

CAPITAL INTENSITY AND OPERATING CASHFLOW OF QUOTED DEPOSIT MONEY BANKS IN NIGERIA.

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ABSTRACT

The study investigated how different forms of capital intensity relate to net operating cash flows. It employed the ex post facto design as the research design. Secondary data were obtained from the annual reports of deposit money banks listed on the Nigeria Exchange Group (NSE), covering a twelve-year period from 2013 to 2024. The population of the study comprised all the sixteen (16) deposit money banks listed and actively trading on the Nigerian Exchange Group as 31st December 2024. Out of the total population, a sample size of 10 banks was purposively determined based on firms with complete and available data for the studied variable. Descriptive, correlation and the Panel Regression Model were employed to analyze the data collected. The Econometric Views (E-views) software was used in computing the desired statistics. The results of the fixed-effects estimations showed consistent and distinct effects of capital intensity on banks net cash flow performance. Accordingly, Property, plant and equipment intensity (PPEI) was positive and statistically significant with net operating cash flows. Intangible assets intensity (INTI) was robustly negative for OCFM indicating that increases in intangible intensity led to weaker cashflows. Long-term investments intensity (LTVI) produced a negative and significant effect on OCFM while deferred tax assets intensity (DFTI) indicated insignificant impact on OCFM. Bank size (BKSZ), on the other hand, was significant in all models, but indicated negative effect on OCFM. It was therefore concluded that capital intensity influenced cash flows of banks significantly. Based on the findings and conclusions made the following policy recommendations are advocated. (i) Prioritize targeted tangible investments as PPEI's was consistent positive association with operating cash flows, Secondly, manage intangible investments cautiously, because INTI is linked to lower OCFM of banks. Thirdly, treat long-term investments as strategic, not short-term liquidity substitutes. The fourth recommendation was that banks should interpret DTAs conservatively as balance-sheet enhancers rather than immediate cash strength. Finally, regulators and managers should

account for the dual role of size, especially in making strategic capital decisions since size has the potential of reducing net operating cashflows.

Keywords: Capital intensity, Operating Cash flows, Intangibles Intensity, Deferred Tax Intensity

JEL Classification: M41, G21

1. INTRODUCTION

Globally, deposit money banks play very significant roles in the economic development and transformation of various nations. They constitute the backbone of the financial system, serving as key intermediaries between surplus and deficit economic units. According to Ezirim (2004), they serve as intermediaries by ensuring the efficient mobilization of savings, enhancement of investments and the promotion of efficient allocation of financial resources from one economic unit to another. He further argued that deposit money banks also perform other functions such as: (i) serving as a channel for mobilizing funds to borrowers in the form of loans and advances; (ii) provision of credit facilities such as loans and overdrafts to households, small and medium enterprises, large corporations and government in the economy; (iii) operation of the payment system; safe keeping of funds and valuables of customers; (iv) creation of money through the lending process; (v) provision of expert financial and agency services to customers, companies and government; (vi) implementation of money policy as well as helping to maintain stability in the financial system of nations. Onochie (2025) further posits that the stability and performance of deposit money banks to economic growth, financial inclusion and overall macro-economic stability can therefore, not be overemphasized.

In recent years, quoted deposit money banks in Nigeria have operated in an increasing competitive and regulated environment characterized by rapid technological advancement, increased capital requirements, stricter regulatory reforms by the Central Bank of Nigeria (CBN) and growing stakeholders' expectations. These changing circumstances have made banks to increase their investments in physical or non-current assets (both tangible and intangibles). Such investments increase their capital intensity, which explains the proportion of their investments in non-current assets, with the expectation to enhance their operational efficiency, service delivery, profitability and cash flows. Capital intensity has therefore become a strategic decision variable for quoted deposit money banks, as it can be arguable that higher investment in capital assets can lead to enhanced financial performance of listed firms.

Considering the crucial roles they play in the country's economic development and the need to ensure efficient and strengthened banking sector in Nigeria, the Central Bank of Nigeria (CBN) in March 2024, issued a directive on a new minimum capital, a directive that is likely to financially reshape the domestic money banks (DMBs) theatre of competition. According to KMPG (2024), the increase in capital requirement by the CBN is aimed at strengthening the resilience of the banking industry to withstand challenges arising from global and domestic headwinds. The higher capital requirement will enhance financial system stability as banks become better positioned to absorb financial shocks or unexpected losses.

