if effectively managed by the company, can lead to a positive market response, resulting in a positive impact on the company's value. This is because debt can enhance company performance, which subsequently affects the company's value and, in turn, influences stock prices (Prihatni, 2020). Furthermore, research suggests that debt can positively impact company performance, which ultimately affects the company's value and stock prices (Ibhagui & Olokoyo, 2018; Rizqa et al., 2023).

Financial leverage is a crucial concept in business, as it enables organizations to secure finance for acquiring new assets, enhancing operational activities, and achieving their objectives (Okoye, 2019). By leveraging financial resources, companies can not only attain their goals but also maximize shareholder value. Financial leverage is essential for both new and established businesses, as it provides the necessary funds to support daily operations (Okeya et al., 2020). In accounting and finance, leverage is defined as the amount of debt or credit used to purchase assets, enhance operational activities, or acquire new firms. Typically, the cost of borrowed money (leverage) is lower than the amount of equity. By analyzing financial ratios such as the debt-to-equity ratio and debt-to-total assets ratio, the financial position of a firm and the extent of leverage used can be easily identified (Umer & Muhammad, 2018).

Financial leverage indicates how much a firm depends on debt financing to seize business opportunities. Gatsi et al. (2013) and Afolabi et al. (2019) note that effectively using debt to generate investment returns reflects strong corporate governance. Additionally, if the revenue from debt exceeds financing costs, it can enhance returns on equity (Abdul & Adelabu, 2015). Debt financing includes both short-term and long-term obligations. Short-term debt involves periodic payments, while long-term debt may consist of issuing bonds or securing loans. Conversely, equity financing typically involves raising capital through stock issuance or reinvesting earnings into share capital. Firms generally use a mix of both debt and equity. Research indicates that short-term loans,

like trade payables, often represent a larger share of leveraged capital than long-term debts, which are harder to secure (Salawu & Awolowo, 2009; Ibrahim & Isiaka, 2020).

The financial performance of deposit money banks (DMBs) in Nigeria is vital for the country's economic stability and growth. These banks provide essential services to individuals and businesses, and their performance is affected by various factors, including financial leverage. Current literature on the relationship between financial leverage and the performance of DMBs in Nigeria shows mixed results, with some studies (Ibhagui & Olokoyo, 2018; Afolabi et al., 2019; Ibrahim & Isiaka, 2020; Lawrence et al., 2021) finding a positive association while others (Salawu, 2007; Akinlo & Asaolu, 2012; Jeleel and Olayiwola, 2017) report negative impacts or no significant relationship (Azeez, 2015). This inconsistency highlights the need for further empirical research to clarify the leverage-performance nexus among DMBs. In addition, many of the available studies were not conducted in the Nigerian banking sector which is a major player in the Nigeria's economic growth. Therefore, this study aims to investigate the effect of financial leverage on the financial performance of deposit money banks in Nigeria. This gives rise to the hypotheses of the study which are:

H_1: Financial leverage has significant effect on the profitability of DMBs

H_2: Financial leverage has significant effect on the firm value of DMBs

2. Literature Review

2.1 Financial Leverage

The term 'leverage' refers to the percentage change in one variable relative to the percentage change in another variable or variables (Gweyi & Karanja, 2014). In finance management, leverage describes a firm's ability to utilize fixed cost assets or funds. A common measure of financial leverage is the Debt-to-Equity Ratio (DER), which is calculated by dividing a company's total debts by its stockholders' equity. This ratio indicates the proportion of debt to equity used to finance the company's assets. The use of debt funding, or financial leverage, has significant implications for a firm. By raising funds through debt, shareholders can retain control without needing to increase their investment. Enekwe et al. (2014) and Makwe and Mike (2019) state that the debt-to-equity ratio reflects the relative proportion of equity and debt used to finance a company's assets, indicating financial leverage. It is calculated as:

