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A Threshold Analysis of the Short-Term Capital Structure and Firm Performance Nexus in Nigeria

Dr Justina Adaku Okoror ✉
Anan University Kwali, Jos Nigeria, Nigeria

Ndubuisi Jeffery Jamani
RadarMetrics Research & Advisory, Nigeria

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Abstract:

The focus of the research is to examine the relationship between short term capital structure and firm performance and to identify the presence of a safe short term debt-equity threshold in this regard. Consequently, the study utilized the Panel threshold regression estimation technique using complete data from listed manufacturing firms in the Nigerian Stock Exchange for 2018-2022. The data analytics used for the study includes descriptive statistics, the correlation analysis and finally, the threshold regression. Our results identified the presence of a threshold effect for the effect of short term debt to equity ratio (STDEQTY) on ROA indicator of financial performance but not for TOBINQ. In the threshold, where STDEQTY threshold ≥ 3.45%, the coefficient (λ_1) is -28.73 and thus the result suggests that points beyond this level may be most risky and should be avoided. In this regard, it is important to for manufacturing firms to adjust their STDEQTY ratios much lower than the identified threshold to move from the region of negative returns on assets. Furthermore, the study identified the presence of a threshold effect for the effect of TDEQTY on ROA indicator of financial performance but not for TOBINQ. The study concludes that manufacturing firms in Nigeria indeed engage considerable debt obligations for their operations and have a high appetite for debt financing. However, while this ordinary makes the firms less debt averse, it is recommended that managers reduce the extent of their debt obligations. In addition, the efficiency, under-development and high market imperfections has not made it easy for firms to seek equity financing and hence the strong reliance on debt. Hence, Regulatory Authorities need to focus on implementing policies to improve the efficiency of the equity markets.

Keywords: *short term capital structure, threshold effect, Nigeria manufacturing firms.*

Introduction

Capital structure refers to the different options used by a firm in financing its assets. It describes 'the proportion of a company's capital, which is obtained through debt and equity or hybrid securities. Debt consists of loans and other types of credit that is to be repaid in the future, usually with interest. Equity involves ownership interest in a corporation in the form of common stock or preferred stock.(Nenu, Vintilă & Gherghina 2018). The goal of a company's capital structure decision is to maximize the gains for the equity shareholders. The optimal financial mix is the one that maximizes the price of the stock and simultaneously minimizes the cost of capital thus striking a balance between risk and return.

Generally, a firm can go for different levels/mixes of debts, equity, or other financial arrangements (Ardalan, 2018). Ogbonna and Ejem (2019) pointed out that the relative percentages of capital structure involving debt and equity capital usually change as the company grows.

Particularly, short-term capital structure specifically focuses on the short-term liabilities and sources of funding that a company uses to meet its immediate financial needs, typically with a maturity period of one year or less. Short-term capital includes items like short-term debt, trade credit, and working capital. Short-term capital provides liquidity and flexibility to a company. It allows the firm to meet its short-term obligations, manage cash flow fluctuations, and seize immediate opportunities. Having access to short-term capital can enhance operational efficiency and support profitability. Short-term debt typically comes with lower interest rates compared to long-term debt. This can reduce interest expenses in the short run, potentially improving short-term profitability. However, the uncertainty of securing short-term funding can create volatility in profitability.

The relationship between short-term capital structure and firm profitability is complex and can vary depending on various factors and management decisions.The existence of a link between a firm's short term capital structure and financial performance has been a hotly debated area of accounting research.

Though the topic of capital structure and firm performance has been examined in Nigeria by a number of scholars (Umobong and Ayebanengiyefa 2019; Adeniyi, Marsidi, Babatunji 2020; Ogbonna and Ejem 2019; Yinusa, Ismail, Yulia and Olawale 2019; Nelson and Peter 2019), a major weakness with the prior studies cited above is the fact that none of these studies have attempted to speculate what an ideal capital structure composition should be and whether there exist a threshold effect in the relation relationship between capital structure and financial performance. Thus, these studies erroneously assume symmetrical effects of capital structure on financial performance which is realistically untrue because even for all studies focused on estimating this relationship, the underlying belief is that there exists some form of appropriate capital mix which is optimal for the firm beyond or below which the effects on financial performance may vary. Therefore, the actual reality is that the relationships are asymmetric and not necessarily symmetric. This study therefore also further to expand the boundaries of knowledge on this issue by investigating the presence of a threshold effect in the relationship between short term capital structure and firm performance.