Arguably, one way to increase the capacity of banks is by capital intensity. Capital intensity denotes the amount of cash or cash equivalents invested in property, plant and equipment and other non-current assets used in a company's operations. It is usually expressed as the ratio of non-current assets to total assets. A higher level of such investment indicates greater capital intensity, which can influence the firm's outcomes either positively or negatively. This measure is important because it affects the company's financial position, asset efficiency, and overall performance. In Nigeria, capital intensity does not exert a uniform effect on banks' financial performance because outcomes vary with managerial efficiency, the experience of leadership, the banks' ages, organizational characteristics, and size. Bank size, for example, shapes access to economies of scale, cheaper funding, risk diversification, and the capacity to absorb investment costs (Nangih & Onuorah, 2020). Larger banks are often better positioned to leverage capital-intensive investments to boost efficiency and returns, while smaller banks may suffer cost inefficiencies and financial strain from comparable investments.

Despite the relevance of these issues, existing empirical studies on Nigerian deposit money banks exhibit some gaps concerning how bank size conditions the relationship between capital intensity and financial performance in Nigeria. In other words, the relationship between capital intensity and firm performance remains contentious among financial researchers and practitioners. More disturbing is the fact that findings of prior studies on the subject matter, remained mixed and inconclusive, particularly in developing economies like Nigeria, where infrastructural challenges, high costs of operations and regulatory constraints may limit the expected benefits of capital-intensive investments of banks and other firms. For example, Onochie (2025) examined how investment in non-current assets affects the market performance of listed Nigerian banks and found that only property, plant, and equipment had a positive and statistically significant impact. Nangih and Onuorah (2020) explored the link between capital intensity and profitability among listed oil and gas firms in Nigeria and reported a significant negative relationship. Chukwu and Egbuhuzor (2017) studied tangible assets and corporate performance in Nigerian manufacturing firms, finding a significant positive association between return on assets and plant and machinery. Similarly, Zhang (2017) investigated the effect of intangible asset intensity on profitability in China from 2014

to 2016 and provided empirical evidence that higher intangible-asset ratios positively and significantly influence firm financial performance. Consequently, this study attempted to examine the effect of capital intensity on cash flow of banks and also harmonize the conflicting findings on the subject matter. Further, it sought to empirically examine the effect of capital intensity on net operating cash flows of quoted deposit money banks in Nigeria from 2013 to 2024, taking into cognizance the moderating effect of bank size. It is believed that the study findings would be useful to shareholders, managers, investors, regulatory bodies and researchers alike, in Nigeria and beyond.

2. LITERATURE REVIEW

2.1. Conceptual Review

Concept of Operating Cash flows- Net Operating Cash Flow measures a company's cash generation from its core business operations. Operating cash flows is the amount of cash generated by a company in producing and selling its products or services. In simple terms, operating cash flows measure the amount of cash generated by a company's core business operations over a specific period. It's the cash inflows and outflows directly related to producing and selling the company's products or services and a clear picture of how much cash a business generates from its day-to-day operations before considering any external funding sources or capital expenditures. Cash flow means the amount of that flows into and out of the entity over a certain time period (Albrecht, 2003).

Concept of Capital Intensity- The term capital intensity denotes the amount of cash or cash equivalents invested in property, plant and equipment and other non-current assets (Nangih & Owa 2025). Shahean and Malik (2012) defined capital intensity as the ratio of total non-current assets to total assets, a straightforward metric that highlights the share of fixed assets within the firm's asset base. This ratio is important because it affects the company's financial structure, asset turnover, and operational flexibility, and therefore has direct implications for profitability, liquidity, and overall asset efficiency. This study proxied capital intensity by property plant & equipment, intangible non-current assets, deferred assets as well as long term investment intensity as discussed below;

Property, Plant and Equipment Intensity- Property, plant and equipment (PPE) is employed in this study as a primary proxy for capital intensity. PPE, also known as tangible non-current assets, are physical items owned or controlled by a business for use in production, supply, rental, or administrative functions rather than for resale. PPE are classified into categories such as land, land improvements, buildings, plant and machinery, motor vehicles, and

furniture and fittings, and are depreciated systematically over their estimated useful lives; except for land, which ordinarily has an indefinite useful life unless held under lease.

Intangible Non-current Assets Intensity- According to International Accounting Standards (IAS) 38, intangible non-current assets are defined as identifiable non-monetary assets without physical substance. They are resources controlled by an entity as a result of past transactions or events, expected to generate future economic benefits, but lacking a tangible form. Examples include patented technologies, computer software, licensing agreements, franchise rights, and trademarks. These assets are critical in modern business environments where innovation, intellectual property, and brand recognition often drive competitive advantage more than physical resources. In addition, intangible assets often serve as strategic tools for differentiation, enabling firms to build unique market identities. Their recognition in financial reporting highlights the growing importance of knowledge-based resources in today's global economy.

