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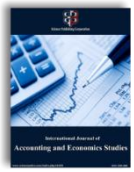

The Analysis of Firm Size, Asset Tangibility, and Financial Performance of Non-Financial Firms Listed on The Nigerian Exchange Limited

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Abstract

This study examined the effect of asset tangibility, a firm-specific factor, on the financial performance of non-financial firms listed on the Nigerian Exchange Group and assessed the moderating role of firm size. Covering 78 firms across nine industries, including oil and gas, communication, real estate, healthcare, industrial goods, consumer goods, services, and conglomerates, the study spanned the period from 2012 to 2024. Descriptive statistics were employed to summarize the data characteristics, while the cross-sectional dependence augmented IPS (CIPS) test was used to assess stationarity. Additional diagnostic tests, including correlation analysis, slope heterogeneity, heteroscedasticity, and serial correlation, ensured model robustness. The Prais-Winsten regression with panel-corrected standard errors (PCSEs) was applied to estimate the long-run effects of the explanatory variables on financial performance. Empirical findings showed that asset tangibility exerted a negative and statistically significant effect on financial performance, suggesting that higher fixed asset intensity reduces profitability. The moderating analysis further revealed that firm size strengthened the relationship between asset tangibility and financial performance, indicating that larger firms can better leverage tangible assets to enhance efficiency and returns. These results highlight the importance of strategic asset allocation and scale efficiency in improving firm performance. The study recommends that firm managers optimize asset structures and pursue growth strategies that exploit size advantages to mitigate inefficiencies linked to excessive asset tangibility and sustain long-term financial performance in Nigeria's non-financial sector.

Keywords: *Firm-Specific Factors; Financial Performance; Nigerian Exchange Group; Asset Tangibility; Firm Size; Panel-Corrected Standard Errors.*

1. Introduction

Financial performance is of vital importance to stakeholders; it influences the interests of various parties connected to a firm. It is a measure of how effectively a firm utilizes its assets and operations to generate revenue. Segun and Vincent (2021) describe financial performance as an estimation of what a firm achieves over a given period in monetary terms, providing essential information for assessing liquidity, solvency, profitability, and efficiency. Similarly, Chen-Ying Lee (2020) defines financial performance as the extent to which a firm's strategic and capital-related objectives are achieved, reflecting the efficiency of resource utilization in maximizing profitability and shareholders' wealth. Firm-specific factors such as asset tangibility, asset turnover, liquidity, leverage, and firm size significantly influence financial performance (Kellins, 2020). These internal characteristics represent unique resources or strengths that firms can leverage to improve competitiveness and performance. However, when poorly managed, such factors may adversely affect profitability and sustainability. The non-financial sector in Nigeria, comprising industries such as oil and gas, telecommunications, real estate, consumer goods, and industrial services, plays a critical role in employment generation, economic growth, and government revenue. Yet, evidence suggests a persistent decline in financial performance, possibly due to inefficient management of firm-specific factors.

Despite their importance, most existing studies focused on individual industries such as banking, insurance, or manufacturing, limiting the generalizability of findings across sectors. Furthermore, while asset tangibility has been identified as a key determinant of firm value, many Nigerian non-financial firms struggle to optimize their asset bases, often resulting in suboptimal performance. This underscores the need to re-examine how asset tangibility influences financial performance in an environment characterized by infrastructural deficiencies, economic volatility, and regulatory inefficiencies. Empirical literature presents mixed findings. Some studies, such as Khan, Shamim, and Goyal (2018) on Indian telecommunications firms, Kocamam, Altemur, Aldemir, and Karaca (2016) on Turkish manufacturing firms; Olatunji and Tajudeen (2014) on Nigerian banks; and Korkmaz and Karaca (2014) on Turkish manufacturing firms, reported a positive and significant relationship between asset tangibility and financial performance. Conversely, Vintila and Nenu (2015) on Romanian firms, Pratheepan (2014) on Sri Lankan manufacturers, and Eric, Samuel, and Victor (2013) on Ghanaian insurance companies found a negative

and significant relationship. Others, including Derbali (2014), Kotsina and Hazak (2012), and Okwo, Okelue, and Nweze (2012), reported no significant relationship.