Consequently, the broad objective of this study is to examine the effect of short-term capital structure threshold on financial performance of listed Manufacturing firms in Nigeria. The specific objectives are to investigate the impact of Short-term term- Asset (STDTA) threshold and Short-term debt- Equity ratio (STDEQTY) threshold and on financial performance of Manufacturing firms in Nigeria.

Literature Review and Hypothesis

A contentious issue in the field of accounting research is whether or not there is any causality between a company's capital structure and its profitability. Soumadi and Hayajneh (2008) have compiled a list of potential outcomes linked to the impact that the firm's capital structure has on its overall performance. The first scenario includes a positive association between business performance and the structure of the firm's financing, which shows that the companies' performance will improve when they rely on debt to the same extent as the firm's demands. Given that the cost of debt is lower than the cost of stock and because the tax benefit of debt, which would thus enhance the firm's performance, being heavily levered is preferred. This is because the cost of debt is less than the cost of equity.

The second possibility is that there is an inverse correlation between the firm's financing structure and its performance. This kind of situation arises whenever a company is dependent on debt without putting that debt into investments that are profitable, or whenever the net present value of investments is altered as

a result of business or economic uncertainty, which can lead to the risk of the company going bankrupt and poor firm performance. The third and last possibility is that there is no correlation between the company's finance structure and its overall success. In this scenario, the cost of debt remains quite consistent, however the cost of equity does not remain the same (Soumadi & Hayajneh 2008).

The relationship between capital structure and firm performance is a fundamental area of interest for researchers and practitioners alike. Several recent studies have explored this relationship, shedding light on the complex dynamics that govern it. For example, Ngoc, Nguyen, and Pham (2023) investigated the relationship between capital structure and firm value for Vietnamese stock market-listed companies. They employed various estimation methods, including OLS, FEM, REM, and GLS, and assessed the impact of capital structure on key financial indicators, including ROA, ROE, and Tobin's Q. The findings were intriguing, as they revealed that both short-term and long-term debt ratios had negative effects on ROA, ROE, and Tobin's Q. This suggests that a high reliance on debt may not necessarily translate into improved financial performance in the Vietnamese context.

Anozie, O.R., Muritala, T.A., Ininm, V.E. (2023) examined the impact of capital structure on the financial performance of Nigerian oil and gas companies. Using an ex-post facto research methodology, the study investigated various debt ratios as proxies for capital structure and financial performance. The findings indicated a mixed relationship between debt ratios and financial performance. Long-term debt to total assets had a negative significant influence on return on assets (ROA), while short-term debt to total assets and total debt to total equity had positive insignificant impacts. This suggests that the impact of capital structure on financial performance in Nigeria's oil and gas sector is nuanced and varies depending on the specific debt components considered.

Dang, Bui, Dao & Nguyen (2019) focused on the relationship between financing structure and firm performance within Vietnam's Food and Beverage sector. The study employed different approaches, including pooled OLS, FEM, and REM, to explore this relationship. The findings highlighted that debt ratios significantly and positively affected ROE and EPS but negatively affected ROA. This suggests that in this industry, financial leverage has a strong impact on firm performance, with a trade-off between profitability and risk.

Grant, Ilse, and Marise (2019) adopted a panel regression approach to assess the impact of capital structure on financial performance for mobile telecommunications operators in sub-Saharan Africa. The study revealed a mixed impact of financing structure on financial performance. Notably, mobile operators showed a preference for short-term debt over long-term debt. This indicates that the choice of financing structure varies across industries and regions, reflecting the unique challenges and opportunities faced by firms in different contexts. Umobong and Ayebanengiyefa (2019) examined the capital structure composition and financial performance of Food and Beverage firms in Nigeria. The study found significant positive relationships between certain debt ratios and performance metrics, such as Tobin Q and earnings yield. However, it also identified significant negative relationships between other debt ratios and performance metrics, including P/E ratio. This suggests that the impact of capital structure on firm performance is multifaceted and context dependent. In the light of the above, the study raises the following hypothesis.

H_{01}: Short term capital structure threshold have a significant impact on financial performance of manufacturing firms in Nigeria.