Long term investments Intensity- Long-term investments form an important component of a firm's non-current assets. These are investments that cannot be readily converted into cash within a single accounting period and are typically held to secure future profitability and stability. On the statement of financial position, long-term investments represent commitments made by a company to sustain growth and ensure long-term success. Examples include investments in associates, subsidiaries, available-for-sale financial assets, and investment properties. Unlike current assets such as inventory, cash, or trade receivables, which are liquid and tied to immediate operations, long-term investments are strategic in nature, designed to generate returns over extended periods. They often reflect management's confidence in the firm's ability to expand and diversify its portfolio. The long-term investment ratio is calculated by dividing the total value of long-term investments by the total assets of the company as reported in the statement of financial position.

Deferred Tax Assets Intensity- Deferred tax assets are taxes receivable in the future. It is usually approximated due to timing differences. Hence, deferred tax is a function of timing differences. In Nigeria income taxes are assessed on taxable profit as against the accounting profit. Chukwu (2006) posited that taxable profits are not always the same with the accounting profit in practice. The difference between the two are as a result of treatment of certain items called non-allowable deductions in the accounts such as depreciation, traffic offences, penalties and interests and other fines, etc. These items are usually used in determining accounting profit but are non-allowable in the determination of the taxable profit. This gives rise to timing differences (permanent and temporary differences).

2.2. Theoretical Review

Signaling theory was chosen to underpin the study. Signaling theory was established by Michael Spence in 1973. Signaling theory aims to provide an explanation for how individuals are capable of doing so. This theory's main predictive mechanism is the concept of a "separating equilibrium," which is when expectations of a signal are validated through real-life experiences. The theory is also helpful in explaining behavior when two parties (individuals or organizations) possess varying information. In most cases, one party needs to decide how to convey information, while the other party needs to determine how to interpret it. Signaling theory is widely recognized and applied in various management literatures, such as strategic management, entrepreneurship, and human resource management. Although the application of signaling theory to organizational concerns has gained momentum in recent years, its central tenets have become somewhat unclear. Michael Spence was originally credited with the theory of signaling in 2002 (Spence, 2002). He proposed that where information asymmetry exists, it is always possible for people to signal their type, ability and capability, thus invariably transferring information to the other party and resolving the asymmetry. According to Spence (1973), not all attributes are fixed, as some can be altered. Indices are fixed data points that encompass characteristics such as sex, gender, race, and other immutable attributes. Signals and indices are considered as factors in changing conditional probability distributions that shape an employer's beliefs (Spence, 1973).

The Signaling theory is relevant to this study because it highlights the issue of information asymmetry that can arise when financial statements are assumed to be creative. Therefore, users would need a clear and dependable financial statement that accurately reflects the entity's financial performance and position, enabling them to make informed and rational investment decisions.

2.3. Empirical Review

The following empirical studies relate to the study: Onochie (2025) looked into how capital intensity affected the stock returns of Nigerian money deposit banks that were listed. The study used an ex post facto research design and was grounded in the resource-based view theory and signaling theory. Property, plant, and equipment, intangible assets, long-term investments, and deferred tax intensity were used as proxies for capital intensity, the independent variable. In contrast, market price per share and earnings per share were used to measure stock returns, which was the dependent variable. Ten Nigerian listed banks were purposefully chosen as the study's sample. The study used data that was gathered over an 11-year period, from 2013 to 2023.

They developed hypotheses were tested using the panel multiple regression technique. Additionally, descriptive and correlational analyses were performed. The main conclusions show that only PPER is significant, but all independent variables have a negative impact on the dependent variables. The findings showed that long-term investments, deferred tax intensity, and intangible asset intensity all had negative but not statistically significant effects on the dependent variables. The study's findings support the following conclusions higher plant and machinery investment levels do not increase stock returns.

Okeke and Yetunde (2025) examined the relationship between capital intensity and the financial performance of listed agricultural companies on the Nigerian Exchange Group. Their study focused on how proxies of capital intensity, namely: investment ratio, property, plant and equipment ratio, and intangible asset ratio, affected financial performance, measured by return on assets. Using an ex post facto design, the study covered the period from 2014 to 2024, with data sourced from annual financial statements of selected firms. Ordinary least squares regression was employed to analyze the data. Findings revealed a negative and insignificant association between intangible asset ratio and return on assets, indicating that investments in intangibles did not enhance profitability. Conversely, the investment ratio showed a positive and significant effect on return on assets, while property, plant, and equipment also had a significant positive impact on firm performance. These results suggest that tangible investments are more effective in driving profitability compared to intangible assets. The study highlights the importance of asset allocation strategies in determining financial outcomes for agricultural firms.