$$DER = \frac{Total\ Liabilities}{Total\ Equity} \qquad (1)$$

The Debt Ratio (DR) is another financial leverage ratio used in corporate finance to measure a company's ability to meet its obligations. It compares a company's total debt to its total assets, providing a general idea of the amount of leverage being used by the company. This ratio gives users a quick assessment of the level of debt a firm has in relation to its assets, which includes both short-term and long-term obligations. The Debt Ratio is used to evaluate a firm's financial structure and financing operations. Typically, the higher the debt compared to assets a company has relative to its peers, as indicated by a high Debt Ratio, the more leveraged and riskier it is considered to be. In other words, a high Debt Ratio suggests that a company has a greater proportion of debt compared to its assets, making it more leveraged and potentially more vulnerable to financial distress. Debt ratio is calculated as:

$$DR = \frac{Total\ Liabilities}{Total\ Assets} \qquad (2)$$

Myers (1977), Myers (2001) and Ibrahim and Isiaka (2020) argued that existing shareholders of highly leveraged firms will only be motivated to make additional investments if the expected return on investment is equal to or greater than the returns promised to long-term creditors. Otherwise, shareholders will refuse to invest further, leading to a situation known as underinvestment. In other words, if the potential returns from new investments are not sufficient to cover the obligations to long-term lenders, shareholders may be reluctant to commit more capital, resulting in a lack of investment by the firm (Okeya et al., 2020).

2.2 Profitability

Firm profitability refers to a company's ability to generate earnings relative to its revenue, assets, or equity over a specific period. It indicates how effectively a firm utilizes its resources to produce profit after covering all expenses. Profitability is often measured using various financial ratios that provide insights into operational efficiency and financial health (Ibhagui & Olokoyo, 2018). Profitability is often assessed using return on assets (ROA) and return on equity (ROE). ROA indicates how effectively a company uses its assets to generate profit and is calculated by dividing net income by total assets. ROE measures the return generated on shareholders' equity and is calculated by net income by shareholder's equity.

$$ROA = \frac{Net\ Income}{Total\ Assets} \quad and \quad ROE = \frac{Net\ Income}{Total\ Equity} \tag{3}$$

Financial performance is a critical objective that firms, especially those focused on profit, strive to achieve. It reflects the firm's capacity to effectively manage its financial resources, generate profits, and maintain a strong financial position over time. By monitoring and analyzing financial performance, firms can make informed decisions, identify areas for improvement, and ensure long-term sustainability and growth.

2.3 Firm value

Firm value refers to the total worth of a company as determined by various financial metrics and market perceptions. It encompasses the company's equity, debt, and overall financial performance, reflecting its potential to generate future cash flows (Alwan & Risman, 2023). According to Risman (2021), firm value is determined by the present value of a company's future cash flows. These future cash flows are influenced by various risk factors that can lead to potential deviations. More so, firm value can also reflect the value of the company's assets, such as securities. The higher the firm value, the greater the prosperity that the company's owners will receive. Alwan and Risman (2023) define a firm's value as the price that potential investors are willing to pay if a company is to be sold. This suggests that firm value is determined by the market's perception of the company's worth, based on factors such as future growth potential, risk, and the value of its assets.

One of the commonly used measures of a firm's value is the Tobin's Q method which serves as an investment decision-making tool, as it encapsulates future information relevant to a company's investment decisions. If Tobin's Q is greater than 1, it indicates that the company will generate a higher rate of return than the cost of its assets, incentivizing the firm to increase its capital investment (Alwan & Risman, 2023). Tobin's Q is calculated using the following formula:

$$Tobin's\ Q = \frac{Market\ Value\ of\ Firm}{Replacement\ Cost\ of\ Assets} \tag{4}$$

2.4 Theoretical Framework

2.4.1 Agency Model

The Agency Model of capital structure, introduced by Jensen and Meckling (1976), builds on trade-off theory by addressing agency costs from conflicts of interest. It posits that a firm's optimal capital structure balances these agency costs with the tax advantages of debt. Two key conflicts affect firm value. The first is between managers and shareholders, leading to an "agency cost of outside equity." Managers, with less than full ownership, may prioritize personal utility over shareholder value, potentially misusing resources (Jensen, 1986). Jensen's free cash flow theory suggests that excess cash can lead to overinvestment by managers. He argues that increased leverage can mitigate this by restricting available cash flow for wasteful spending and enforcing discipline through debt covenants, thus aligning managerial behavior with shareholder interests.

