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***Research Article***

# Capital Structure and Financial Performance of Manufacturing Companies in Nigeria

**Clement Olatunji Olaoye [1] & Olufemi Dadepo Adesina [2]**

**Abstract**

This empirical research aimed at establishing the effect of capital mix on the financial performance of ten chosen manufacturing firms among companies listed on the Nigerian Exchange (NGX) for twelve years period, 2009 to 2020. Secondary data were extracted from the audited accounts and reports of the chosen firms. This research employed descriptive and inferential statistical analyses for data estimation. The results of this work reveal that debt in relation to equity (DER) has insignificant adverse effect on return on asset (ROA) of the selected firms. Contrarily, DER has a direct significant effect on return on equity (ROE) and a direct insignificant effect on the net profit margin (NPM) of the sampled manufacturing companies. Total debt to total assets (TDTA) has positive but insignificant effect on all the financial performance indicators. The study also found that short-term debt to total assets (SDTA) and long-term debt to total assets (LDTA) have negative negligble effect on all the dependent variables. The outcomes of the study imply that the management of these companies need to always be guided appropriately in their capital mix decisions in order to optimize their financial performance. Therefore, the main thrust of this study is that optimal capital structure is essential for the profitability of manufacturing companies in Nigeria.

**Keywords:** Debt Equity Ratio, Return on Assets, Return on Equity, Regression Analysis.

**JEL Codes:** M21, M42, G3

[1] Assoc. Prof.Dr., Ekiti State University, Faculty of Management Sciences, Department of Accounting, Ado-Ekiti/Nigeria, clement.olaoye@eksu.edu.ng, ORCID ID: https://orcid.org/0000-0003-0204-6857

[2] Lecturer, Federal Polytechnic, School of Business and Management Studies, Department of Accountancy, Ile-Oluji, Ondo State/ Nigeria, olufemiadesina@fedpolel.edu.ng, ORCID ID: https://orcid.org/0000-0001-9675-2941, (Corresponding Author)

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***Araştırma Makalesi***

# Sermaye Yapısı Yönetimi ve Nijerya'daki İmalat Firmalarının Finansal Performansına Etkileri

**Clement Olatunji Olaoye [1] & Olufemi Dadepo Adesina [2]**

**Öz**

Bu ampirik çalışma, 2009'dan 2020'ye uzanan on iki yıllık bir süre içinde Nijerya Borsası'nda (NGX) işlem gören şirketler arasından seçilen on imalat firmasının sermaye yapısının finansal performansı üzerindeki etkisini ortaya koymayı amaçlamıştır. Bu çalışma için seçilen firmaların beyan ve raporları kullanılmıştır. Bu araştırmada veri analizi için betimsel istatistikler, korelasyon ve panel veri regresyon analizleri kullanılmıştır. Bu çalışmanın sonuçları, borç özsermaye oranının (DER), seçilen firmaların aktif getirisi (ROA) üzerinde olumsuz ve önemsiz bir etkiye sahip olduğunu ortaya koymaktadır. Aksine, borç özsermaye oranı (DER), Nijerya'daki örneklenen imalat firmalarının özkaynak karlılığı (ROE) üzerinde pozitif anlamlı bir etkiye ve net kar marjı (NPM) üzerinde pozitif ancak anlamsız bir etkiye sahiptir. Toplam borcun toplam varlıklara oranı, tüm finansal performans göstergeleri üzerinde pozitif ancak anlamsız bir etkiye sahiptir. Çalışma ayrıca kısa vadeli borcun toplam varlıklara (SDTA) ve uzun vadeli borcun toplam varlıklara (LDTA) göre tüm bağımlı değişkenler üzerinde negatif ve anlamsız bir etkiye sahip olduğunu bulmuştur. Bu çalışmanın bulguları, bu şirketlerin yönetiminin finansal performanslarını optimize etmek için sermaye yapısı kararlarında her zaman uygun şekilde yönlendirilmesi gerektiğini göstermektedir. Bu nedenle, bu çalışmanın ana fikri, Nijerya'daki imalat firmalarının karlılığı için en uygun sermaye yapısının gerekli olduğudur.