Onyebuchi and Newstyle (2025) investigated the effect of non-current asset investment on the financial performance of listed agricultural firms in Nigeria between 2015 and 2024. Guided by three research questions and hypotheses, the study adopted an ex post facto design. The population consisted of five listed agricultural firms on the Nigerian Exchange Group, and census sampling was used to include all five firms. Data were obtained from annual reports and statements of accounts of the selected companies. Independent variables included plant and equipment, land, and buildings, while net profit margin served as the dependent variable, with firm size acting as a moderating variable. Panel Least Square (PLS) estimation was applied to panel data spanning ten years (2014–2023). Results showed that plant and equipment had a positive and significant effect on net profit margin, while land and buildings had a negative and insignificant effect. Firm size was found to positively moderate the relationship between non-current asset investment and net profit margin. The study concluded that non-current asset investment positively influences financial performance, recommending that agricultural firms increase investments in plant and equipment. This conclusion underscores the role of firm size in amplifying the benefits of capital investments.

Nangih and Owa (2025) explored the impact of capital intensity on stock prices of listed deposit money banks in Nigeria. Anchored on signaling theory, the study employed an ex post facto design. Non-current asset intensity was proxied using property, plant and equipment, intangible assets, and long-term investments, while stock price was measured by market price per share. A purposive sample of ten listed banks was selected, with data covering eleven years (2013–2023). Panel regression techniques, alongside descriptive and correlational analyses, were used to test the hypotheses. Findings revealed that all independent variables had negative effects on stock prices, though only property, plant and equipment was statistically significant. Intangible assets and long-term investments negatively affected stock prices but were not significant. The study concluded that increasing investments in plant and machinery does not necessarily stimulate stock prices of banks. These findings highlight the nuanced relationship between capital intensity and market valuation. They also suggest that investors may perceive heavy capital investments as riskier, thereby dampening stock price growth.

Umoh (2025) investigated the impact of non-current assets on the financial performance of Nigerian manufacturing firms, using BUA Cement Plc as a case study for 2015–2023. The study sought to determine how property, plant, and equipment (PPE), intangible assets, and right-of-use assets affected return on assets (ROA). An ex-post facto design was adopted, supplemented by trend and SWOT analyses, and hypotheses were tested using multiple regression in E-Views. The findings showed that PPE, intangible assets, and right-of-use assets had no statistically significant effect on ROA ($p\text{-values} > 0.05$). The study concluded that, for the period examined, non-current assets did not materially influence financial performance at BUA Cement Plc. It recommended closer monitoring and more effective management of non-current assets to ensure they deliver value. The author argued that improved asset utilization and strategic investment decisions could enhance ROA and strengthen firms' financial resilience.

Hồng et al. (2024) analyzed capital intensity and financial performance for 230 manufacturing enterprises listed on HNX and HOSE between 2015 and 2022, yielding 1,734 observations. Capital intensity was measured as the ratio of fixed assets to net revenue, with Tobin's Q used as the performance indicator; firm size, leverage, and liquidity were included as control variables. The authors applied OLS, FEM, and REM estimations, tested for model adequacy, and corrected heteroscedasticity and autocorrelation using FGLS to obtain robust results. Their analysis showed that capital intensity, financial leverage, and liquidity were negatively associated with financial performance, while company size had a positive effect. The study suggests that larger firms may better withstand the adverse effects of capital-intensive operations. The authors recommend that managers consider firm scale and financial structure when planning capital investments to avoid eroding firm performance.

Momoh and Musa (2024) investigated the impact of non-current asset management on financial performance of listed consumer goods manufacturing firms in Nigeria for the period 2009–2022. The study focused on plant and machinery and motor vehicles as explanatory variables, with net profit and ROA as outcome measures, and employed an ex-post facto design with multiple regression analysis. Results indicated that investment in plant and machinery had a positive and significant effect on both net profit and ROA. Investment in motor vehicles showed a positive but insignificant effect on net profit and a negative but significant effect on ROA. The authors concluded that non-current assets influence financial performance, but the magnitude and direction vary by asset type. They recommended that firms invest in modern plant and machinery to improve production efficiency and profitability, while exercising caution in motor vehicle investments due to potential negative impacts on ROA. The study highlights the importance of asset-specific strategies in non-current asset management.