The second conflict is between debt holders and shareholders, termed the "agency cost of debt." Debt holders, being risk-averse, prefer safer investments. If managers pursue riskier strategies, shareholders benefit from gains while debt holders face losses. This leads to the "asset substitution effect" (Jensen & Meckling, 1976). Additionally, the "underinvestment problem" (Myers, 1977) occurs when financially distressed firms prioritize debt servicing over valuable investments, deterring shareholder capital. Ultimately, while increased leverage can benefit low-growth firms, it may harm high-growth firms by exacerbating agency costs and negatively affecting performance.

2.4.2 Pecking Order Theory

The Pecking Order Theory posits that firms prioritize financing sources based on information asymmetry. Companies first use internal funds, like retained earnings, for financing. If these are inadequate, they opt for debt, with equity financing as the last resort. This theory is based on the idea that managers have better insights into their company's prospects than outside investors. Managers prefer internal funds because they are readily available and avoid disclosing sensitive information. If internal funds fall short, firms choose debt over equity, as debt is perceived as less risky and prevents ownership dilution. Equity financing is avoided due to potential stock price discounts that might occur when new equity is issued.

The Myers and Majluf (1984) model, which supports the Pecking Order Theory, suggests that firms would first exhaust internal funds, then seek debt, and finally turn to equity. In the absence of investment opportunities, firms aim to retain profits and build financial reserves to minimize the need for external financing.

2.5 Review of Empirical Studies

2.5.1 Effect of Financial Leverage on Profitability

So many studies have been carried out, in Nigeria and outside Nigeria, on the relationship between financial leverage and firm profitability. A few of them is reviewed in this paper. Chen (2020) examined the impact of financial leverage on firm performance–based on the moderating role of operating leverage. The findings suggest that increased financial leverage might negatively affect firm performance. The study employed various metrics to assess firm performance and used the average industrial financial leverage as an instrumental variable for financial leverage to ensure robust testing. This comprehensive approach helps establish a credible relationship between financial leverage and firm performance, indicating that higher levels of debt potentially hinder a firm's financial success.

Afolabi et al. (2019) investigated the impact of leverage on the financial performance of Nigerian firms. Their findings showed a positive and significant relationship between the debt ratio and financial performance, suggesting that firms utilize debt capital for tax benefits, enhancing profitability. Additionally, a positive and significant effect of the debt-equity ratio on performance was found, although higher financial leverage could negatively impact firm performance. By employing various measures of performance and using average industrial financial leverage as an instrumental variable, the study confirms a plausible link between financial leverage and firm performance. Similarly, Uzokwe (2019) examined the relationship between debt financing and corporate performance in Nigerian quoted firms. The findings revealed that leverage positively affects corporate profitability.

Umer and Muhammad (2018) investigated the impact of financial leverage on firm performance. The finding indicated that financial leverage negatively or insignificantly impacts a firm's return on equity (ROE), but it has a positive and significant effect on the firm's return on assets (ROA). Their results indicate that as financial leverage increases, the value of equity decreases, while the value of assets increases, due to leverage's negative impact on ROE and positive impact on ROA. Similarly, Abubakar et al. (2018) studied the relationship between leverage and financial performance, measured with Return on Asset (ROA) of quoted conglomerate firms in Nigeria for 2005-2016. The findings revealed that short-term debt ratio (STDR) has a positive and significant effect on return on asset at 1% level of significance, while LTDR and DER have an inverse and significant effect on ROA

Ubesie et al. (2016) assessed the impact of capital structure on the financial performance of listed cement companies in Nigeria from 2006 to 2015. The study focused on Dangote Cement, Lafarge Cement, Ashaka Cement, and Cement Company of Northern Nigeria, aiming to determine how financial leverage affects corporate performance. Using a fixed-effect econometric panel regression model, the study found that the debt ratio has no significant effect on the return on assets (ROA) of these companies. However, the debt-equity ratio has a negative significant effect on ROA, while the interest coverage ratio has a positive significant effect on ROA. The study recommended that regulators and market operators, such as the CBN, SEC, and NSE, collaborate to develop Nigeria's capital market to provide listed companies with access to long-term debt.

