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# RESEARCH ARTICLE

## THE DETERMINANTS OF CAPITAL STRUCTURE OF MANUFACTURING FIRMS IN NIGERIA: A PANEL DATA APPROACH

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**ABSTRACT**

***Purpose:*** This study looks at the factors that influence capital structure in Nigeria's manufacturing sector, with the goal of determining how they affect a company's ability to get financial leverage. ***Design/methodology/approach:*** The impact of profitability, business size, tangibility, and liquidity on debt is investigated through a survey of 70 companies conducted over a ten-year period, from 2007 to 2016. Long-Term Debt-Equity (LTD-E) and Long-Term Debt-Total Assets (LTD-TA) ratios have been proxied by capital structure. ***Findings:*** The findings reveal that ROA has no discernible impact on the LTD-TA ratio. The variable has a considerable and favourable effect when the capital structure is represented by the LTD-E ratio. The LTD-TA ratio was significantly influenced by size and tangibility, while the effect on the alternate measure was statistically negligible. Both measures of debt indicated a negative and substantial influence of liquidity, indicating that firms invest excess liquidity and are apprehensive of tying up capital. ***Research limitations/implications:*** It is assumed that Nigerian manufacturing companies gain from the tax break. The firm size coefficients support the Trade-off Theory (TOT), while the liquidity coefficients support the Pecking Order Theory (POT). Overall, the results were influenced by the approximation chosen, and no one hypothesis dominated the others. Thus, management should decide how much external capital it will need to raise and take advantage of their core competencies to minimise cost of capital. ***Originality/value:*** To date, no Nigerian study studying the factors of manufacturing enterprises' capital structure is believed to exist. As a result, this research adds to the body of knowledge on industry-specific capital structure.



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# INTRODUCTION

One of the most significant considerations a firm's finance management must make is capital structure. This helps to explain why, since Modigliani and Miller's initial proposal in 1958, the factors affecting the structure of firm capital have sparked ongoing dispute among academics. Alternative theories have evolved in response to Modigliani and Miller's (1958) declaration in their capital structure irrelevance theory that a firm's worth is independent of how it is financed in a perfect market with no taxation and no bankruptcy cost. The agency cost theory (Jensen &Meckling, 1978; Jensen, 1986), the Static Trade-off model, and the Pecking order hypothesis (Sbeiti 2010) are some of the ideas that point out some elements that may determine capital structure. For example, according to Akhtar (2017), Joeveer (2013), Sabir and Malik (2012), and Sbeiti (2010), the drivers of capital structure differ from country to country and even from industry to industry within the same country. While these revelations have helped to clarify our knowledge of the factors that influence business capital structure, empirical evidence continues to yield mixed outcomes. Despite the high level of interest in the subject, there is no satisfactory theoretical model or significant empirical tests that explain firm capital structure behaviour; even in developing countries, where contextual variables and informality play a significant role in determining firm capital structure, there is limited research (Kouki and Said 2012). Despite the fact that many research have attempted to investigate the drivers of corporate debt, there is still a lack of understanding on firm behaviour and how it effects their financing mix. According to Kouki and Said (2012), the difficulty in implementing empirical testing is likely related to the approximations employed to quantify variables, and the results are insufficient in understanding the causes of company debt under these conditions. As a result, this study examines the determinants of capital structure in an important emerging country - Nigeria – with a particular focus on the determinants of capital structure in Nigeria's manufacturing industry. The study investigates the impact of profitability, asset size, tangibility, and liquidity on debt in the capital structure to this extent. Our findings reveal that different proxies provide varied results, implying that the variable definition has an impact on the outcome. As a result, capital determinants might be considered to be subjective in terms of variable representation. In the following aspects, the Nigeria study adds significantly to the existing literature:

First, the factors that influence capital structure are well understood; nonetheless, this study aims to determine how these factors influence the debt-equity mix of listed manufacturing (consumer and industrial products sectors) enterprises in a unique country like Nigeria's. The study is one of the few and first to look at capital structure from a theoretical perspective. It is one of the first in Nigeria to put the agency, trade-off, and pecking order theories of capital structure to the test in the consumer and industrial products sectors. The majority of previous research has been on the banking industry. Second, the study's scope and statistics add to the existing literature on the current state of Nigeria's investment climate, which has been influenced by recent events such as the recession and ethno-religious unrests. To put it another way, there are dangers connected with doing business in Nigeria that are distinct from those associated with doing business in other nations. Finally, this research aims to evaluate whether the debt-equity mix, which is driven by capital structure determinants, would be the same in Nigeria as it is in other countries, or if there will be a major variation, given the considerations stated above.