Egwu et al. (2023) investigated the effect of investments in non-current assets on the performance of quoted manufacturing firms in Nigeria. The study used secondary data drawn from the annual reports and accounts of fifteen selected quoted firms over an eight-year period (2012–2019). Data were analyzed using descriptive statistics, correlation, and regression techniques. Empirical results showed that investment in tangible non-current assets had a positive and highly significant effect on return on assets (ROA), with a coefficient of 0.95 ($p = 0.000$). Investment in intangible non-current assets also exhibited a positive and significant impact on ROA, with a coefficient of 0.44 ($p = 0.000$); the debt-to-assets ratio had a positive and significant effect on ROA, while the assets turnover ratio showed a negative but insignificant relationship with ROA. The adjusted R^2 of 0.923 indicated that approximately 92% of the variation in ROA was explained by tangible non-current assets (TNCA), intangible non-current assets (INCA), debt-assets ratio (DAR), and assets turnover ratio (ATR). The authors concluded that tangible non-current assets exert a stronger influence on the financial performance of Nigerian manufacturing firms than intangible assets and recommended that firms prioritize optimal utilization of their assets.

Nangih et al. (2023) examined the effect of asset tangibility on market performance among listed firms in Nigeria, focusing on the consumer and industrial goods sectors. Anchored in resource-based theory and employing an ex-post facto design, the study proxied asset tangibility by ratios of tangible and intangible non-current assets, while market-based performance was measured by earnings per share and market price per share. Thirteen purposively selected firms comprised the sample, with data spanning 2013–2022; analyses included descriptive statistics, correlation, and regression techniques. Findings showed that asset tangibility was a significant predictor of market performance at the 5% level. Specifically, tangible non-current assets exhibited a negative but insignificant effect on market

performance indicators, whereas intangible non-current assets had a positive and significant effect. The authors therefore recommended that firms limit heavy investment in tangible assets given their limited impact on EPS and market price, and instead prioritize intangible resources to enhance market performance. The study highlights the growing market premium for intangible capital and suggests managers reallocate resources toward innovation, brand, and human capital.

Nangih et al. (2020) investigated the relationship between investment in intangible non-current assets and firm profitability, using Guaranty Trust Bank Plc as a case study. The research adopted an ex-post facto design and drew data from the bank's audited financial statements for the period 2009–2019. Specifically, the study sought to determine the extent to which expenditures on intangible assets influence profitability, to identify which categories of intangible investment (such as software, goodwill, and customer-related intangibles) are most closely associated with profit measures, and to assess the temporal dynamics of this relationship over the ten-year window. The analysis aimed to provide evidence on the extent to which goodwill as well as computer software costs influence bank profitability proxied by return on equity, using the Least Squares Multiple Regression statistical technique to analyze the data. Findings showed that neither goodwill nor computer software costs significantly influenced Return on Equity. Thus, intangible assets do not significantly enhance financial performance of banks.

3. METHODOLOGY

The study employed the ex post facto design. This design was chosen because the data already exist and could not be manipulated by the researcher. Secondary data were obtained from the annual reports of deposit money banks listed on the Nigerian Exchange Group, covering a twelve-year period from 2013 to 2024. The sample size was purposively determined based on firms with complete and available data on the variables of the study. In all 10 banks were sampled in this study, which are: Access Bank, Fidelity Bank, First Bank of Nigeria (FBN), First City Monument Bank (FCMB), Guaranty Trust Bank (GTB), Union Bank of Nigeria (UBN), Sterling Bank, United Bank for Africa (UBA), Unity Bank, and Zenith International Bank. The correlation analysis was also carried out in order to determine whether or not multi co-linearity exists between the explanatory variables. On the other hand, the fixed effect panel regression technique was employed to test the research hypotheses at significance level of 0.05. The Econometric Views (E-views) software was used in computing the desired statistics.

3.1 Model Specification

The model below was adopted in this study thus: $OCFM = f((PPEI + INTI + LTVI + DFTI + BKSZ + \mu))$. The relationship is expressed econometrically as follows:

$$OPCF = \beta_0 + \beta_1 PPEI_{it} + \beta_2 INTI_{it} + \beta_3 LTVI_{it} + DFTI_{it} + BKSZ + \mu$$

Where OCFM = Operating Cash Flow Margin

PPEI= Property plant and equipment intensity

INTI= Intangible assets intensity

LTVI= Long term investments intensity

DFTI = Deferred tax assets intensity

BKSZ = Bank Size

β_0 = Constant;

$\beta_1 \dots \beta_8$ = Coefficient of the regression equation.