Rondk (2015) explored the impact of capital structure on firm performance, focusing on companies listed on the Iraq Stock Exchange from 2009 to 2013. Using multiple regression data analysis, the study examined how the capital structure affected the financial performance of 40 companies (18 manufacturing, 7 services, 10 tourism, and 5 agriculture). The research utilized Return on Equity (ROE) and Return on Assets (ROA) as dependent variables and leverage (short-term debt/total assets) as the independent variable. The findings revealed that the short-term debt ratio negatively affects ROA, while it has a positive and significant effect on ROE. Additionally, asset turnover was found to be a significant determinant.

Chinaemerem and Anthony (2012) studied the impact of capital structure on the financial performance of Nigerian firms, analyzing 30 listed non-financial companies on the Nigerian Stock. Exchange over a seven-year period from 2004 to 2010. Using panel data and ordinary least squares regression, the study found that the debt ratio, representing the company's capital structure, has a significantly negative association with financial performance as measured by Return on Assets (ROA) and Return on Equity (ROE).

Simon-Oke and Afolabi (2011) investigated the effect of capital structure on the performance of the industrial sector in Nigeria, using debt financing as a proxy for capital structure and profit efficiency as a proxy for firm performance. Their findings, consistent with previous studies, indicate a negative relationship between debt financing and firm performance.

2.5.2 Effect of Financial Leverage on Firm Value

This subsection discussed studies on relationship between financial leverage and firm value which are evolving in literature. To start with, Edore and Ujuju (2020) conducted a study to assess the impact of debt financing on the value of firms in Nigeria, focusing on long-term, medium-term, and short-term debt as key mechanisms. Their research revealed that each type of debt—whether long-term, medium-term, or short-term—negatively affects the firm's value. This finding underscores the importance of carefully managing the composition of a firm's financial structure. The study highlights that if management does not achieve an optimal financial structure, it could lead to serious consequences such as insolvency and financial distress, which may ultimately result in bankruptcy.

Also, Ibrahim and Isiaka (2020) investigated the effect of financial leverage on firm value of selected listed firms in Nigeria. Long-term debt to equity ratio was used to represent financial leverage and Tobin's Q to measure firm value. Their model also included variables such as total assets, return on assets (ROA), and firm age. Data from the firms' annual reports were analyzed to determine causal and correlational relationships between the dependent variable (firm value) and the regressors. The findings indicate a significant negative relationship between financial leverage and firm value, showing that a 1% increase in financial leverage results in a 0.21344% decrease in firm value. Additionally, the impact of other regressors revealed that a 1% increase in total assets leads to a 0.23% increase in firm value, while a 1% increase in ROA results in a 0.516% decrease in firm value.

Adetunji et al. (2016) examined the relationship between financial leverage and firm value of selected firms in Nigeria. The study examined a sample of five firms listed on the Nigerian Stock Exchange (NSE) over a six-year period from 2007 to 2012, utilizing data from the firms' annual reports. The Ordinary Least Square (OLS) regression technique was employed for data analysis. The findings demonstrated a significant relationship between financial leverage and firm value, indicating that financial leverage significantly impacts firm value. The study concluded that financial leverage is a more effective source of finance than equity for firms needing to fund long-term projects.

Lin and Chang (2011) also using debt as a threshold, found that for Taiwanese listed companies, there are two threshold effects between leverage and firm performance. When the debt ratio is low, then firm performance, proxied by Tobin's Q, increases following an increase in leverage. When the leverage is high, there is no evidence of a relationship between leverage and firm performance.