Theoretical Framework-The Static Trade-Off Theory

This theory looks at the trade-off between tax benefit of debt and the costs of bankruptcy. It argues that while investment decision and firm assets are held constant, an optimal financing structure is attained when the tax benefit of debt equals to leverage associated costs which include financial distress, bankruptcy and agency (Myers,

2001). Firms will use debt as much as possible but watch out for any disadvantage that may arise as a result of a bankruptcy. This is the point at which the tax saving from any additional unit of debt exactly equal to the cost which arises from an increase in the financial distress probability (Sheikh & Wang, 2011). The theory assumes the existence of different target leverage for different firms due to firm's specific factors and also believe that firms are already at their presumed targets (Myers, 2001). This study is anchored on the static trade-off theory and this is so because in the context of this study, this theory implies that for companies to continue to perform financially well and not face distress, agency cost, bankruptcy, liquidation, e.t.c., their financing structure is germane and hence managers have to ensure an optimal financing structure and this decision according to the theory will depend on the trade-off between tax benefit of debt and the costs of bankruptcy. Hence the theory directly identifies that an optimum financing structure is at the core of corporate survival, and this is the focus of the study to examine what kind of capital structure will be beneficial for financial performance of companies.

Methodology

This study is based on the positivism research philosophy. The positivism philosophy is used because the study is interested in using data and quantitative approaches is providing answers to the research questions and attaining the research objectives, also quantitative research design are generally associated with positivism (Mark and Saunders, 2019). This study utilizes *ex post facto* design which is employed to study the independent variable possible changes to and effect on the dependent variable. The researcher under *ex post facto* design takes data as they are and try to discover possible links or cause-effect relationship. The population consists of all manufacturing companies quoted on the Nigerian Stock Exchange (NSE) as at December 31, 2022.

As at the study period, there are 40 of such firms listed on Nigerian Stock Exchange classification (NSE, 2020) and these will constitute the sample. In this study, secondary data, by way of annual reports and accounts of the sampled Manufacturing companies in Nigeria and some relevant NSE fact books will be used to collect data. Annual report and accounts of a company remain a regularly produced statutory document (CAMA 2004) that evokes an important or valid construction of a company social imagery. Essentially, the annual reports and accounts are those of all manufacturing firms quoted in Nigerian Stock Exchange (NSE) from 2018 to 2022. The effect of capital structure threshold on performance of listed manufacturing firms in Nigeria was analysed using panel threshold regression.

Model Specification-Threshold Model

Cuong (2014) pointed out that threshold model assumes that there exists an optimal capital structure and therefore tries to use threshold model to estimate this mix, which can capture the effect as well as help firms make decisions regarding the appropriate capital structure combination. Thus, we set up single threshold model as follows:

$$v_{it} = \begin{cases} \mu_i + \theta' h_{it} + \alpha_1 d_{it} + \varepsilon_{it} & if \quad d_{it} \le \gamma \\ \mu_i + \theta' h_{it} + \alpha_2 d_{it} + \varepsilon_{it} & if \quad d_{it} > \gamma \end{cases} \tag{1}$$

$$\theta = (\theta_1, \theta_2, \theta_3, \theta_4)', \; h_{it} = (s_{it}, m_{it}, g_{it}, c_{it})'$$

Where v_{it} represents proxy variables of firm financial performance, which are q_{it}:; d_{it}, represents the threshold variables, γ, the specific estimated threshold value. Besides, μ_i, the fixed effect, represents the heterogeneity of companies under different operating conditions; The errors ε_{it} is assumed to be independent and identically distributed with mean zero and finite variance σ^2 ($\varepsilon_{it} \sim iid(0, \; \sigma^2)$); I represent different companies; t represents different periods.

Another threshold regression model of (1) is to set:

$$v_{it} = \mu_i + \theta' h_{it} + \alpha_1 d_{it} I(d_{it} \le \gamma) + \alpha_2 d_{it} I(d_{it} > \gamma) + \varepsilon_{it} \quad (2)$$

where I(.) represents indicator function,

$v_{it} = \mu_i + \theta' h_{it} + \alpha' d_{it}(\gamma) + \varepsilon_{it}$ can be written as:

$$v_{it} = \mu_i + [\theta', \alpha'] \begin{bmatrix} h_{it} \\ d_{it}(\gamma) \end{bmatrix} + \varepsilon_{it}$$

$$v_{it} = \mu_i + \beta' x_{it}(\gamma) + \varepsilon_{it} \quad (3)$$

$$d_{it}(\gamma) = \begin{bmatrix} d_{it} I(d_{it} \le \gamma) \\ d_{it} I(d_{it} > \gamma) \end{bmatrix}$$

where $\alpha = (\alpha_1, \alpha_2)'$, $\beta = (\theta', \alpha')'$, $x_{it} = (h_{it}', d_{it}'(\gamma))'$.

The observations are divided into two "regimes" depending on whether the threshold variable d_{it} is smaller or larger than the threshold value (γ). The regimes are distinguished by differing regression slopes, α_1 and α_2. We will use known v_{it} and d_{it} to estimate the parameters (γ, α, θ, and σ^2).