μ = Error term;

i = is the cross section of firms used;

t = Time period

4. DATA ANALYSIS AND DISCUSSIONS

Table 4.1: Descriptive Statistics

	OCFM	PPEI	INTI	LTVI	DFTI	BKSZ
Mean	56.07620	2.286324	0.41244 5	6.269255	0.275898	22.05108
Median	59.93365	2.317562	0.34088 9	4.823500	0.270472	21.95514
Maximum	359.8565	3.842507	1.25753 9	18.16620	0.704248	24.04403
Minimum	-	0.773075	0.04560 6	0.127200	-	20.73151
Std. Dev.	82.45860	0.817864	0.29431 0	4.727892	0.244265	0.833426
Skewness	1.296530	-0.074119	0.87185 2	0.844769	0.026959	0.446789
Kurtosis	6.526731	2.239675	2.97951 6	2.471152	2.163147	2.574378
Jarque-Bera	95.80893	3.000344	15.2046 3	15.67109	3.516149	4.898169

			0.00049			
Probability	0.000000	0.223092	9	0.000395	0.172376	0.086373
			49.4934			
Sum	6729.144	274.3589	0	752.3106	33.10782	2646.130
Sum Sq.			10.3076			
Dev.	809131.1	79.59925	2	2660.003	7.100200	82.65725
Observations	120	120	120	120	120	120

Source: Researcher's Computation

In Table 4.1, operating cash flow measure (OCFM) a mean of 56.08 and median value of 59.93, which suggests that its central tendency was in the high fifties, but the standard deviation is very large with a value of 82.46 and the range is extreme: a maximum of 359.86 and a minimum of -101.72. The negative minimum signals that some banks experienced substantial negative operating cash flows during the sample period. Skewness (1.30) and kurtosis (6.53) again point to a heavy-tailed right distribution, and normality is rejected. Property, plant and equipment intensity (PPEI) shows identical mean (2.29) and median (2.32) with modest standard deviation (0.82). The distribution is approximately symmetric (skewness -0.07) with kurtosis slightly below three (2.24). The Jarque-Bera test does not reject normality. Bank size (BKSZ), likely measured in logged assets or turnover, on the other hand, was tightly distributed: mean 22.05, median 21.96, and a small standard deviation (0.83) with a narrow range (20.73 to 24.04). Skewness (0.45) and kurtosis (2.57) are mild and the Jarque-Bera test is not significant at the 5% level.

Table 4.2: Correlation Matrix

	OCFM	PPEI	INTI	LTVI	DFTI	BKSZ
OCFM	1.000000					
PPEI	0.103242	1.000000				
INTI	-0.231920	0.228634	1.000000			
LTVI	0.068113	-0.418099	-0.108837	1.000000		
DFTI	-0.185233	0.173899	0.392544	0.118963	1.000000	
BKSZ	0.116246	-0.546630	-0.308016	0.254871	-0.236168	1.000000

Source: Researcher's Computation

The correlation matrix in Table 4.2 offers a compact map of linear relationships among capital-intensity measures, bank size and the dependent variable, being net operating cash flow. Accordingly, Operating cash flow measure (OCFM) shows a weak positive correlation with PPEI ($r=0.103$) and bank size ($r=0.116$), while it is negatively correlated with INTI ($r=-$

0.232) and DFTI ($r=-0.185$). PPEI is negatively correlated with bank size ($r=-0.547$), but positively correlated with ROTA ($r=0.319$) and modestly with INTI ($r=0.229$) and DFTI ($r=0.174$). Intangible assets intensity INTI on the other hand correlates negatively with bank size ($r=-0.308$), and negatively with OCFM ($r=-0.232$), while showing a small positive correlation with PPEI ($r=0.229$) and a moderate positive correlation with DFTI ($r=0.393$).

Equally, long-term investments intensity (LTVI). LTVI has a moderate positive correlation with bank size ($r=0.255$), while it is negatively correlated with PPEI ($r=-0.418$) and slightly negatively with INTI ($r=-0.109$). On its part, Deferred tax assets intensity (DFTI). DFTI shows a modest positive correlation INTI ($r=0.393$), a small negative correlation with OCFM ($r=-0.185$), and weak negative correlation with bank size ($r=-0.236$); while LTVI ($r=0.255$), while it is strongly negatively correlated with PPEI ($r=-0.547$) and negatively with INTI ($r=-0.308$) and DFTI ($r=-0.236$).

Table 4.3: Hausman Tests

Test Summary	Model 1
Chi-Sq. Statistic	21.119297
Chi-Sq. d.f.	5
Prob.	0.0008

Source: Researcher's Computation

The Hausman test results in Table 4.3 provide a formal decision rule about whether the random-effects estimator yields consistent parameter estimates or whether the fixed-effects estimator is required. The result showed that Chi Square coefficient was **21.12** on 5 degrees of freedom, while the p-value was = 0.0008, so the null hypothesis that the random-effects estimator is consistent is decisively rejected. Consequently, the fixed-effects estimator, which conditions out time-invariant bank heterogeneity, is therefore the preferred baseline estimator for inference in this study.