2.6 Gaps in Literature

These studies have shown mixed results regarding the relationship between financial leverage and the profitability of firms in Nigeria. Also, there is a significant gap in research examining the relationship between financial leverage and firm value, particularly with a focus on deposit money banks in Nigeria. This highlights the need for more empirical investigation on this subject. Therefore, this study aims to explore the effect of financial leverage on the profitability and firm value of Nigeria's deposit money banks.

3. Methodology

3.1 Research Design

This study utilized an ex-post facto research design, meaning the events under observation had already occurred, and the researchers had no control over the variables involved but analyze the effects of these variables. This design allowed the researcher to assess the effect of financial leverage on the profitability and firm value of deposit money banks in Nigeria.

The investigation primarily relied on secondary sources of data. Specifically, the necessary information was meticulously gathered from audited annual reports and financial statements of deposit money banks in Nigeria, spanning the years 2018 to 2023. These documents provided comprehensive financial data and insights into the performance, financial leverage, and firm value of these banks over the specified period. By leveraging these authoritative and audited sources, the study ensured the accuracy and reliability of the data, thereby enhancing the robustness and validity of the research findings.

3.2 Population, Sample Size and Sampling Techniques

The population of this study comprises all the thirteen deposit money banks that are listed on the Nigerian Exchange Group (NGX) as at April 26, 2024. Purposive sampling technique was employed to select a sample size of nine deposit money banks with international authorization. The banks are Access Bank Limited, First

Bank Nigeria Limited, Zenith Bank Plc, Fidelity Bank Plc, First City Monument Bank Limited, United Bank of Africa Plc, Guaranty Trust Bank Limited, Stanbic IBTC Bank Limited, and Wema Bank Plc.

3.3 Measurement of Variables

Table 1 shows the measurement of the variables of the study. The dependent variable of the study is financial leverage which is measured by debt-to-equity ratio and debt ratio. The independent variables are profitability and firm value of the deposit money banks. Profitability is measured by return on equity, while firm value is measured by Tobin's Q. Firm size is the control variable of the study.

3.4 Model Specification

The panel regression model employed to investigate the effect of financial leverage on the profitability and firm value of deposit money banks in Nigeria is presented below:

$$ROE_{it} = \beta_0 + \beta_1 DER_{it} + \beta_2 DR_{it} + \beta_3 FSIZE_{it} + \varepsilon \tag{5}$$

$$Tobin's\_Q_{it} = \beta_0 + \beta_1 DER_{it} + \beta_2 DR_{it} + \beta_3 FSIZE_{it} + \varepsilon \tag{6}$$

Where: ROE = Return on Equity

Tobin's_Q = Firm Value

DER = Debt-to-Equity Ratio

DR = Debt Ratio

FSIZE = Firm Size

β_0 = Intercept Coefficient

β_1 to β_3 = Parameters to be estimated

Apriori expectation: $\beta_1, \beta_2, \beta_3 > 0$

The panel data models (1) and (2) were estimated using the Feasible Generalized Least Squares (FGLS) regression technique.

4. Result and Discussion

4.1 Descriptive Statistics of Measured Variables

The descriptive statistics for the variables under study are presented in Table 2. The average ROE during this period (2008-2023) was 0.113 with maximum at 0.35 and minimum at -1.26, indicating that, on average, Nigerian deposit money banks generated a return of 11.3% on their shareholders' equity. The standard deviation of 0.214 suggests a relatively high variability in ROE among these banks, reflecting significant differences in their performance across the sample. This variability underscores the importance for banks to aim for an optimal level of financial leverage that maximizes firm performance without incurring excessive risk, necessitating a careful balance between debt and equity financing to achieve a cost-effective capital structure.