It's applied in this paper that the threshold theory is proposed by Hansen (1999) and the assumption that capital mix compositions; STDTA, STDEQTY and TDEQTY.

First, if there exists threshold effect, then test double threshold and single threshold effect are tested, respectively, and the relevant formulas for both models are as follows:

$$v_{it} = \begin{cases} \mu_i + \theta' h_{it} + \alpha_1 d_{it} + \varepsilon_{it} & if \quad d_{it} \le \gamma_1 \\ \mu_i + \theta' h_{it} + \alpha_2 d_{it} + \varepsilon_{it} & if \quad \gamma_1 < d_{it} \le \gamma_2 \\ \mu_i + \theta' h_{it} + \alpha_3 d_{it} + \varepsilon_{it} & if \quad \gamma_2 \le d_{it} \end{cases}$$

for double threshold effect (4)

$$v_{it} = \begin{cases} \mu_i + \theta' h_{it} + \alpha_1 d_{it} + \varepsilon_{it} & if \quad d_{it} \le \gamma \\ \mu_i + \theta' h_{it} + \alpha_2 d_{it} + \varepsilon_{it} & if \quad d_{it} > \gamma \end{cases}$$

for single threshold effect (5)

The dependent variable v_{it} represents corporate financial performance measured using ROE, and TOBINQ. The independent variable d_{it} represents capital mix compositions; STDTA, STDEQTY and Total debt to total equity (TDEQTY). Besides, μ_i, the fixed effect, represents the heterogeneity of companies under different operating conditions. The errors ε_{it} is assumed to be independent and identically distributed with mean zero and finite variance $\sigma^2(\varepsilon_{it} \sim iid(0, \sigma^2))$. i and t are symbols for firms and time periods.

Results

In table 1, the descriptive statistic across the years is presented and as observed, the average TOBINQ has been on a decline over the study period. From a value of 1.25 in 2018, it increased to 1.459 in 2019 and then fell to 1.39 in 2020. In 2021, it declined further to 1.29 and then to 1.17 in 2022. Hence, in the last three years average market value of manufacturing firms in Nigeria has been a decline as its values over the years indicated that firms were largely over-valued, and a gradual reduction thus indicates that the firms are now moving towards some level of adjustment in its value. Looking at the ROA value, which is accounting measure of performance, it stood at 1.309 in 2018 and then rising to 2.148 in 2019 and then declining to 0.39 in 2020. However, in 2021, average ROE for the sample rose to 2.0272% and then further to 3.57% in 2022. For the entire study period, the performance of STDTA ratio hovered between 1:42.3 and 1:48.49. Basically, the STDA ratio shows how much of the enterprise's total assets are financed using loans and financial debts

lasting for one year or less. On the average, clearly, the STDTA of the manufacturing firms in the sample is indeed high although the industry is indeed capital intensive, and such industries are characterized by quite high short term debts ratios. STDEQTY ratio has remained quite low compared for the period under study ranging from between 0.98-1.89 over the last 5 years.

Table 1. Descriptive Statistics

2022					
	Mean	Median	Standard Deviation	Minimum	Maximum
TOBINQ	1.170392	0.84	1.149527	-0.31	7.07
ROA	3.566667	2.81	19.12654	-41.14	108.9
STDTA	46.86745	41.2	28.38796	1.52	176.46
STDEQTY	1.485294	0.96	1.992122	-2.18	11.23
TDEQTY	1.937059	1.38	2.216723	-2.24	11.24
2021					
TOBINQ	1.286667	0.96	1.242275	0.45	6.75
ROA	2.027255	2.64	36.89454	-179.92	176.27
STDTA	48.49667	38.63	34.87967	8.1	222.97
STDEQTY	1.899804	0.83	4.443939	-2.55	27.35
TDEQTY	2.638235	1.28	7.24202	-7.08	47.92
2020					
TOBINQ	1.394386	0.99	1.26283	0.39	7.84
ROA	0.385789	2.95	16.10087	-55.2	32.15
STDTA	44.80895	42.08	20.75817	12.81	141.08
STDEQTY	1.72807	1.05	4.163446	-2.83	31.39
TDEQTY	3.905263	1.34	17.24257	-3.01	131.08
2019					
TOBINQ	1.459107	1.005	1.434049	0.42	8.99
ROA	2.148929	3.275	13.24095	-47.17	29.89
STDTA	45.74429	43.365	22.45573	3.73	107.68
STDEQTY	0.980179	1.05	2.520691	-13.75	5.33
TDEQTY	1.621786	1.365	3.582489	-15.41	11.94
2018					
TOBINQ	1.254333	0.87	1.012671	0.31	5.31
ROA	1.309	2.2	13.08032	-71.36	32.62
STDTA	42.31667	40.375	20.62445	3.59	98.64
STDEQTY	1.576667	1.065	2.956246	-4.95	19.94
TDEQTY	2.305667	1.55	4.967317	-9.64	34.86