Recent research continues to produce inconclusive evidence. Ahmed et al. (2024) examined capital structure, total asset turnover, and liquidity on financial performance in Egyptian listed firms; Irma et al. (2024) explored firm size, capital structure, and asset turnover with corporate governance moderation in Indonesia; and Nurlaela et al. (2019) studied the Indonesian consumption industry. While some found total asset turnover positively related to profitability (Nurlaela et al., 2019), others, such as Irawati et al. (2019) and Sunjoko and Arilyn (2016), found negative or insignificant relationships. These inconsistencies may stem from differences in variable selection, study period, sectoral scope, and estimation techniques. Given the conflicting outcomes and the peculiar dynamics of Nigerian non-financial firms, there remains a critical need for a comprehensive empirical investigation that integrates key firm-specific factors and explores the moderating role of firm size. This study, therefore, analyzes the effects of asset tangibility on the financial performance of non-financial firms listed on the Nigerian Exchange, with firm size introduced as a moderator to deepen understanding of how firm-level characteristics shape performance outcomes in the Nigerian context.

2. Literature Review

2.1. Asset tangibility, firm size, and financial performance

Asset tangibility reflects the extent to which a firm's operations and financing are supported by non-current physical assets. According to Oganda (2023), it denotes the level of financing through fixed assets such as property, plant, and equipment (PPE), which are retained for long-term use in production rather than resale. These assets, including buildings, machinery, and office equipment, strengthen a firm's financial position and serve as collateral for raising external funds, thereby supporting the going concern principle (Kenton, 2017). The International Accounting Standards Board (IASB, 2018) defines assets as resources controlled by an entity that are expected to generate future economic benefits. Tangible assets constitute a vital component of a firm's productive capacity and financial stability, as they can be physically verified and used to secure financing. Firms in non-financial sectors often invest heavily in such assets due to the capital-intensive nature of their operations. Asset tangibility plays a central role in determining a firm's financing choices and performance outcomes. High levels of tangible assets reduce information asymmetry, enhance access to external finance, and lower borrowing costs (Irungu et al., 2018; Liberti & Sturgess, 2016). Liu et al. (2021) further noted that firms with greater tangible assets enjoy higher financial stability and investor confidence. Empirical evidence shows that asset tangibility positively affects firm performance by improving operational efficiency and production capacity (Zhang & Zhao, 2022; Ahmad et al., 2023). Firm size also influences this relationship. Larger firms generally have better access to capital markets, economies of scale, and greater resource utilization, which can amplify the positive effects of asset tangibility on financial performance. Dorothy and Owino (2017) found that firm size positively affects performance, while Daniel et al. (2019) emphasized its role as a moderating factor in firm-specific relationships. Thus, firm size can strengthen the capacity of non-financial firms to leverage tangible assets for improved profitability and competitiveness.

2.2. Theoretical framework

The relationship between asset tangibility and financial performance can be explained using the Resource-Based Theory (RBT), known as the Resource-Based View (RBV). The theory, originally developed by Wernerfelt in the 1980s and further advanced by Barney (1991), posits that a firm's internal resources and capabilities are the primary sources of its competitive advantage and sustained superior performance. Earlier, Penrose (2009) laid the foundation by emphasizing that firms grow and perform effectively through the optimal utilization and management of their internal resources. The RBT asserts that firms possessing resources that are valuable, rare, inimitable, and non-substitutable (VRIN) can achieve a sustained competitive advantage. These resources may include both tangible and intangible assets such as technology, managerial expertise, organizational culture, and financial capital. Tangible assets, such as plant, property, and equipment, collectively termed asset tangibility, are crucial because they enhance a firm's productive capacity, support financing opportunities through collateralization, and contribute to long-term profitability and stability (Barney, 1991).

Furthermore, the theory suggests that firm performance depends on the ability to create, deploy, and reconfigure these resources to adapt to changing market conditions. This capacity to integrate and renew resources is referred to as dynamic capabilities (Teece et al., 1997). Thus, while the RBT explains the foundational role of firm-specific resources in achieving superior performance, the Dynamic Capabilities Theory extends it by emphasizing continuous adaptation and renewal of resources to sustain competitiveness. Accordingly, this study adopts the Resource-Based Theory as its underpinning framework to explain how asset tangibility, an essential internal resource, affects the financial performance of non-financial firms. Firms with a well-managed mix of tangible assets are better positioned to leverage these resources to improve operational efficiency, reduce risks, and achieve sustained profitability in the Nigerian context.