***Aims and Objectives***

The study's goal is to look into the factors that influence the capital structure of manufacturing companies in Nigeria. The following objectives were scrutinised in particular:

- The impact of profitability on a company's debt decision.
- The impact of a company's size on its debt decision.
- The impact of tangibility of assets on firm debt decisions.
- The impact of liquidity on a firm's debt decision

***Significance of the Study:*** Previous studies on determinants of capital structure in both developed and developing economies have revealed mixed and conflicting results. While we have ample studies, which examine the determinants of capital structure in advanced countries, there are relatively few recent studies on the determinants of capital structure decisions in transitioning and developing contexts and particularly sub-Saharan Africa. This is due to the difficulty of obtaining data in such contexts. This study utilises the Nigerian example to illustrate the determinants of capital structure in developing contexts. In doing so, we focus on the different sectors that are manufacturing related, to provide a detailed explanation of the behaviour of debt in Nigeria's manufacturing industry.

# REVIEW OF LITERATURE

Previous research into the factors that influence capital structure in developed and emerging economies has yielded diverse and contradictory results. While there are many studies on the drivers of capital structure decisions in advanced countries, there are few current studies on the determinants of capital structure decisions in transitioning and emerging countries, notably in Sub-Saharan Africa. This is owing to the difficulty of gathering information in such circumstances. The drivers of capital structure in developing countries are illustrated in this article using the Nigerian example. We do so by focusing on the various manufacturing-related sectors in order to provide a complete explanation of debt behaviour in Nigeria's manufacturing industry.

***Review of Capital Structure Theories:*** Because the goal is to reduce the overall cost of capital, choosing the best optimal capital structure remains a very essential and difficult task for businesses. The foundation of this substantial literature may often be traced back to Modigliani and Miller's (M&M) 1958 capital structure irrelevance theory. Scholars have since decided that M&M's thesis is false, and during the last 50 years or so, other ideas that offer alternative explanations have arisen. Even Modigliani and Miller have now revised their initial unrealistic assumptions that the absence of taxation and bankruptcy costs has no impact on the firm's capital structure to account for taxation.

The tax shield benefit of debt financing, according to Modigliani and Miller (1963), will lead the valuation of the levered firm and the 'unlevered' firm to differ. This argument was based on the idea that the higher the debt in a company's financial structure, the cheaper the cost of capital and the higher the company's market value. As a result, a company's value will be maximised by having as much debt as feasible in its capital structure. However, critics of this theory claim that Modigliani and Miller ignored the cost of financial distress and insolvency (Bhabra and Yao, 2011), (Kouki and Said, 2011), and (Kouki and Said, 2011). (Kwansa and Cho 1995). The more a company borrows, the greater the danger of default, to the point that both direct and indirect bankruptcy costs can no longer be ignored (Kouki and Said, 2011; Bhabra and Yao, 2011). When investors believe a company is at risk of default due to asymmetry in knowledge between managers and investors, the cost of borrowing rises. As a result, businesses increase their debt levels until the utility of an additional unit of debt equals the cost of debt, which includes the cost of a higher risk of financial difficulty as debt levels rise (Bundala 2012 and Rasiah and Peong 2011). Kraus and Litzebnerger created the Trade-off Theory (TOT) as a result of this (1973). According to the theory, a company selects the best capital structure by balancing the benefits and costs of debt financing. According to the TOT theory, a company will continue to borrow as long as the tax benefits of debt are significant (see Bundala 2012, Cortez and Susanto 2012, Keshtkar, Valipour and Javanmard 2012, Kouki and Said, 2011, Sbeiti 2010, Seelanatha 2010 and Ho-Yin Yue 2011). The theory implies that a corporation can navigate an optimum level of debt, which is reached when the marginal utility of one unit of additional debt equals the cost. However, there is no agreement on the debt level at which this will be accomplished.