Source: STATA 14

Table 2. Correlation Statistics

	TOBINQ	ROA	TDEQTY	STDEQTY	STDTA
TOBINQ	1				
ROA	-0.03508	1			
TDEQTY	-0.0653	-0.01240	1		
STDEQTY	-0.1007	0.01511	0.8665	1	
STDTA	0.4159	-0.35868	-0.03239	0.05177	1

Source: STATA 14

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Table 2 shows the correlation between financial performance indicators and the independent variables. As observed, TDEQTY is negatively correlated with both TOBIN Q(r=-0.0653) and ROA (r= -0.0124) which indicates that increasing the TDEQTY is associated with a decline in both TOBINQ and ROA. STDEQTY is also negatively correlated with TOBINQ (r=-0.1007) but positively with ROA (r=0.0151). STDA have positive correlations with TOBINQ (r=0.415 and r=0.0647) and negative correlations with ROA (r=-0.35868 and r=-0.2173).

Table 3. Tests for the Threshold Effects for STDEQTY

STDEEQTY and ROA					
			Critical values		
Threshold Value	F-stat	P-value	1%	5%	10%
Single threshold effect test 3.45	9.75**	0.0275	12.736	7.614	6.2616
Double threshold effect test 3.37	15.88	0.1025	46.167	25.498	16.118
Triple threshold effect test -2.550	4.97	0.5050	30.713	17.176	11.86
STDEEQTY and TOBINQ					
Threshold Value	F-stat	P-value	Critical values		
			1%	5%	10%
Single threshold effect test 5.330	6.98	0.115	14.89	9.329	6.2616
Double threshold effect test 5.330	8.60	0.235	21.27	15.729	10.452
Triple threshold effect test 1.9100	1.44	0.9600	22.089	15.505	21.4910

Notes: F-statistics and p-values result from repeating the bootstrap procedures 400 times for each of the three bootstrap tests. ***, ** and * indicate significance at the 1, 5 and 10% levels, respectively

The F-test statistics along with their bootstrap p-values are shown in table and used as a statistical criterial for the selection of the appropriate threshold model. As observed, we find that the test for a single threshold is rejected given that the F-value of 9.75 with p-value of 0.0275 is significant at, 5% levels. The F-test for a double threshold is not significant, with a bootstrap-p-value of 0.1025. On the other hand, the test for a third threshold is not close to being statistically significant with a bootstrap p-value of 0.5050. Hence, for the threshold regression for STDEQTY, there is strong evidence that there is only one threshold in the regression relationship, and this will be used for the estimation.

Table 4. Threshold Regression Result for STDEQTY

Threshold Variable: SDEQTY	Coefficient	Std. Error	t-value	Prob
Dependent Variable: ROA				
Cons	18.497	3.217	5.75	0.000
TDEQTY	28.173	285.091	0.10	0.921
STDTA	-0.3191	0.0524	-6.08	0.000***
STDEQTY-Threshold estimates				
0	-25.928	285.05	0.09	0.928
λ_1	-28.728	285.06	0.10	0.920
Dependent Variable: TOBINQ				
Cons	0.4298	0.1861	2.31	0.022
TDEQTY	-28.321	17.0215	1.66	0.098*
STDTA	0.0213	0.00305	6.98	0.000***

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

In table 4, beginning with the analysis for ROA, in the absence of a SDEQTY threshold, the slope (ψ) has a negative coefficient of -25.928 though not statistically significant at 1%, 5% or 10% respectively. In the first regime, where STDEQTY threshold is less than 3.45 which is indeed quite high, the coefficient (λ_1) is -25.728 though not significant at 1%, 5% or 10%. However, for other non-threshold control variables used in the model, the result reveals that both LTDEQTY, LTDTA and STDTA all have negative coefficients indicating that an increase in their ratios has a negative effect on ROA though only the coefficients of LTDTA and STDTA are significant at 1% respectively. Moving to TOBINQ, the test for thresholds in table 4.4, TDEEQTY have slope coefficients of -28.321 and significant at 10%. However, STDTA have coefficients of 0.0213 which imply that the variable has a positive impact on TOBINQ and significant at 5%.