2.3. Empirical literature

Empirical evidence on the relationship between asset tangibility and financial performance remains mixed across sectors and regions, reflecting variations in methodological approaches, sample characteristics, and economic contexts. Birhan (2017), in a study on Ethiopian insurance companies, found a statistically significant and positive effect of asset tangibility on financial performance, suggesting that tangible assets enhance firms' operational efficiency and profitability. However, Derbali (2014) found no statistically significant relationship between asset tangibility and financial performance, implying that tangible assets may not always translate into superior outcomes, especially where asset utilization is inefficient. Comparable findings were reported by Mwangi et al. (2022), who analyzed the impact of capital structure, asset tangibility, and asset turnover on the financial performance of small and medium-sized enterprises (SMEs) in Thika sub-county, Kenya, and concluded that asset tangibility had no significant effect. This contrasts with evidence from developed markets. For instance, Ali and Noor (2018), studying Malaysian manufacturing firms from 2010 to 2017, documented a significant positive relationship between asset tangibility and both return on assets (ROA) and return on equity (ROE), attributing this to enhanced operational efficiency and lower financing costs associated with tangible collateral. Likewise, Ahmed et al. (2019) reported a positive and significant association between asset tangibility and firm performance in the Indian pharmaceutical industry from 2011 to 2018, emphasizing that tangible assets serve as reliable collateral and enhance firm credibility. Contradictory results have emerged in other contexts. Osei and Appiah (2020), focusing on listed firms in Ghana between 2012 and 2019, found no significant relationship between asset tangibility and financial performance indicators such as ROA and ROE. They attributed this to contextual factors such as infrastructure deficiencies and

weak financial systems. Conversely, Nyarko and Mensah (2023) analyzed Ghanaian SMEs from 2015 to 2022 and found that asset tangibility positively influenced financial performance by enhancing firms' access to credit and operational stability. Zhang and Wang (2021), studying Chinese technology firms from 2010 to 2019, reported a negative relationship between asset tangibility and financial performance. The study argued that in technology-intensive sectors, high tangible asset investments may hinder innovation and adaptability, leading to inefficiencies. In contrast, Khan and Ahmad (2022), studying Pakistan's textile industry between 2012 and 2021 using the generalized method of moments (GMM), reported no significant relationship between asset tangibility and financial performance, highlighting the growing importance of intangible assets and innovation in performance outcomes.

In the Nigerian context, Olatunji et al. (2014) investigated the relationship between investment in fixed assets and profitability in thirteen selected commercial banks from 2000 to 2012 and found that investment in fixed assets had a strong positive impact on profitability. Musa and Ibrahim (2021) also confirmed a positive association between asset tangibility and financial performance in Nigerian banks during 2010–2018, asserting that tangible investments such as buildings and equipment significantly enhance profitability. Similarly, Olatunde, Ogbeide, and Aribaba (2017) examined the effect of asset tangibility on stock returns of listed Nigerian firms between 2008 and 2015 using a quasi-experimental design. Their results also indicated a significant positive relationship, underscoring the importance of tangible assets in improving firms' market valuation. Extending this evidence, Aliyu and Suleiman (2022) examined the construction industry in Nigeria (2010–2020) and found a significant positive effect, suggesting that capital-intensive sectors benefit from tangible asset accumulation due to operational scale and asset-backed financing advantages. Similarly, Ojo and Alade (2023) reported that asset tangibility had a positive and significant effect on financial performance in Nigeria's oil and gas sector between 2013 and 2021, emphasizing the relevance of physical capital investments in capital-intensive industries.