Jensen and Meckling established the agency cost theory, which is based on knowledge asymmetry between managers and investors (1976). The use of external funding in the presence of asymmetric information and imperfect contracting can lead to potential conflicts of interest between managers, stockholders, and bondholders, as Jensen and Meckling (1976), Jensen (1986), Myers (1977), and Stulz (1990) explained. This issue could lead to the firm adopting a sub-optimal investment plan that is incompatible with maximising the firm's worth (Kouki and Said, 2011). A conflict of interest between the manager and the shareholders, as well as a conflict between shareholders and bondholders, is looming. Shareholders are interested in the long term, but debt holders are interested in the short term, and hence are divided in their opinions. To mitigate this, debt holders typically use one or more of the organization's assets as collateral for a loan. Managers will be forced to develop enough liquid resources to meet the debt holders' obligations, as they have the power to put the company into bankruptcy. Managers, on the other hand, act as agents for their principals, which in this case are the shareholders. As such, they should behave in the best interests of the shareholders as an agent, although this is not always the case. Instead, a possible conflict between managers and stockholders may arise. As a result, shareholders must install monitoring systems to verify that managers behave in their best interests. As a result, Varela (2017), Nobanee, Ellili, and Abraham (2017), Bundala (2012), Sbeiti (2010), and Jensen and Meckling (1978) define agency costs as the total of the principal's monitoring expenses, the agent's bonding costs, and a residual loss. According to this idea, firms with larger tangible asset values will eventually receive funding from debt holders. As a result, a positive relationship between debt and asset tangibility is expected. Myers and Majluf (1984) were the first to propose the Pecking Order Theory (POT) (1984). The concept of information asymmetry between managers and investors underpins the theory. Proponents contended that company executives are more informed than outside investors, which makes debt financing more expensive, particularly during periods of bad financial performance. To overcome the problem of underinvestment, managers typically rely on internal finance such as retained earnings, then migrate to debt when that source becomes insufficient, and finally to equity issue. The expense of financing justifies this order. The most expensive option is to issue additional equity since there are information gaps between managers, existing shareholders, and potential new owners.

Debt is already less susceptible to information difficulties due to its fixed payments, whereas internally created resources are unaffected by issuance costs (Sbeiti 2010). This theory implies that a firm's goal degree of leverage is undefined, and that debt is only used when internal finances are insufficient (Cortez and Susanto, 2012 and Sbeiti 2010). As a result, companies with high liquidity will use less debt in their capital structure.

***Determinants of Capital Structure and Hypotheses:*** So far, empirical findings on capital structure determinants have yielded inconsistent and contradictory conclusions. The pecking order theory is supported by some empirical data, whereas the static trade-off theory is supported by others. Researchers have discovered evidence to support both ideas, leading them to conclude that neither can adequately explain the determinants of capital structure. This section focuses on more recent empirical studies. Profitable firms, according to the Pecking Order Theory of Myers and Majluf (1984) and Myers (1984), prefer to employ internal sources of funding since it is less expensive and avoids the underinvestment problem, and then go to debt financing if this is insufficient. In other words, the more profitable a company is, the less debt it will have in its capital structure, demonstrating that debt has a negative impact. Anwar (2012), Crnigoj and Mramor (2009), Jucá, Sousa and Fishlow (2012), Smith (2012), and Teker, Tasseven, and Tukel (2012) have all found a negative relationship (2009).

According to the Trade-off Theory, a more lucrative corporation will take on greater debt because of the tax benefits and lower risk of bankruptcy (see Cortez and Susanto 2012, Ellili and Farouk 2011 and Sbeiti 2010,). Accounting texts and researchers have pushed for several notions of profitability. This includes things like return on assets, return on equity, and return on sales, among other things. Moreover, different outcomes are linked to various performance measurements. According to Cortez and Susanto (2012), the return on assets (ROA) is the most comprehensive accounting measure of performance since it reflects how efficiently all assets of a corporation (whether funded by stock or debt financing) have created sufficient returns for the firm's investors. According to Cortez and Susanto (2012) and Sbeiti (2010), the ROA is the most comprehensive accounting measure of performance, and it was utilised to determine profitability.

**Accordingly, the hypothesis follows**

**H0:** Profitability does not significantly impact the capital structure of firms

**H1:** Profitability significantly impacts the capital structure of firms

According to Keshtkar, Valipour, and Javanmard (2012), there are numerous assumptions concerning the relationship between company size and capital structure. In this regard, the trade-off theory states that enterprises choose their capital structure by balancing the benefits and costs of debt. Investors consider larger companies to be less hazardous since they have a lower risk of default. As a result, investors will be more ready to lend. Lim (2012) and Sayilgan, Karabacak, and Kucukkocaoglu (2012) both found a positive connection (2006). As a result, huge companies with consistent cash flows use their scale to negotiate reduced debt costs, and hence benefit greatly from debt financing. The pecking order theory, on the other hand, indicates that corporations use internal money first and seek external investment only when internal funding is insufficient. As a result, proponents of this viewpoint think that businesses with more consistent cash flow do not need to borrow because doing so would be like to asking someone to give you what you already have. Frank and Goyal (2003) and Titman and Wessels (1988) are two of these scholars who found that size had a detrimental impact on debt.
According to certain scholars, such as Chen (2004) and Keshtkar, Valipour, and Javanmard (2012), the size of a company influences the type of debt preferred.