**Anahtar Kelimeler:** Borç Özkaynak Oranı, Aktif Kârlılığı, Özkaynak Kârlılığı, Regresyon Analizi.

**JEL Kodlar:** M21, M42, G3

[1] Doç.Dr., Ekiti State University, Faculty of Management Sciences, Department of Accounting, Ado-Ekiti/Nigeria, clement.olaoye@eksu.edu.ng, ORCID ID: https://orcid.org/0000-0003-0204-6857

[2] Okutman, Federal Polytechnic, School of Business and Management Studies, Department of Accountancy, Ile-Oluji, Ondo State/ Nigeria, olufemiadesina@fedpolel.edu.ng, ORCID ID: https://orcid.org/0000-0001-9675-2941, (Corresponding Author)

## 1. Introduction

Competion among manufacturing companies is very keen and vigorous in this era of globalization. According to Wulandari, Paminto and Kusimawardani (2022), Long-term competitiveness is influenced by a strong capital structure. For any company to compete favourably in this era, it must be well focused on three decisions areas. A dividend policy decision, an investment decision, and a financing decision. There is a strong connection among the three types of decisions. The company's investment decisions are crucial. If they are not taken properly, it will affect every other decision. Management must consider different options before borrowing money or using its own capital. (Endri, Mustafa & Rynandi, 2019). A financing decision is based on determining the most appropriate financing mix or capital structure. Financing decisions are influenced by decisions regarding fixed assets and current assets. Company sustainability and growth are dependent on dividend policy decisions. A company's ability to pay dividends from earnings is important to shareholders. The company performance in financial terms will be enhanced if it makes sound decisions in these three areas. This will enable it to meet its objectives of profit maximization and wealth creation for its shareholders as well as meeting the needs of other stakeholders. Companies determine their capital structure by analyzing how readily available funds are, how capable they are to bear risk, and how much cost and benefit are derived from each funding source. Management can proceed once the debt and equity mix has been determined. (Endri, Mustafa & Rynandi,2019). A measure of the DER indicates extensiveness to which the borrowed funds or liabilities and equity support the assets of a business. An entity with a significant proportion of debt will be highly geared. As a result, creditors are at an increased risk of default if the ratio is high. An appropriate mix of equity and debt must be used to structure capital. Financial performance and the long-term survival of a company are inextricably linked to an optimal capital structure.

According to Barbosa & Louri (2005), profitability measures the company's overall financial indicators. ROA indicates the efficient use of company’s assets in generating profit. Higher returns are indication of effective management of assets of the company. Net profit attributable to shareholders is known ROE. It is essential to state that shareholders are interested in higher ROE. The net profit margin (NPM) measures how much profit a company has per unit of corporate turnover. The higher ratio, indicates more profitability to the company. These profitability indicators are of interest to the management, investors and other stakeholders of the company.

Different researchers have produced divergent results in their capital structure empirical analysis globally .The reasons for the divergence might be as a result of sample size, selected firms and statistical analyses adopted. It could also be as a result of variables used as the dependent and independent variables. Debt financing has been shown to positively impact the performance of manufacturing companies in several studies, including Leon (2013), Nirajimi and Priya (2013), Addae, Nyarko and Hughes (2013), Aliu (2010), Simeon-Oke and Afolabi (2011), Akinyomi (2013), Zeitun and Tian, 2007, Akingunola, Olawale and Olaniyan (2018), Mukunmbi, Eugine and Jinghong (2020) and Abdullah and Tursoy (2021). As opposed to this, Onaolapo and Kayode (2010), Lawal, Edwin, Kiyanjui and Adisa (2014), Akeem, Terer, Kiyanjui and Kayode (2014), Abeywardhana (2015), Deepika (2015), and Appah, Okroafor and Bariweni (2016), Uremadu and Onyekachi (2018) have found that debt negatively impacts financial performance of firms. There have been other studies with varying findings regarding the impact of different components of an organization's capital structure and market value, they are Ashraf, Ameen and Shahzadi (2017), Oke, Saheed and Quardri (2018), Akinleye and Akomolafe (2018), Dinh and Pham (2020), Winata, Endri, Yuliantin and Hamid (2020), Edri,

Ridho Marlapa and Susanto (2021), Opoku-Asante and Shcarifzadah (2022), Dsouza, Rabbani, Nawaz, and Demiraj (2022), Kurniashi, Rustam, Heliantono and Endi (2022).