Table 5. Tests for the Threshold Effects for STDA

STDTA and ROA					
			Critical values		
Threshold Value	F-stat	P-value	1%	5%	10%
Single threshold effect test 78.71	24.92**	0.020	26.544	18.1208	14.0978
Double threshold effect test 36.14	9.17	0.2700	37.756	19.69	14.99
Triple threshold effect test 50.21	7.77	0.5750	43.908	27.252	11.86
STDTA and TOBINQ					
Threshold Value	F-stat	P-value	Critical values		
			1%	5%	10%
Single threshold effect test 5.330	8.15	0.2450	24.832	15.5171	11.361
Double threshold effect test 5.330	4.95	0.5600	22.224	15.335	11.44
Triple threshold effect test 1.9100	8.53	0.3350	28.023	18.519	15.043

Notes: F-statistics and p-values result from repeating the bootstrap procedures 400 times for each of the three bootstrap tests. ***, ** and * indicate significance at the 1, 5 and 10% levels, respectively

As observed, in the relationship between STDTA and ROA, we find that the test for a single threshold is not rejected given that the F-value of 24.92 with p-value of 0.020 is significant at, 5% levels while others are rejected as their p-values are not significant at 1%, 5% and 10% respectively. As observed, in the relationship between STDTA and TOBINQ, we find that the test for a single, double and triple threshold is rejected given that the F-values of 8.15, 4.95 and 8.53 are not significant at 1%, 5% and 10% respectively.

Table 6. Threshold Regression Result. For STDTA

Threshold Variable: STDTA	Coefficient	Std. Error	t-value	Prob
Dependent Variable: ROA				
Cons	12.5187	3.6525	3.43	0.001**
TDEQTY	-59.713	278.48	0.21	0.830
STDEQTY	-60.2832	278.45	0.22	0.829
STDTA-Threshold estimates				
0	-0.9016	0.07986	1.13	0.260
λ_1	-0.3884	0.0499	7.78	0.000***

Notes: F-statistics and p-values result from repeating the bootstrap procedures 400 times for each of the three bootstrap tests. ***, ** and * indicate significance at the 1, 5 and 10% levels, respectively

In the absence of a STDTA threshold, the slope (ψ) has a negative coefficient of -0.9016 though not statistically significant at 1%, 5% or 10% respectively. In the threshold, where STDTA threshold ≥ 78.71%, the coefficient (λ_1) is -0.3884 and thus the result suggests that points beyond this level may be most risky and should be avoided. Thus, it is in the interest of firms to move to more upward levels before the threshold to be able to reduce the negative implications the STDA may have on performance. However, for other non-threshold variables used in the model, the result reveals that TDEQTY have a negative coefficients of 59.713 and respectively indicating that an increase in both ratios has a negative effect on ROA and there is no significant difference in their impacts on ROA though the estimates were not significant at 1%, 5% or 10% respectively.

Discussion

Firstly, our results identified the presence of a threshold effect for the effect of STDTA on ROA indicator of financial performance but not for TOBINQ for the selected listed manufacturing firms in Nigeria. In the threshold, where STDTA threshold ≥ 0.78.71% and thus the result suggests that points beyond this level may be most risky and should be avoided. Secondly, our results identified the presence of a threshold effect for the effect of STDEQTY on ROA indicator of financial performance but not for TOBINQ for the selected listed manufacturing firms in Nigeria. In the threshold, where STDEQTY threshold ≥ 3.45%, and thus the result suggests that points beyond this level may be most risky and should be avoided. Thus, the study fail to reject the hypothesis that Short term capital structure threshold have a significant impact on financial performance of manufacturing firms in Nigeria. Though not focusing particularly on thresholds, our findings corroborates those of Ngoc, Nguyen, and Pham (2023) which revealed that short-term debt ratios had negative effects on ROA, ROE, and Tobin's Q. This suggests that a high reliance on debt may not necessarily translate into improved financial performance in the Vietnamese context. Anozie, Muritala, Ininm, (2023) findings indicated a mixed relationship between debt ratios and financial performance. Long-term debt to total assets had a negative significant influence on return on assets (ROA), while short-term debt to total assets and total debt to total equity had positive insignificant impacts. Grant, Ilse, and Marise (2019) revealed a mixed impact of financing structure on financial performance. Umobong and Ayebanengiyefa (2019) found significant positive relationships between certain debt ratios and performance metrics, such as Tobin Q and earnings yield. This suggests that the impact of capital structure on firm performance is context dependent. On the overall, our research results imply that the relationship between capital structure and firm performance is not necessarily linear, and the existence of a threshold effect suggests the need to pay close attention to understand and stay within the boundaries of their threshold.