As a result, larger companies often borrow for a longer period of time, whereas smaller companies borrow for a shorter period of time. The authors will not be able to substantiate this claim due to the nature of the study. Total assets, revenue, and market capitalization are some of the ways to gauge a company's size. However, in accordance with Lim, this study measures business size using total assets (2012). The writers believe that a company's asset size is a good indicator of its wealth and size. As a result, the following theory is put forth:

**H0:** Size of firms does not significantly impact the capital structure decisions

**H1:** Size of firms significantly impacts the capital structure decisions

Managers are agents of the shareholders, according to the agency cost theory (Jensen &Meckling, 1976), and there is the risk of conflict between managers and shareholders, as well as between shareholders and bondholders. As a result, when shareholders make sub-optimal investment decisions, lenders are more likely to take on additional risks (Lim 2012). This is due to the fact that the debt holders do not have authority over the firm's decision-making, and the manager is an agent of the shareholders. Lenders of funds typically acquire one or more assets of the company as collateral for a loan to reduce their risk. It stands to reason that a lender will lend more to a company with higher tangible asset value than one with lower tangible asset value.
This compels the manager to act optimally since he must generate sufficient cash to meet lender demand, and therefore the interests of both shareholders and bondholders will be aligned. The empirical works of Nunkoo and Boateng (2010), Shah and Khan (2007), Teker, Tasseven, and Tukel have all confirmed this (2009). Grossman and Hart (1982), on the other hand, disagreed, claiming that the cost of monitoring is significant for companies with limited physical assets. They claim that shareholders monitor managers' opportunistic behaviour in order to avoid the high cost of monitoring caused by a smaller amount of tangible assets; the firm wants a greater debt capital structure. This is done to put pressure on managers to create enough funds to pay their debt obligations, leaving them with little money to spend on their personal luxuries. As a result, companies with fewer physical assets will have more debt in their capital structure. The empirical work of Akinlo (2011), Booth et al. (2001), Sayilgan, Karabacak, and Kucukkocaoglu supports this logic (2006). According to Ahmed et al., (2010), Lim (2012), and Nunkoo and Boateng (2010), the ratio of fixed assets to total assets will be used as a proxy for tangibility.Thus:

**H0:** Tangibility does not significantly impact the capital structure decisions of firms.

**H1:** Tangibility significantly impacts the capital structure decisions of firms

Liquidity has been employed as an explanatory variable on capital structure determinants by a number of researchers. Liquidity refers to a company's capacity to meet short-term obligations when they become due. According to Ozkan (2001), a larger liquidity ratio indicates that a company has more ability to repay its loan. Pecking order theory (POT) states that the more a company's internal funding capability, the less it will rely on external sources of money, such as debt financing. This indicates that a company with more liquidity will have a lower debt-to-equity ratio in its capital structure. Liquidity is likely to have a negative connection with leverage in this regard. Guney et al. (2011), Mishra and Tannous (2010), Tong and Green (2010), and others have all corroborated this (2005). In support of POT, Childs, Mauer, and Ott (2005) found an unexpected negative correlation between debt and liquidity, indicating that firms avoid interest rate and liquidity risk. A corporation with more flexibility to take on more debt, on the other hand, will most likely do so to maximise the tax benefit of debt financing, according to trade off theory. To maximise the benefits of debt financing, a company with more liquidity will use its debt option. As a result, according to Yu's research, liquidity is projected to have a positive association with

business leverage (2000). The following hypothesis is derived from the foregoing:

**H0:** Liquidity of a firm does not significantly impact capit Decision

**H1:** Liquidity of a firm significantly impact capital structure decision of firms

# METHODOLOGY

***Data Source and Sample:*** Secondary data from companies listed on the Nigerian Stock Exchange (NSE) would be used in the study. The study used companies listed on the Nigeria Stock Exchange in the manufacturing sector. Over ten years, from 2007 to 2016, relevant data from 70 firms was obtained, yielding 700 observations. The information was gathered via the African Financials website (www.africanfinancials.com), which has 6,006 financial papers from 241 African listed businesses, as well as hard copies of the Nigerian Stock Exchange's annual report.