The study needs to be conducted in Nigeria incorporating all the elements of capital structure both in the short term and long term. None of the previous studies incorpoarated these variables in single study. Also, none of the previous studies incorporated ROA, ROE and NPM in a study. The impact of capital structure on each of these variables will be investigated in this study. In addition, none of the previous studies was extended to year 2020 except Kurniashi et al (2022) which was carried out in Indonesia. These gaps in the literature are addressed in this study.

## 2. Literature Review

### 2.1.Conceptual Literature

#### 2.1.1. Capital Structure

In a company, long-term debt is combined with equity in the capital mix, as described by Brealey, Myers, and Marcus (2009), while Abor (2005) considers it as a blend of various and distinct financial securities instruments. Nirajini and Priya (2013) have a broad perspective of the concept; therefore, they included bank loans, debentures, preference share, convertible loan and ordinary shares and reserves, bank overdraft, trade creditor as components of capital. A company's capital structure is influenced by its financial strategy regarding debt financing and equity financing, according to Ross, Westerfield, and Jordan (2001). External and internal capital sources make up an organization's capital structure.

When investors understand the capital structure, they can determine how risk and return are balanced (Sulindawati, Yuniarta, & Purnamawati, 2017). DER ratio measures the amount of debt compared to equity capital financing in a corporate entity. By having a significant proportion of debt, it indicates the greater chance of defaulting. Proportion of total debt in financing the assets (TDTAR) can be calculated. In contrast, SDTAR reveals the proportion of short-term funding in the company's assets. LDTAR reveals how long-term funding supports asset financing, while SDTAR determines how much short-term funding supports asset financing. These elements will have divergent effect on the company’s profitability.

#### 2.1.2. Financial Performance of the Company

Revenues are generated by the efficient use of a company's resources. Decisions made regarding business development, managerial control, and asset acquisition will be guided by the analysis of financial performance. Performance evaluation also reflects a company's monetary achievements over time. Comparing similar firms in the same industry can also be done based on such achievements. Financial ratios and market data can be used to determine shareholders values from time to time through clear financial performance analysis (Zeitun, & Tian, 2007).

Companies can measure their financial performance with relative and absolute metrics of their operational and administrative expenditures and income and revenue. A number of indicators can be used to measure performance. ROE and ROA are commonly cited measures of performance in most studies.