Overall, these studies reveal a lack of consensus on the direction and strength of the relationship between asset tangibility and financial performance. Positive relationships are often observed in capital-intensive sectors such as manufacturing, banking, and construction (e.g., Ali and Noor, 2018; Ojo and Alade, 2023), while negative or insignificant effects are more prevalent in innovation-driven or service-oriented industries (e.g., Zhang and Wang, 2021; Khan and Ahmad, 2022). This inconsistency suggests that the impact of asset tangibility is industry- and context-dependent, shaped by structural, technological, and institutional factors. Despite the rich body of literature, several critical gaps remain. First, African evidence is limited, and existing Nigerian studies are largely sector-specific, restricting the generalizability of findings across industries. Second, prior studies focus mainly on the direct effect of asset tangibility, with limited attention to moderating factors, particularly firm size, which may shape firms' ability to efficiently deploy tangible assets. Third, methodological inconsistencies ranging from cross-sectional analyses to short panel designs have contributed to mixed and inconclusive results. Finally, few studies adopt a longitudinal, cross-sectoral framework that captures firm heterogeneity over time. This study addresses these gaps by providing a comprehensive panel analysis of non-financial firms listed on the Nigerian Exchange, explicitly examining the moderating role of firm size in the asset tangibility–financial performance relationship. In doing so, it contributes robust evidence from an emerging African economy and advances understanding of how firm-specific characteristics condition the performance effects of tangible assets.

3. Methodology

This study adopted an ex-post facto research design, which examines relationships between variables without manipulating the independent variables. The design is appropriate because it allows the assessment of how existing firm characteristics, such as asset tangibility and firm size, affect financial performance, measured by return on assets (ROA). Firm size serves as the moderating variable. The population of the study comprised all listed non-financial firms on the Nigerian Exchange Group (NGX) as of December 31, 2024. These firms were drawn from various sectors, including communication, consumer goods, consumer services, healthcare, industrial goods, materials, oil and gas, real estate, and technology. Out of 84 non-financial firms listed on the NGX, 78 firms met the inclusion criteria and were selected as the study sample. The selection criteria required that each firm: (i) was listed as of December 31, 2012; (ii) was not delisted during the study period; and (iii) was not involved in mergers or acquisitions during the same period. The study relied on secondary data obtained from the published annual financial statements of the sampled firms over 13 years (2012–2024). Data were extracted from audited statements of comprehensive income and financial position. Given the nature of the dataset, panel data analysis is employed, allowing for both cross-sectional and time-series dimensions, which enhance the robustness of the results. To address potential econometric issues such as heteroskedasticity, non-normality, and contemporaneous correlation, the study employed the Panel-Corrected Standard Errors (PCSEs) technique proposed by Beck and Katz (1995). This estimator is particularly suitable when the number of cross-sections (N) exceeds the number of time periods (T), as in firm-level studies. The Prais-Winsten regression model with PCSEs was used to obtain efficient and consistent estimates. Preliminary diagnostic tests, including tests for cross-sectional dependence (CIPS), heterogeneity, heteroscedasticity, and serial correlation, were conducted to ensure data reliability and model validity. The variables used in the analysis and their measurements were presented in Table 1:

Table 1: Variables Measurement and Description

Variable	Proxy	Measurement	Reference Authors
Return on Assets	ROA	Net Profit / Total Assets	Ullah & Barkat (2020)
Asset Tangibility	ATN	Fixed Assets / Total Assets	Nousheen (2013)
Firm Size	FMZ	Natural Log of Total Assets	Cheong & Hoang (2021); Obaje et al. (2021); Daniel (2019)
Firm Age	FMA	Number of Years since Establishment	Ullah & Barkat (2020)

Source: Author's compilation, 2024.

The study's econometric model was specified as follows:

$$ROA_{it} = \beta_0 + \beta_1(ATN_{it}) + \beta_2(FMZ\_ATN_{it}) + \beta_3(FMZ_{it}) + \beta_4(FMA_{it}) + \mu_{it}$$

Where:
ROA= Financial Performance (Dependent Variable)
ATN= Asset Tangibility
FMZ= Firm Size
FMZ_ATN= Moderator
FMA= Firm Age (Control Variable)
β_0= Constant