***Variables of the Study***

**The dependent variable is measured by debt ratio as follows:**

Debt-Equity Ratio = *Long Term Debt/Total Equity*

Debt-Total Assets Ratio = *Long Term Debt/Total Assets*

**The following are the independent variables:**

The following ratio represents the return on total assets: Operating profit/Total Assets Equals (ROA). The size of a company is determined by its total assets. The total assets of the frangibility are represented by: Size = Total Assets of the frangibility is represented by: Total Assets/Tangible Assets = Tangibility The following ratio was used to measure corporate liquidity: Current Assets/Current Liability = Liquidity

***Methods of Data Analysis:*** As the primary method of analysis, the study employs a quantitative approach. The panel data approach was used because of the nature of the data under inquiry. Over the course of ten years, the 70 firms were grouped together and layered throughout the area to create 700 observations. Previous researchers such as Ahmed et al. (2010), Anwar (2012), Cortez and Susanto (2012), Kouka and Said (2012), and Lim (2012) have used a quantitative approach (2012). As a result, for both models, the regression equation will be:

$$\text{Debt Ratio} = \beta_0 + \beta_1 ROA + \beta_2 Size + \beta_3 Tang + \beta_4 Liq + \varepsilon$$

Where:

$\beta$ = the coefficient of the regression or the slope of the regression
ROA = return on assets
Size = Assets size
Tang = Tangibility of assets
Liq = Liquidity of firms

Preliminary descriptive statistics and correlation coefficients were obtained once the data was pooled. The aim was next to evaluate whether the fixed effect model (FEM) or random effect model (REM) is consistent, which was followed by a panel data regression analysis. The Hausman test was performed to evaluate which model was best. The null hypothesis that the random effect model is consistent is supported by the chi-square (4) value of 4.74 with a p-value of 0.3155. As a result, the random effect model was selected, and the results will be given and discussed in the next part. To lessen the extremes between the data in the panel regression analysis, the natural log of the data was used.

**Analysis and Discussion of Results:** The analysis and presentation of estimated outcomes are covered in this section. The descriptive statistics section begins with the table below, which illustrates the behavioural pattern of the variables utilised in the study. The results of the descriptive statistics revealed that the average debt ratio for the period was approximately 0.8496 while maximum and minimum values of debt ratio are 754.4 and -1578.3 respectively, this implies that some of the sampled companies have a healthy capital structure while some have a very poor capital structure or rely very heavily on loans as their primary source of financing. The mean value of return on assets (ROA) is -0.14 and the maximum and minimum values are 0.77 and -325.8 respectively, this suggests that a lot of the firms have a low return on their assets. The ROA is the only variable with a negative mean value, while the others maintain a positive average. Except for the liquidity variable, which has a standard deviation of 5.64, which is lower than the mean value of 1.63, the standard deviation results showed a large dispersion of the variables from their respective mean values. The study moves on to the correlation matrix analysis after completing the basic descriptive analysis.

**Correlation Matrix:** The correlation matrix technique was used to investigate the relationship between the study's variables, as shown in the table below. The correlation between the study's variables is shown in table 4.2. It can be seen that most of the variables have a negative association, notably with the debt ratio. There are negative relationships between ROA, SIZE, TANG, and the debt ratio, but the relationship between SIZE and the debt ratio is substantial at 5%. This negative association indicates that increasing any of these variables would decrease the debt ratio. Liquidity (LIQ) and debt ratio, on the other hand, have a positive association. There are additional positive connections between ROA and SIZE, TANG, and LIQ, meaning that a considerable rise in any of these variables would result in an increase in the return on assets. The largest positive association is between TANG and ROA, while the strongest negative correlation is between SIZE and debt ratio. Following that, the research will look at the more empirical panel data regression result shown below.

**Panel Regression Analysis:** The results of the model in the preceding section, as shown in the table below, reveal that profitability as measured by return on assets has no bearing on the debt-to-total-assets ratio (Panel B). The coefficient of ROA becomes statistically significant when the dependent variable is replaced with the long-term debt to equity ratio, as the p-value falls below 1% at 0.0002. This means that the debt to equity ratio is a better indicator of a company's capital structure because it includes all aspects of the ownership structure. The profitability coefficient had a favourable impact on the capital structure of businesses. As a result of the trade-off theory, Nigerian manufacturing enterprises modify their capital structure. The findings of Ahmad and Abbas (2011), who reported a negative impact on profitability, are contradicted by the findings of this study. They looked at the Pakistan Banking Industry, as well as the difference in proxy for long-term debt-to-total assets ratio (Ahmad and Abbas used total debt to total assets). As a result, variances in the economy, industry, and proxy used could explain the disparities in the results. Different economies alone may not explain the discrepancies in the results, as Al-Qudah (2011) found identical results in Jordan using the same proxy. It's worth noting that his research was conducted in industries that are similar to this author's. It supports the claim that firms' capital structures operate differently across industries, with the financial sector having its own quirks. When debt is proxied by the long-term debt to equity ratio and when debt is proxied by the long-term debt to total assets ratio, firm size has a favourable impact on capital structure, however the p-value increased by more than 10% in both situations, indicating a non-significant impact. Ho-Yin Yue (2011), on the other hand, produced more significant results, despite the fact that the coefficient of regression was likewise positive. Discrepancies in approach could be to blame for the differences in significance levels. Ho-Yin Yue used a strategy to eliminate heteroscedasticity, which is a prevalent problem in this sort of data, by taking the log of both the debt ratio and the firm's size. This finding demonstrates that as a company grows larger, it borrows more to meet demand for its products.