Conclusion and Recommendations

This research results has identified the presence of a threshold effect for the effect of STDTA on ROA indicator of financial performance but not for TOBINQ for the selected listed manufacturing firms in Nigeria. In the threshold, where STDTA threshold ≥ 0.78.71% and thus the result suggests that points beyond this level may be most risky and should be avoided. Secondly, our results identified the presence of a threshold effect for the effect of STDEQTY on ROA indicator of financial performance but not for TOBINQ for the selected listed manufacturing firms in Nigeria. In the threshold, where STDEQTY threshold ≥ 3.45%, and thus the result suggests that points beyond this level may be most risky and should be avoided. Consequently, the study makes the following recommendations which will useful to practionioners. Firstly, firms must have to

understand the trade-off between risk and return. When a company takes on more debt, it increases the risk of default, but it also increases the return to shareholders. Therefore, firms should carefully consider the trade-off between risk and return when determining their capital structure.

Secondly, managers making decisions about an optimal capital structure needs to analyze the company's industry and financial position. The optimal capital structure will vary depending on the industry and the financial position of the company. For example, a mature, stable company in a low-growth industry may be able to take on more debt than a young, high-growth company in a rapidly changing industry. Consequently, managers need to consider the uniqueness of its internal and external environment in deciding capital structure decisions Thirdly, it is important that firms and particularly finance managers and evaluate their company's cash flows in staying with the thresholds. A company's ability to generate cash flow is crucial for meeting its debt obligations. Therefore, firms should evaluate their cash flow to ensure they have enough to meet their debt payments and continue to grow their business. In addition, companies also need to pay attention to their credit rating as this will provide more optimal capital structure options. A company's credit rating is an indicator of its ability to repay its debt. Firms should aim for a strong credit rating to ensure they can access debt at favourable terms.