β_1–β_4= Coefficients of Parameters
μ_{it}= Error Term

4. Results

4.1. Descriptive statistics for asset tangibility, firm size, and financial performance

Table 2 summarizes the distributional characteristics of the key variables: Return on Assets (ROA), Asset Tangibility (ATN), Firm Size (FMZ), and Firm Age (FMA). The mean ROA is 0.62, with a large standard deviation (27.90) and wide range (−255.69 to 617.43), indicating high profitability variability across firms. The strong right-skewness (8.93) and extreme kurtosis (252.79) suggest the presence of outliers, confirmed by the Jarque-Bera test ($p < 0.01$). This dispersion in the ROA is largely attributable to structural differences across firms, including variations in capital intensity, exposure to macroeconomic shocks, firm-specific efficiency, and sectoral characteristics. In particular, periods of economic instability, exchange rate volatility, and firm-specific restructuring may have resulted in extreme profit or loss positions for some firms, thereby generating outliers. ATN averages 0.43 with moderate variability (std. dev. = 0.26). Although its skewness (0.42) and kurtosis (3.42) are close to normal values, the Jarque-Bera statistic ($p < 0.01$) indicates slight deviations from normality. FMZ shows a mean of 16.32 and low variability (std. dev. = 2.07), with an approximately normal distribution ($p = 0.288$). FMA has a mean of 28.66 years, showing wide variation in firm maturity (std. dev. = 13.81). Overall, most variables deviate from normality, particularly ROA, indicating heterogeneity and the presence of extreme observations across firms.

Table 2: Summary Statistics for Asset Tangibility, Firm Size, and Financial Performance

Variable	Mean	Std. Dev.	Skewness	Kurtosis	Jarque-Bera (p-value)
ROA	0.62	27.9	8.93	252.79	2649574.00 (0.000)
ATN	0.43	0.26	0.42	3.42	37.28 (0.000)
FMA	28.66	13.81	−0.16	1.73	72.85(0.000)
FMZ	16.32	2.07	0.00	2.76	2.49 (0.288)

Source: Computed by the Author based on the World Bank WDI (2025).

4.2. Correlation analysis for firm size, asset tangibility, and financial performance

The correlation results in Table 3 reveal the relationships among financial performance (ROA), asset tangibility (FMZ_ATA and ATN), firm size (FMZ), and firm age (FMA). ROA is negatively correlated with asset tangibility (FMZ_ATA = -0.143; ATN = -0.194), implying that firms with higher tangible asset holdings tend to record lower profitability, possibly due to depreciation costs or reduced investment flexibility. In contrast, ROA has weak positive correlations with firm size (0.124) and firm age (0.069), suggesting that larger and more established firms achieve slightly better performance through scale advantages and experience. Asset tangibility is negatively related to firm age (FMZ_ATA = -0.245; ATN = -0.260), indicating that older firms rely less on physical assets, likely shifting toward intangible resources such as technology and brand value. None of the coefficients exceed the multicollinearity threshold of 0.8 (Gujarati & Porter, 2008; Hair et al., 2009), confirming the suitability of the variables for regression analysis. Overall, the findings suggest that while firm size and age offer modest profitability gains, heavy dependence on tangible assets may hinder financial performance.

Table 3: Correlation Matrix for Firm Size, Assets Tangibility, and Financial Performance

	ROA	FMZ_ATA	ATN	FMZ	FMA
ROA	1.000				
FMZ_ATA	-0.143	1.000			
ATN	-0.194	0.660	1.000		
FMZ	0.124	0.124	-0.123	1.000	
FMA	0.069	-0.245	-0.260	0.129	1.000

Source: Computed by the Author based on the World Bank WDI (2025).

4.3. Homogeneity and cross-sectional dependency tests for firm size, asset tangibility, and financial performance

Table 4 presents the results of the slope heterogeneity and cross-sectional dependency tests for firm-level variables, including Return on Assets (ROA), Asset Tangibility (ATN), Firm Size (FMZ), the interaction term (FMZ_ATN), and Firm Age (FMA). The Pesaran and Yamagata (2008) slope heterogeneity tests reveal statistically significant p-values at the 1% level ($\Delta = 7.795$, $p = 0.000$; $\Delta\_adj = 9.937$, $p = 0.000$), indicating rejection of the null hypothesis of homogeneity. This confirms the existence of slope heterogeneity among the sampled firms, implying that parameter estimates vary across cross-sections rather than remaining constant. Similarly, the Pesaran CD cross-sectional dependency test shows strong evidence of interdependence among firms, as all variables record significant CD-test statistics ($p < 0.01$). This suggests that firm performance and characteristics are influenced by common shocks or spillover effects within the sample. The average correlation coefficients, particularly for firm age (corr = 0.964), further indicate a high degree of association among cross-sectional units. These findings validate the adoption of second-generation panel estimation techniques such as Pesaran's CIPS test and the PCSE estimator, which effectively account for both heterogeneity and cross-sectional dependence, ensuring robust and efficient results.