**Table 4.1. Descriptive Statistics**

| | DEBTRATIO | ROA | SIZE | TANG | LIQ |
|---|---|---|---|---|---|
| Mean | 0.849643 | -0.1357684 | 5.71e+07 | 3.007465 | 1.632102 |
| Maximum | 754.3729 | 0.774884 | 2.92e+09 | 890.0466 | 65.81462 |
| Minimum | -1578.325 | -325.7646 | 0.000000 | -2.058002 | -110.67 |
| Std. Dev. | 74.38767 | 277.2632 | 1.71e+08 | 46.99763 | 5.635888 |
| Observations | 700 | 700 | 700 | 700 | 700 |

**Table 4.2 Correlation Matrix**

| Covariance Analysis: Ordinary | | | | | |
|---|---|---|---|---|---|
| Included observations: 700 | | | | | |
| Correlation | | | | | |
| t-Statistic | | | | | |
| Probability | DEBTRATIO | ROA | SIZE | TANG | LIQ |
| DEBTRATIO | 1.000000 | | | | |
| | ----- | | | | |
| ROA | -0.0010 | 1.000000 | | | |
| | (0.9800) | ----- | | | |
| SIZE | -0.1464* | 0.0139 | 1.000000 | | |
| | (0.0001) | (0.7137) | ----- | | |
| TANG | -0.0006 | 0.3383* | -0.0190 | 1.000000 | |
| | (0.9866) | (0.0000) | (0.6163) | ----- | |
| LIQ | 0.0005 | 0.0316 | -0.0221 | -0.0147 | 1.000000 |
| | (0.9886) | (0.4043) | (0.5599) | (0.6973) | ----- |

** - Significant at 5% level( ) – p-value*

**Table 4-3. Panel Regression (2007 – 2016)**

| | **Panel A - Dependent Variable – Debt to Equity Ratio** | | |
|---|---|---|---|
| **Variables** | Co-efficient | t-statistic | p-value |
| Intercept | 0.0762521 (0. 095003) | 0.80 | 0.4220 |
| **ROA** | 0 .022021*** (0.0070287) | 3.13 | 0.0002 |
| **SIZE** | 0. 0080461(0. 0061385) | 1.31 | 0.1910 |
| **TANG** | -0. 1931002*** (0.0212823) | -9.07 | 0.0000 |
| **LIQ** | -0. 7659196*** (0. 0164609) | -46.53 | 0.0000 |
| **F-stat. (4, 695)** = 1402.19 | R-squared = 0.**8897** | | |
| Prob (F-stat.) = 0.0000 | Adj. R-squared = 0.**8891** | | |
| Total Panel Observations = **700** | Root MSE = **0.3519** | | |
| | **Panel B - Dependent Variable – Debt to Total Assets Ratio** | | |
| **Variables** | Co-efficient | t-statistic | p-value |
| Intercept | 0.4767152*** (0.1014695) | - 4.70 | 0.0000 |
| ROA | 0 .0026966 (0. 0075071) | 0.36 | 0.7200 |
| SIZE | 0.0059734 (0.0065564) | 0.91 | 0.3630 |
| TANG | 0.214147*** (0.0227309) | 9.42 | 0.0000 |
| LIQ | -0.43462*** (0.0175814) | -24.72 | 0.0000 |
| F-stat. (4, 695) = 185.88 | R-squared = 0.5169 | | |
| Prob (F-stat.) = 0.0000 | Adj. R-squared = 0.5141 | | |
| Total Panel Observations = 700 | Root MSE = 0.3758 | | |

Standard errors in parenthesis. Significance levels: *<0.10, **<0.05, ***<0.01.