Table 1: Summary of Measurement of Variables

Variable	Label	Measurement	Source
Dependent variable			
Return on Equity	ROE	Net income divided by total equity	Makwe & Mike, (2019)
Firm value	Tobin's Q	Overall worth of a company	Ibrahim & Isiaka (2020)
Independent variable			
Debt-to-Equity Ratio	DER	Total debt divided by total equity	Makwe & Mike (2019)
Debt Ratio	DR	Total debt divided by total assets	Umer & Muhammad (2018)
Control variable			
Firm Size	FSIZE	Natural logarithm of total assets	Afolabi et al. (2019)

The results further revealed an average Debt-to-Equity Ratio (DER) of 0.4190 and an average debt ratio (DR) of 0.864, with corresponding standard deviations of 21.964 and 0.046 respectively. The high standard deviations of DER indicate substantial variability in these ratios across Nigerian banks. This variability underscores the heavy reliance on debt financing and the differing practices in managing leverage among banks. Such high leverage significantly magnifies both potential returns and associated risks. The differences in leverage management practices, reflected in the variability, impact overall profitability and firm value. Effective management of leverage is crucial for balancing these benefits and risks. Regarding the control variable, the analysis estimated the average size of Nigerian deposit money banks using the logarithm of their total assets. The resulting value for this measurement was 0.096, with a standard deviation of 0.684, indicating the typical scale of these financial institutions within the context of the study. This measure provides insight into the general size distribution of the banks in the sample and serves as a control to account for the effect of bank size on financial performance and leverage.

Table 2: Descriptive Statistics of Measured Variables

Variable	Mean	Median	Maximum	Minimum	Std. Dev.
ROE	0.113	0.137	0.350	-1.260	0.214
DR	0.864	0.866	0.995	0.717	0.046
DER	0.419	0.274	159.144	-184.217	21.964
TOBIN_S_Q	0.211	0.206	0.477	0.089	0.060
FSIZE	0.096	0.149	0.949	-7.322	0.684

4.2 Multicollinearity Test

Multicollinearity occurs when independent variables in a regression model are not independent but rather highly correlated with each other. This makes it difficult to assess the individual effect of each variable on the dependent variable. The multicollinearity analysis, summarized in Table 3 by correlation matrix, examines the relationships between bank performance, measured by ROE and Tobin's Q, and various financial leverage variables used for the study. The findings reveal generally weak correlations between the financial leverage and bank performance variables. Also, the correlation between the variables of financial leverage was found to be weak. In the same vein, the relationship between firm size and financial leverage was weak. The multicollinearity test conducted showed that all correlation values were below 0.8, which indicated that there was no issue of multicollinearity among the study variables.

Table 3: Correlation Matrix

Variable	(1)	(2)	(3)	(4)	(5)
(1) ROE	1.000				
(2) DR	-0.278	1.000			
(3) DER	-0.419	0.185	1.000		
(4) TOBIN_S_Q	-0.315	-0.434	-0.057	1.000	
(5) FSIZE	0.048	0.158	-0.014	-0.040	1.000

4.3 Stationarity Test

The variables of independent variables (DER, DR and FSIZE) and financial performance (ROE and Tobin's Q) were subjected to unit root test using Levin-Lin-Chu method. The essence of the test was to determine the stationarity of the variables in the models. Stationary series are necessary to avoid spurious regression results and to accurately interpret the relationships between variables. This establishes the confidence in the reliability of the models. The analysis in Table 4 shows the unit root tests for stationarity of the variables. The results show that all variables have their p-values less than 5% level of significance. This indicates that the data series or variables

were stationary at level I(0) - integrated of order 0.Stationarity I(0) refers to a series that is stationary without requiring any differencing. It indicates that the series has a constant mean, variance, and no autocorrelation structure over time, making it suitable for many types of statistical analysis and modeling. Hence, the null hypothesis that the data series have unit root is rejected.

Table 4: Levin Chin-Chu Unit Root Test

Variables	t-stat	p-value	Order	State
ROE	-3.3658	0.0004	I(0)	Level
TOBIN_S_Q	-2.54239	0.0055	I(0)	Level
DER	-10.2556	0.000	I(0)	Level
DR	-6.80871	0.000	I(0)	Level
FSIZE	-8.96144	0.000	I(0)	Level

4.4 Effect of Financial Leverage on Profitability of Deposit Money Banks

The Heteroscedasticity LR test was conducted and the test yielded p-values greater than 0.05, indicating that we fail to reject the null hypothesis of homoscedasticity. This suggests that the variance of the error terms remains consistent across different levels of the independent variables. As a result, the assumption of homoscedasticity is upheld, implying that the model's residuals do not exhibit significant heteroscedasticity. This ensures that the standard errors are likely reliable, making the estimates efficient and unbiased, thereby supporting the validity of the regression analysis. Consequently, the estimated effect of the financial leverage on bank profitability was considered robust within this analytical framework.