Table 4: Slope Heterogeneity and Cross-Sectional Dependency Tests for Firm Size, Asset Tangibility, and Financial Performance

Test / Variable	Statistic	p-value	corr	Abs(corr)
Pesaran & Yamagata (2008)				
Delta	7.795	0.000	–	–
Delta adj	9.937	0.000	–	–
Pesaran CD Test				
ROA	7.68	0.000	0.039	0.287
ATN	8.11	0.000	0.041	0.388
FMZ	30.84	0.000	0.156	0.584
FMZ_ATN	5.03	0.000	0.025	0.386
FMA	190.55	0.000	0.964	0.965

Source: Computed by the Author based on the World Bank WDI (2025).

4.4. Diagnostic tests for firm size, asset tangibility, and financial performance

Table 5 presents the results of the key diagnostic tests, CIPS unit root, Modified Wald heteroskedasticity, and Breusch-Pagan LM serial correlation tests conducted to ensure the validity of the panel data model. Based on evidence of cross-sectional dependence, the study employed the Cross-sectionally Augmented IPS (CIPS) unit root test by Pesaran (2007). All variables, including ROA (-2.312), ATN (-2.184), FMZ (-2.860), FMZ_ATN (-2.180), and FMA (-4.933), have test statistics lower than the 5% critical value (-2.07), leading to rejection of the null hypothesis of a unit root. This confirms that the variables are stationary at the level, i.e., integrated of order zero [I(0)], and can be directly included in the regression model without differencing. The Modified Wald test result ($\chi^2(78) = 380000.0$, $p = 0.0000$) rejects the null hypothesis of homoscedasticity, indicating the presence of heteroscedasticity across firms. Similarly, the Breusch-Pagan LM test (Chi-square (3003) = 5269.916, $p = 0.000$) rejects the null of no serial correlation, confirming autocorrelation among residuals. Together, these findings justify the use of the Prais–Winsten regression with Panel-Corrected Standard Errors (PCSEs), which effectively addresses both heteroscedasticity and serial correlation, producing consistent and efficient parameter estimates.

Table 5: Diagnostic Tests for Firm Size, Asset Tangibility, and Financial Performance

Test	Variable / Statistic	Value	5% Critical Value	p-value	Decision	Remark
CIPS Unit Root Test (Pesaran, 2007)	ROA	-2.312	-2.07		Reject H_0	I(0)
	ATN	-2.184	-2.07		Reject H_0	I(0)
	FMZ	-2.86	-2.07		Reject H_0	I(0)
	FMZ_ATN	-2.18	-2.07		Reject H_0	I(0)
	FMA	-4.933	-2.07		Reject H_0	I(0)
Modified Wald Test for Heteroskedasticity	Chi-square (78)	380000		0.000	Reject H_0	Heteroskedasticity present
Breusch–Pagan LM Test for Serial Correlation	Chi-square (3003)	5269.92		0.000	Reject H_0	Serial correlation present

Source: Computed by the Author based on the World Bank WDI (2025).

4.5. Panel corrected standard errors (PCSEs) results for assets tangibility, firm size, and financial performance

To address heteroskedasticity and serial correlation in the panel data, the study applied the Panel Corrected Standard Errors (PCSEs) estimator, which is appropriate when the cross-sectional dimension (N = 78) exceeds the time dimension (T = 13) (Menegaki, 2021). This method ensures efficient and reliable estimates by correcting for heteroskedasticity, contemporaneous correlation, and serial correlation. The PCSE results in Table 6 show that the model is statistically significant overall (Wald $chi^2 = 27.83$, $p = 0.000$), confirming the joint influence of the explanatory variables on financial performance. Asset tangibility (ATN) has a negative and significant effect on ROA (Coef. = -229.07, $p = 0.022$), suggesting that higher tangible asset intensity lowers profitability, likely due to reduced liquidity and higher operational costs. Firm size (FMZ) and the interaction term FMZ_ATN both show positive and significant effects (Coef. = 5.02, $p = 0.042$; Coef. = 13.08, $p = 0.036$), indicating that larger firms and the moderating effect of size can enhance financial performance. Firm age (FMA), although positive (Coef. = 0.154), is not statistically significant ($p = 0.066$), suggesting limited performance advantages from age alone.