Table 4.4: Fixed-Effect Panel Regression Test Showing the Effects on Net Operating Cashflows

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PPEI	49.79525	18.34741	2.714021	0.0078
INTI	-97.28396	10.17455	-9.561497	0.0000
LTVI	-2.629825	0.592046	-4.441923	0.0000
DFTI	-18.67509	27.83805	-0.670848	0.5038
BKSZ	-31.48791	13.91350	-2.263119	0.0257
C	698.3344	281.4891	2.480858	0.0147
R-squared	0.353439	Mean dependent var		56.07620
Adjusted R-squared	0.253002	S.D. dependent var		82.45860
S.E. of regression	71.26819	Akaike info criterion		11.50135
Sum squared resid	523153.0	Schwarz criterion		11.89624
Log likelihood	-673.0809	Hannan-Quinn criter.		11.66172
F-statistic	3.519017	Durbin-Watson stat		1.769028
Prob(F-statistic)	0.000051			

Source: Researcher's Computation

The fixed-effects estimation for Model, reported in Table 4.4, indicates that PPEI is positively and significantly related to OCFM: a one-unit increase in property, plant and equipment intensity is associated with a 49.795 increase in operating cash flows ($t = 2.71$; $p = 0.0078$). INTI shows a large, negative and highly significant effect: a one-unit rise in intangible assets intensity corresponds to a 97.284 decline in OCFM ($t = -9.56$; $p < 0.001$). LTVI is negative and significant, with a one-unit increase in long-term investments intensity associated with a 2.630 decrease in OCFM ($t = -4.44$; $p < 0.001$). DFTI is negative but not statistically significant (coefficient = -18.675 ; $p = 0.5038$). BKSZ has a negative and significant coefficient: a one-unit increase in bank size is associated with a 31.488 reduction in OCFM ($t = -2.26$; $p = 0.0257$). The intercept is 698.334 ($p = 0.0147$). Overall, the model explains a moderate portion of the variations in operating cash flows ($R^2 = 0.3534$, adjusted $R^2 = 0.2530$), the F-statistic is 3.519 (Prob < 0.001), and the Durbin–Watson statistic is 1.769.

4.2 Test of Hypothesis

Four hypotheses were formulated in this study. The hypotheses were tested using the t-statistics and probability values (p-values) from the fixed-effects estimations as the bases for rejection/non-rejection. The decision rule was to reject the null hypothesis if the p-value of the

t-statistic is less than or equal to 0.05. The results are summarized in Table 4.7. Bank size (BKSZ) was treated as a control variable throughout.

H0₁: Property plant and equipment intensity do not affect net operating cash flows significantly of quoted deposit money banks in Nigeria.

The third PPEI hypothesis returns a (t)-statistic of 2.7140 and a p-value of 0.0078, leading again to rejection of the null at the 5% level. This reinforces the earlier findings: PPEI is statistically significant and positively related to the operating cash flow margin (OCFM).

H0₂: Intangible non-current assets intensity does not significant impact net operating cash flow of quoted deposit money banks in Nigeria.

The third INTI specification again shows a very large negative effect with a (t)-statistic of -9.5615 and p-value 0.0000, leading to rejection of the null. It is therefore concluded that intangible non-current assets intensity significantly impacts net operating cash flow of quoted deposit money banks in Nigeria. This strong and consistent negative finding (together with H₀₄) strengthens confidence that, in several specifications, INTI is negatively associated with the dependent variable.

H0₃: There is no significant effect of long-term investments intensity on net operating cash flows of quoted money deposit banks in Nigeria.

The third LTVI specification produces a (t)-statistic of -4.4419 and a p-value of 0.0000, leading to rejection of the null with high significance. It is concluded that there is a significant effect of long-term investments intensity on net operating cash flows of quoted money deposit banks in Nigeria

H0₄: There is no significant effect of deferred tax assets intensity on net operating cash flows of quoted deposit money banks in Nigeria.

The third DFTI specification yields a (t)-statistic of -0.6708 with a p-value of 0.5038, and the null is not rejected. There is no evidence in this test that DFTI differs from zero. Thus, there is no significant effect of deferred tax assets intensity on net operating cash flows of quoted deposit money banks in Nigeria.

4.3 Discussion of Findings

First, property, plant and equipment intensity (PPEI) was statistically significant and positively associated with operating cash flows. The null hypothesis of no effect is rejected in the model. This indicates that within-bank increases in tangible asset intensity coincide with improvements in stronger operating cash generation. This pattern provides direct support to several studies in the empirical review. For example, Onyebuchi and Newstyle (2025) report a

significant effect of plants and equipment on net profit margin. Okeke and Yetunde (2025) likewise find that property, plant and equipment have a significant and positive effect on profitability in their sample of listed agricultural firms. Multiple manufacturing-sector studies in the review (Momoh-Musa 2024; Okobo and Monday 2022; Egwu et al. 2023) also document positive links between tangible non-current assets and profitability measures. Consequently, higher PPEI coincides with improved cash generation.