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Appendix

```
. xthreg roa  stdeqty tdeqty, rx(stdta) qx(stdta) thnum(3) trim(0.01 0.01 0.01) grid(100) bs(400
400 400)
Estimating  the  threshold  parameters:   1st ......  2nd ......  3rd ......  Done
Boostrap for single threshold
.................................................. +   50
.................................................. +  100
.................................................. +  150
.................................................. +  200
.................................................. +  250
.................................................. +  300
.................................................. +  350
.................................................. +  400
Boostrap for double threshold model:
.................................................. +   50
.................................................. +  100
.................................................. +  150
.................................................. +  200
.................................................. +  250
.................................................. +  300
.................................................. +  350
.................................................. +  400
Boostrap for triple threshold model:
.................................................. +   50
.................................................. +  100
.................................................. +  150
.................................................. +  200
.................................................. +  250
.................................................. +  300
.................................................. +  350
.................................................. +  400

Threshold estimator (level = 95):
-----------------------------------------------------
     model |    Threshold         Lower         Upper
-----------+-----------------------------------------
      Th-1 |      78.7100       72.6400       81.5200
     Th-21 |      78.7100       71.8100       81.5200
     Th-22 |      36.1400       34.5250       36.2200
      Th-3 |      50.2100       45.3250       50.7600
-----------------------------------------------------

Threshold effect test (bootstrap = 400 400 400):
------------------------------------------------------------------------------
 Threshold |       RSS        MSE      Fstat    Prob   Crit10    Crit5    Crit1
-----------+------------------------------------------------------------------
    Single |  6.68e+04   257.0371      24.92  0.0200  14.0978  18.1208  26.5442
    Double |  6.46e+04   248.2776       9.17  0.2700  14.9986  19.6927  37.7556
    Triple |  6.27e+04   241.0727       7.77  0.5750  20.5137  27.2523  43.9082
------------------------------------------------------------------------------
```

```
 . . xthreg roa  stdeqty tdeqty, rx(stdta) qx(stdta) thnum(1) trim(0.01) grid(100) bs(400)
Estimating  the  threshold  parameters:   1st ......  Done
Boostrap for single threshold
.................................................. +   50
.................................................. +  100
.................................................. +  150
.................................................. +  200
.................................................. +  250
.................................................. +  300
.................................................. +  350
.................................................. +  400

Threshold estimator (level = 95):
-------------------------------------------------
     model |    Threshold         Lower         Upper
-----------+-------------------------------------
      Th-1 |      78.7100       72.6400       81.5200
-------------------------------------------------

Threshold effect test (bootstrap = 400):
------------------------------------------------------------------------------
 Threshold |       RSS        MSE      Fstat    Prob   Crit10    Crit5    Crit1
-----------+------------------------------------------------------------------
    Single |  6.68e+04   257.0371      24.92  0.0100  13.3309  16.6011  24.8596
------------------------------------------------------------------------------

Fixed-effects (within) regression               Number of obs      =       265
Group variable: id                              Number of groups   =        53

R-sq:  within  = 0.2887                         Obs per group: min =         5
       between = 0.1622                                        avg =       5.0
       overall = 0.2607                                        max =         5

                                                F(6,206)           =     13.93
corr(u_i, Xb)  = -0.0340                        Prob > F           =    0.0000

------------------------------------------------------------------------------
         roa |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     stdeqty |  -60.28326   278.4521    -0.22   0.829    -609.2645     488.698
      tdeqty |   59.71303   278.4833     0.21   0.830    -489.3298    608.7558
             |
_cat#c.stdta |
          0  |  -.0901593   .0798579    -1.13   0.260     -.247603    .0672843
          1  |  -.3883549   .0499384    -7.78   0.000    -.4868108    -.289899
             |
       _cons |    12.5187   3.652527     3.43   0.001      5.31757    19.71983
-------------+----------------------------------------------------------------
     sigma_u |  9.1228837
     sigma_e |  18.073306
         rho |  .20305639   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0: F(52, 206) = 1.22                     Prob > F = 0.1663
```

```
. xthreg roa tdeqty stdta, rx(stdeqty) qx(stdeqty) thnum(3) trim(0.01 0.01 0.05) grid(100) bs(400
400 400)
Estimating  the  threshold  parameters:   1st ......  2nd ......  3rd ......  Done
Boostrap for single threshold
.................................................. +   50
.................................................. +  100
.................................................. +  150
.................................................. +  200
.................................................. +  250
.................................................. +  300
.................................................. +  350
.................................................. +  400
Boostrap for double threshold model:
.................................................. +   50
.................................................. +  100
.................................................. +  150
.................................................. +  200
.................................................. +  250
.................................................. +  300
.................................................. +  350
.................................................. +  400
Boostrap for triple threshold model:
.................................................. +   50
.................................................. +  100
.................................................. +  150
.................................................. +  200
.................................................. +  250
.................................................. +  300
.................................................. +  350
.................................................. +  400

Threshold estimator (level = 95):
-------------------------------------------------
     model |    Threshold         Lower         Upper
-----------+-------------------------------------
      Th-1 |       3.4500        2.9500        3.6500
     Th-21 |       3.3700        2.7100        3.4500
     Th-22 |      -2.5500       -3.8900       -1.4800
      Th-3 |      -2.8300       -4.9500       -1.4800
-------------------------------------------------

Threshold effect test (bootstrap = 400 400 400):
------------------------------------------------------------------------------
 Threshold |       RSS        MSE      Fstat    Prob   Crit10    Crit5    Crit1
-----------+------------------------------------------------------------------
    Single |  7.06e+04   271.4873       9.75  0.0275   6.2611   7.6142  12.7362
    Double |  6.65e+04   255.8625      15.88  0.1025  16.1118  25.4988  46.1671
    Triple |  6.53e+04   251.0635       4.97  0.5050  11.8689  17.1768  30.7133
------------------------------------------------------------------------------

Fixed-effects (within) regression               Number of obs      =       265
Group variable: id                              Number of groups   =        53

R-sq:  within  = 0.3084                         Obs per group: min =         5
       between = 0.2406                                        avg =       5.0
       overall = 0.2938                                        max =         5
```

```
                                                F(8,204)          =     11.37
corr(u_i, Xb)  = -0.0123                        Prob > F          =    0.0000

------------------------------------------------------------------------------
           roa |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
---------------+--------------------------------------------------------------
        tdeqty |   59.96239   278.7773     0.22   0.830     -489.692    609.6168
         stdta |  -.4046851   .0565887    -7.15   0.000    -.5162588   -.2931113
               |
_cat#c.stdeqty |
            0  |  -60.70878   278.6582    -0.22   0.828    -610.1283    488.7108
            1  |  -72.02643    279.488    -0.26   0.797     -623.082    479.0292
            2  |  -52.30799   278.7762    -0.19   0.851    -601.9601    497.3441
            3  |  -59.60874   278.7473    -0.21   0.831    -609.2039    489.9864
               |
         _cons |   16.05301   3.313717     4.84   0.000     9.519483    22.58654
---------------+--------------------------------------------------------------
       sigma_u |  8.6607402
       sigma_e |  17.908182
           rho |  .18955335   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0: F(52, 204) = 1.12                     Prob > F = 0.2804
```