Pooled regression, fixed effect and random effect models were run in the study. The pooled regression model was deemed inappropriate because of unobserved individual-specific factors that might affect the dependent variable and vary across individual banks. A Hausman test was conducted to choose between the fixed effects model and the random effects model, with the null hypothesis stating that the random effect model is preferable to the fixed effect model. The Hausman test yielded a p-value of 0.0184, which indicated the rejection of the null hypothesis. Consequently, the random effects model was rejected in favor of the fixed effects model. The analysis in Table 5 presents the regression results of fixed effects model examining the effect of financial leverage on bank profitability, as measured by return on equity (ROE).

The results shows that financial leverage such as debt-to-equity ratio (t = 3.509, p < 0.01) and debt ratio (t = 5.587, p < 0.01) have a significant positive effect on the return on equity of the deposit money banks. This implies that 1% increase in debt-to-equity ratio results in a marginal increase of 0.00585% in the banks' ROE. Similarly, 1% increase in debt ratio leads to an increase of 0.585% in the banks' ROE. Firm size (t = 2.510, p < 0.01) is also found to have a positive effect on the ROE of the sampled deposit money banks.

Furthermore, the joint effect of independent variables (DER, DR and FSIZE) on the banks' profitability is significantly positive (F = 19.389, p < 0.01). The coefficient of determination (R^2) confirmed that financial leverage and firm size have a significant positive effect on bank profitability, as they explain a substantial proportion (65.37%) of the variation in the ROE of the deposit money banks. The Durbin-Watson statistic, which is approximately 2.0, indicates that the regression estimates are reliable and not biased due to autocorrelation. Therefore, the hypothesis (H_1) is accepted, demonstrating that financial leverage has a significant positive effect on the profitability of deposit money banks in Nigeria.

These findings indicate that higher debts result in higher profitability in the DMBs, suggesting that their debt financing increases the returns to equity holders of the banks. The banks earn more on their assets than they pay in interest on the debt, so the excess earnings contribute to higher ROE. The finding of this research is consistent with the results of Akinlo and Asaolu (2012), Abubakar (2015), Ibhagui and Olokoyo (2018), Ahmed et al. (2018), Afolabi et al. (2019), Popoola and Suleiman (2020) and Lawrence et al. (2021) which reveal that debt financing contributes significantly to the profitability of firms, provided the firms generate returns on their assets that exceed the cost of debt. In contrast, Yunisa et al. (2020) found that financial leverage proxied by debt-equity ratio had significant negative effect on return on equity of deposit money banks in Nigeria.

Table 5: Regression Result of Effect of Financial Leverage on Profitability (ROE)

Variable	Coefficient	Std. Error	t-Statistic
C	-0.391596	0.090371	-4.333201
DER	0.005859	0.00167	3.509328***
DR	0.584948	0.104695	5.587146***
FSIZE	0.017582	0.007005	2.50999***
R-squared	0.653675	S.E. of regression	0.148681
Adjusted R-squared	0.619962	Durbin-Watson stat	1.648251
F-statistic	19.38938***	Hausman Test	0.0184

*Note: *, ** and ***indicate significance at the 10%, 5% and 1% respectively.*

4.5 Effect of Financial Leverage on Firm Value of Deposit Money Banks

The study utilized pooled regression, fixed effect, and random effect models. The pooled regression model was found unsuitable due to unobserved factors specific to individuals that could influence the dependent variable and differ among banks. To determine whether to use the fixed effects or random effects model, a Hausman test was performed, with the null hypothesis suggesting that the random effects model is more appropriate. The Hausman test resulted in a p-value of 0.00351, leading to the rejection of the null hypothesis. As a result, the random effects model was dismissed in favor of the fixed effects model. The regression results from the fixed effects model, which investigates the impact of financial leverage on firm value of the banks as indicated by Tobin's Q, are detailed in Table 6.