Secondly, intangible assets intensity (INTI) showed robust negative effect on net operating cash flows, which implies that intangible assets do not reliably support net operating cash flows of quoted banks in Nigeria. The null hypothesis is decisively rejected. In practical terms, increases in intangible intensity are associated with sharply lower operating cash flows. This consistent negative sign suggests that, in the sample period, rising intangible investment is not translating into immediate cash-flow benefits. Several studies also report either negative or insignificant effects of intangibles on performance. Nangih and Owa (2025) both report that intangible asset intensity had negative (and in some cases statistically insignificant) effects on cashflows in Nigerian banks. Very few studies, such as Nangih et al. (2023) find a positive effect of intangible assets on firm performance.

Thirdly, long-term investments intensity (LTVI) showed a detectable within-bank association with lower operating cash flows in these estimates. This suggests that reallocations into long-term investments may depress short-term cash generation and book value per share in some contexts, even if they do not immediately affect measured profitability. Nangih and Owa (2025) specifically report negative (though often insignificant) effects of long-term investments on market outcomes for Nigerian banks. Large holdings of long-term securities or equity stakes may tie up funds in assets that generate returns slowly or whose gains are realized infrequently; purchases depress operating cash flows immediately and may reduce book value if investments are marked down or if unrealized losses accumulate. A negative association may also reflect risk-management choices: banks shifting into long-term investments during uncertain periods could be doing so as a defensive allocation, coinciding with weaker core operations and lower book value.

Fourthly, deferred tax assets intensity (DFTI) is not significant for operating cash flows. The lack of significance for OCFM implies that DTAs are primarily accounting items with limited immediate cash-flow impact. Onochie (2025) reports that deferred tax intensity had a negative but not statistically significant effect on market outcomes.

Lastly, the bank size control (BKSZ) is statistically significant to OCFM. These results indicate that capital intensity measures, within-bank increases in the size metric are associated with lower operating cash flows. Onyebuchi and Newstyle (2025) report a positive and significant moderating effect of firm size on the link between non-current asset investment and

net profit margin, while Nguyễn et al. (2024) and Hồng et al. (2024) find that company size often has a positive effect on financial performance even when capital intensity itself is negative.

5. CONCLUSION AND RECOMMENDATIONS

The study investigated how different forms of capital intensity and relate to net operating cash flows. Using proxies such as PPEI (property, plant and equipment intensity), INTI (intangible assets intensity), LTVI (long term assets intensity) and DFTI (Deferred tax assets intensity), the research aims to establish whether and how capital composition influenced the net operating cash flows of banks. It employed the ex post facto research approach. Hypotheses for the variables were tested using regression analysis and (t)-tests reported for multiple model specifications. Statistical significance was evaluated at the 5% level. Property, plant and equipment intensity (PPEI) is positive and statistically significant with net operating cash flows. Intangible assets intensity (INTI) is robustly negative for OCFM indicating that increases in intangible intensity led to weaker cash generation. Long-term investments intensity (LTVI) produces a negative and significant associations with OCFM. Deferred tax assets intensity (DFTI) is insignificant for OCFM. Bank size (BKSZ) is significant in all models, negative for OCFM.

The following conclusions were drawn from the study's findings. PPEI consistently improves net operating cash flows within banks. INTI was associated with lower cash generation, suggesting that intangible investments in the sample period did not translate into immediate measurable benefits. Long-term investments depress OCFM. Deferred tax intensity, did not produce immediate operating cash benefits. Bank size showed significant but negative influence on operating cash flows of banks.

Based on the findings and conclusions made herein, the following policy recommendations were advocated. (i) Given PPEI's consistent positive association with operating cash flows, banks should prioritize productive physical investments (branches, IT infrastructure) that directly support revenue and cash generation. Secondly, manage intangible investments cautiously. Because INTI is linked to lower OCFM, banks should adopt rigorous project appraisal, phased rollouts, and clear metrics for expected payoffs before capitalizing large intangible expenditures. Thirdly, it was recommended that banks reallocating into long-term securities should plan for short-term cash impacts and communicate expected horizons for value realization. The fourth recommendation is that banks should interpret DTAs conservatively as balance-sheet enhancers rather than immediate cash strength. Finally, regulators and managers should account for the dual role of size, especially in making strategic capital decisions.

Competing Interest: The authors declare that there is no competing or conflicting interest in this manuscript.

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