5. Discussion

The PCSE findings indicate that while asset tangibility exerts a negative and statistically significant effect on financial performance, firm size not only has a direct positive effect on ROA but also significantly moderates the asset tangibility–performance relationship through the interaction term (FMZ_ATN). This moderating effect suggests that larger firms are better positioned to offset the adverse profitability implications of high tangible asset intensity. Specifically, larger firms are more likely to benefit from economies of scale, superior access to financing, better asset utilization efficiency, and stronger managerial and operational capabilities. As a result, firm size weakens the negative effect of asset tangibility on performance, allowing large firms to leverage fixed assets more productively than smaller firms. This nuanced insight advances the literature by demonstrating that asset tangibility does not uniformly constrain performance; rather, its effect depends critically on firm size. The findings highlight that while asset tangibility constrains profitability, firm size plays an important moderating role in improving financial outcomes. Moreover, the results indicate that higher investment in fixed assets reduces profitability, likely because such assets tie up capital, increase depreciation expenses, and reduce operational flexibility. This finding is consistent with Zhang and Wang (2021), who reported a negative impact of asset tangibility on the performance of Chinese technology firms, emphasizing that excessive tangible asset holdings can constrain innovative capacity and liquidity. Conversely, Aliyu and Suleiman (2022) found a positive and significant relationship, arguing that firms with higher tangible asset investments perform better financially due to the collateral value of such assets, which facilitates easier access to debt financing. Similarly, Nyarko and Mensah (2023) observed a positive effect in Ghanaian SMEs, suggesting that tangible assets support credibility and operational stability. On the other hand, Khan and Ahmad (2022) found no significant relationship in the textile industry of Pakistan, implying that asset tangibility may not always directly influence firm outcomes. Taken together, the present study supports the strand of literature emphasizing the risks of excessive investment in fixed assets, particularly where flexibility and liquidity are critical for firm profitability.

Table 6: Results on the Effect of Assets Tangibility moderated by on Financial Performance

ROA	Coef.	Std. Err.	z	P>|z|	Lower limit	Upper Limit
FMZ_ATA	13.07887	6.232097	2.1	0.036	0.864188	25.29356
ATN	-229.065	100.2554	-2.28	0.022	-425.562	-32.5682
FMZ	5.023324	2.470844	2.03	0.042	0.180559	9.86609
FMA	0.1539	0.083792	1.84	0.066	-0.01033	0.318131
Constant	85.1976	40.54563	2.1	0.036	5.72962	164.6656

Wald chi2(4)	27.83
Prob > chi2	0.0000
No of Obs.	1014

Source: Computed by the Author based on the World Bank WDI (2025).
Note: P-value < 1%, <5%, and <10% indicates significance at 1%, 5%, and 10% respectively.

6. Conclusion

The findings reveal that higher asset tangibility negatively impacts financial performance. This suggests that excessive investment in fixed assets may reduce operational flexibility, strain liquidity, and hinder firms from maximizing profitability. For non-financial firms, excessive investment in tangible assets such as plants, property, and equipment may tie up resources in fixed capital, reducing liquidity and limiting their ability to respond quickly to market demands. This rigidity lowers profitability compared to firms that balance tangible and intangible assets. Based on the findings, non-financial firms are advised to avoid excessive investment in fixed assets that may constrain liquidity and reduce operational flexibility. Instead, managers should adopt a more balanced asset structure that prioritizes productive investment in intangible assets such as technology, research and development, brand equity, and human capital. Such a strategy can enhance adaptability, lower depreciation and maintenance costs, and ultimately improve profitability. From a policy perspective, regulators and decision-makers should encourage efficient asset allocation by promoting innovation-driven investments and strengthening disclosure requirements on firms' asset composition. This study contributes meaningfully to the literature by providing new empirical evidence on the determinants of financial performance among non-financial firms, with particular emphasis on the moderating role of firm size. Unlike much of the existing literature that focuses predominantly on financial institutions, this study extends the analysis to a broad set of non-financial industries, thereby addressing an important gap. By showing that asset tangibility, liquidity, leverage, and asset turnover exert distinct and heterogeneous effects on profitability, the study advances theoretical and empirical understanding of how firm-specific characteristics and scale jointly shape performance outcomes across industries.

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