The results show that financial leverage such as debt ratio (t = -11.05959, $p < 0.01$) has a significant negative effect on the firm value of the listed deposit money banks. This implies that 1% increase in debt ratio results in 0.648% decrease in the banks' firm value. However, debt-to-equity ratio and firm size were found to have positive but not significant effect on the firm value, measured by Tobin's Q.

Moreover, the joint effect of the independent variables (DER, DR and FSIZE) on the firm value of the banks is significantly positive (F = 19.389, $p < 0.01$). The coefficient of determination (R^2) confirmed that financial leverage and firm size have a significant positive effect on bank's firm value, as they explain a substantial proportion (57.0%) of the variation in the Tobin's Q of the deposit money banks. The Durbin-Watson statistic, which is approximately 2.0, indicates that the regression estimates are reliable and not biased due to autocorrelation. Therefore, the hypothesis (H_2) is accepted, demonstrating that financial leverage has a significant but negative effect on the firm value of deposit money banks in Nigeria.

The findings of this study revealed that financial leverage had a significantly negative effect on the firm value of the Nigerian deposit money banks, indicating that as the debt ratio increases, the firm value of the banks decreases. This shows that as the banks increase their debt levels relative to equity, their overall value tends to decline. While financial leverage can enhance returns during favorable conditions, excessive debt often results in increased financial risk and costs of capital, leading to a decline in the firm's overall value. The results also indicate that the effect of debt-to-equity ratio on firm value is statistically not significant, suggesting that fluctuations in this particular measure of financial leverage do not have a meaningful effect on firm value within the confines of this model. The finding of this research is consistent with the results of Ilyukhin (2015), Adetunji et al. (2016), Edore and Ujuju (2020) and Ibrahim and Isiaka (2020) which found that financial leverage had significantly negative impact on the firm value of Nigerian listed companies.

Table 6: Regression Result of Effect of financial leverage on Firm Value (Tobin's Q)

Variable	Coefficient	Std. Error	t-Statistic
C	0.770641	0.0503	15.32647
DER	0.0000635	0.000242	0.262006
DR	-0.647686	0.058563	-11.05959***
FSIZE	0.003076	0.003063	1.00421
R-squared	0.570014	S.E. of regression	0.048755
Adjusted R-squared	0.528157	Durbin-Watson stat	1.546593
F-statistic	13.6181***	Hausman Test	0.00351

*Note: *, ** and ***indicate significance at the 10%, 5% and 1% respectively.*

5. Conclusion

The study shows that financial leverage such as debt-to-equity ratio and debt ratio have a significant positive effect on the profitability (return on equity) of deposit money banks in Nigeria. This implies that the higher the leverage, the higher the profitability of the DMBs. This is because the leverage allows the banks to invest more capital into its operations than they would be able to using only equity. If these investments yield returns that exceed the cost of debt, the additional profits are allocated to equity holders, thereby boosting ROE.

The study also reveals that financial leverage has a significant negative effect on the firm value of the deposit money banks, indicating that as the debt ratio increases, the firm value of the banks decreases. The debt ratio plays a critical role in shaping firm value, with higher levels of debt correlating with a decrease in firm value due to the increased financial risk and potential for higher interest expenses associated with greater debt levels. These results underscore the paramount importance of managing debt levels judiciously to avoid diminishing firm value and highlight the need for strategic financial planning to balance leverage and ensure sustainable growth and profitability.

The study recommends that banks should carefully manage their debt levels to balance the benefits of leverage with the associated financial risks. Prudent debt management and the strategic use of equity financing are essential to maintain financial stability and optimize performance. Regular monitoring and adjustment of leverage ratios can help mitigate financial risks and enhance the overall health of the banking sector.

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