The findings back up Lim's (2012) theory of capital structure and Sayilgan, Karabacak, and Kucukkocaoglu's empirical findings (2006). The findings show that larger businesses are more likely to borrow. This is likely due to large organisations being perceived as less hazardous, and as a result, investors are more inclined to lend to larger and more stable firms, as evidenced by profitability results. As a result, businesses take advantage of their scale as well as the tax benefits of debt financing. With a p-value of 0.0000, tangibility had a positive and substantial effect on the long-term debt to total assets ratio. Furthermore, the tangibility result indicates that Nigerian investors are more inclined to lend to companies that have tangible assets as collateral. This is most likely owing to Nigerian banks' and lenders' inability to comply with international best practises. Because lenders must now write off a non-performing loan after a year, they typically take precautions to protect their interests by using one or more tangible assets as collateral. The p-value of 0.0000 indicates that organisations reduce the agency problem and conflict of interest between debt holders and shareholders, as well as between managers and shareholders.

The findings back up the agency theory of capital structure, as well as empirical data from Nunkoo and Boateng (2010) and Shah and Khan (2007), who found that tangibility had a favourable impact on debt ratio. The coefficient of tangibility becomes negative with a p-value of 0.0000 when capital structure is proxied by the long-term debt to equity ratio, demonstrating that this is not a powerful determinant of capital structure. Ahmad and Abbas (2011) found no significant association between tangibility and total debt as a proxy for capital structure, however the coefficient of regression was negative. Saleem et al. (2013) discovered a negative but negligible link between total debt and total assets.

However, Nadem et al. (2012) showed a positive and substantial effect when they used long-term debt to equity ratio as a proxy for capital structure. As a result, depending on the approximation utilised, the link between the tangibility of assets and capital structure differs. The impact of liquidity on a company's capital structure appears to be universal. Liquidity has a negative impact on both long-term debt to equity and long-term debt to total assets, with probabilities of less than 0.01.

As a result, the regression revealed that liquidity is a significant driver of Nigerian enterprises' capital structure. The decision to influence debt is universal, as more liquid companies prefer to engage fewer outside corporations. This could be due to companies' desire to invest extra liquidity rather than tying up large amounts of liquid assets. The findings contradict the first two variables, which favoured the trade-off hypothesis, and instead favour the pecking order theory of capital structure. It also supports the findings of Shahjahanpour, Ghalambor, and Aflatooni (2010), who conducted study in Iran. In Kuwait, Saudi Arabia, and Oman, Sbeiti (2010) discovered a negative relationship between liquidity and long-term debt. Kaur and Rao (2009), on the other hand, found a positive and significant influence on liquidity and capital structure in their empirical results. They looked into the textile sector in India. In their study, however, they considered total debt as a surrogate capital structure. The disparity in results could be due to differences in the debt measurements employed. Finally, the R-square suggests that the regression model only explains roughly 89 percent and 52 percent of the debt to equity and debt to total assets models, respectively. However, the model's probability value (F-Distribution) demonstrates that the variables have a substantial explanatory power on the dependent variables because they are both statistically significant at the 1% level.

# SUMMARY AND CONCLUSIONS

The dependent and independent variables' outcomes have already been examined. This paper's focus on the determinants of capital structure in Nigeria's manufacturing industry is particularly unusual in that it incorporates two debt measurements (the long-term debt to total equity and long-term debt to total assets). Long-term debt to total assets ratios were determined to be minor predictors of capital structure. Profitability, on the other hand, becomes an important variable when expressed as a ratio of total debt to total equity. The impact of size on both debt proxies was positive, though the impact on long-term debt to total assets was statistically negligible. When measured in terms of long-term debt to total assets, tangibility had a similar outcome. The coefficient of regression becomes negative and statistically significant when the long-term debt to total equity ratio is utilised. Liquidity, on the other hand, had a detrimental and considerable impact on both proxies' capital structures. Overall, liquidity outcomes supported POT, whereas size results matched the TOT projection. However, depending on the approximation utilised, the impact of tangibility and profitability is mixed. This clearly illustrates the need of paying attention to the proxy employed while researching capital structure. As shown in this study, different proxies produce varied outcomes, demonstrating that the variable definition has an impact on the outcome. In that instance, the determinants are considered to be subjective in terms of the representation of variables. Depending on the definition chosen, the variables reacted differently. Researchers should also pay attention to the industry being studied, as the findings of this study tend to coincide with those of other studies in the same industry, but contradict those of other industries.

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## Appendices

### Appendix 1: Descriptive Statistics

```
. summarize DEBTRATIO ROA SIZE TANG LIQ

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
  DEBTRATIO |        700     .849643    74.38767  -1578.325   754.3729
         ROA |        700   -.1357684    28.59953  -325.7646   277.2632
        SIZE |        700    5.71e+07    1.71e+08          0   2.92e+09
        TANG |        700    3.007465    46.99763  -2.058002   890.0466
         LIQ |        700    1.632102    5.635888     -110.67   65.81462
```

### Appendix 2: Pearson's Correlation Matrix

```
. pwcorr DEBTRATIO ROA SIZE TANG LIQ, sig star(5)

             | DEBTRA~O      ROA     SIZE     TANG      LIQ
-------------+------------------------------------------------------
  DEBTRATIO |   1.0000
             |
             |
         ROA |  -0.0010   1.0000
             |   0.9800
             |
        SIZE |  -0.1464*  0.0139   1.0000
             |   0.0001   0.7137
             |
        TANG |  -0.0006   0.3383* -0.0190   1.0000
             |   0.9866   0.0000   0.6163
             |
         LIQ |   0.0005   0.0316  -0.0221  -0.0147   1.0000
             |   0.9886   0.4043   0.5599   0.6973
```

## Appendix 3: Panel Data Regression (Capital Structure = Debt to Total Equity Ratio)

```
. xtset COYID YEAR, year
       panel variable:  COYID (strongly balanced)
        time variable:  YEAR, 2007 to 2016
                delta:  1 year

. regress lnDebtRatio lnROA lnSize lnTang lnLiq
```

| Source | SS | df | MS | | |
|---|---|---|---|---|---|
| Model | 694.456478 | 4 | 173.614119 | Number of obs | = 700 |
| Residual | 86.0523302 | 695 | .123816302 | F(4, 695) | = 1402.19 |
| | | | | Prob > F | = 0.0000 |
| Total | 780.508808 | 699 | 1.11660774 | R-squared | = 0.8897 |
| | | | | Adj R-squared | = 0.8891 |
| | | | | Root MSE | = .35188 |

| lnDebtRatio | Coef. | Std. Err. | t | P>\|t\| | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| lnROA | .0220211 | .0070287 | 3.13 | 0.002 | .0082212 | .0358211 |
| lnSize | .0080461 | .0061385 | 1.31 | 0.190 | -.0040062 | .0200984 |
| lnTang | -.1931002 | .0212823 | -9.07 | 0.000 | -.2348855 | -.151315 |
| lnLiq | -.7659196 | .0164609 | -46.53 | 0.000 | -.7982387 | -.7336005 |
| _cons | .0762521 | .095003 | 0.80 | 0.422 | -.1102752 | .2627795 |

## Appendix 4: Panel Data Regression (Capital Structure = Debt to Total Assets Ratio)

```
. xtset COYID YEAR, year
       panel variable:  COYID (strongly balanced)
        time variable:  YEAR, 2007 to 2016
                delta:  1 year

. regress lnDbtAsstRatio lnROA lnSize lnTang lnLiq
```

| Source | SS | df | MS | | |
|---|---|---|---|---|---|
| Model | 105.019189 | 4 | 26.2547972 | Number of obs | = 700 |
| Residual | 98.1654818 | 695 | .141245298 | F(4, 695) | = 185.88 |
| | | | | Prob > F | = 0.0000 |
| Total | 203.184671 | 699 | .290679071 | R-squared | = 0.5169 |
| | | | | Adj R-squared | = 0.5141 |
| | | | | Root MSE | = .37583 |

| lnDbtAsstR~o | Coef. | Std. Err. | t | P>\|t\| | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| lnROA | .0026966 | .0075071 | 0.36 | 0.720 | -.0120427 | .0174358 |
| lnSize | .0059734 | .0065564 | 0.91 | 0.363 | -.0068993 | .018846 |
| lnTang | .214147 | .0227309 | 9.42 | 0.000 | .1695175 | .2587764 |
| lnLiq | -.43462 | .0175814 | -24.72 | 0.000 | -.469139 | -.4001011 |
| _cons | -.4767152 | .1014695 | -4.70 | 0.000 | -.6759387 | -.2774917 |

## Appendix 5: Hausman Test

```
. hausman fe re
```

| | Coefficients (b) fe | (B) re | (b-B) Difference | sqrt(diag(V_b-V_B)) S.E. |
|---|---|---|---|---|
| lnROA | .0263066 | .0253112 | .0009954 | .0019658 |
| lnSize | -.0161285 | -.0058862 | -.0102423 | .0051226 |
| lnTang | -.2139703 | -.2038092 | -.0101612 | .0076882 |
| lnLiq | -.7551979 | -.7620303 | .0068324 | .0087629 |

```
                b = consistent under Ho and Ha; obtained from xtreg
     B = inconsistent under Ha, efficient under Ho; obtained from xtreg

  Test:  Ho:  difference in coefficients not systematic

              chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                      =        4.74
            Prob>chi2 =      0.3155
```

*******