## 3. Theoretical Review

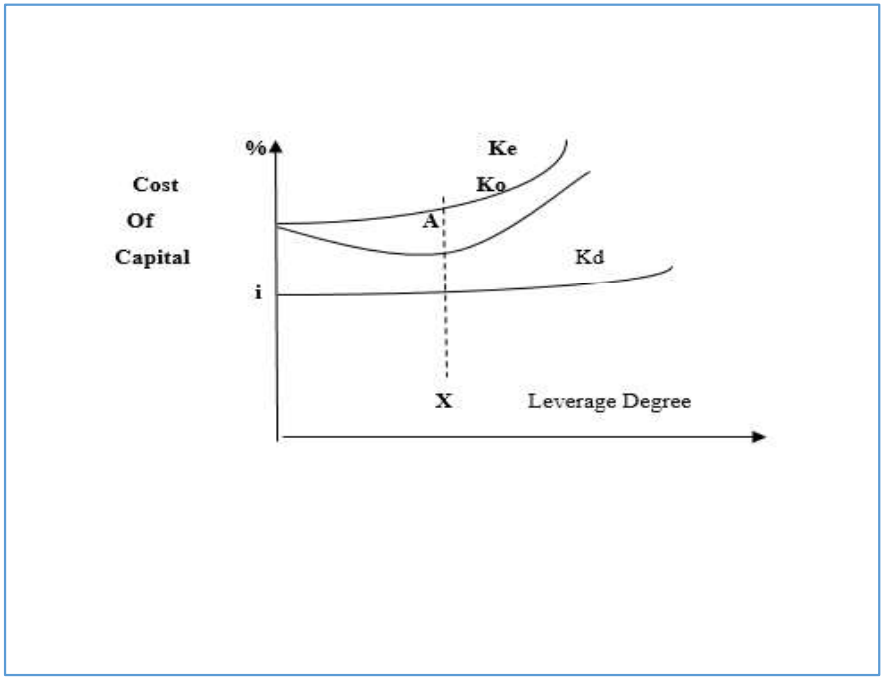
### 3.1.Conceptual Literature

#### 3.1.1. Capital Structure Traditional Theory Approcah

According to the traditional theorists an optimal capital mix is at the point where equity financing's marginal cost and debt financing's marginal cost are the same. Weighted average cost of capital (WACC) has reached the minimum level that maximizes asset market value at this point. However, the theory believed that if the proportion of debt continues to increase, it will get to a stage where it will increase the financial risk which in turn will influence the decision of ordinary shareholders in requesting for higher returns on their investments.

**Figure 1**

***M&M Efficient Market Structure and with Tax Hypothesis***



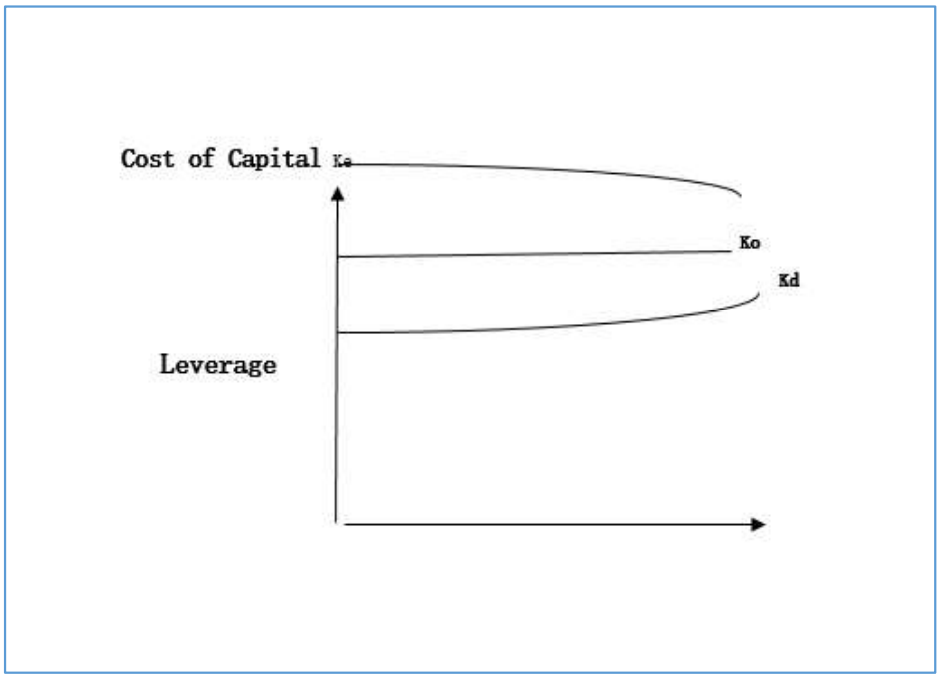

Note. Pike and Neale, 2009, p.498

#### 3.1.2. Modigliani and Miller Efficient Market Structure and with Tax Hypothesis

A market structure that is efficient was proposed in 1958 by Modigliani and Miller with assumptions that there would be no taxes, absence of bankruptcy cost and asymmetric information. These assumptions neutralize the effect of financing options. Therefore, raising capital through debt has no effect on capital structure. In 1963, M&M admitted that tax reduces the cost of a company's debt. Further, the company's market value will be maximized at 100% gearing as the WACC will be reduced as gearing increases.

**Figure 2**

*M&M Theory of Cost of Capital and Leverage*




Note. Moh'd Zira Al-Hadid 2017, p.12

### 3.1.3. Trade off Theory

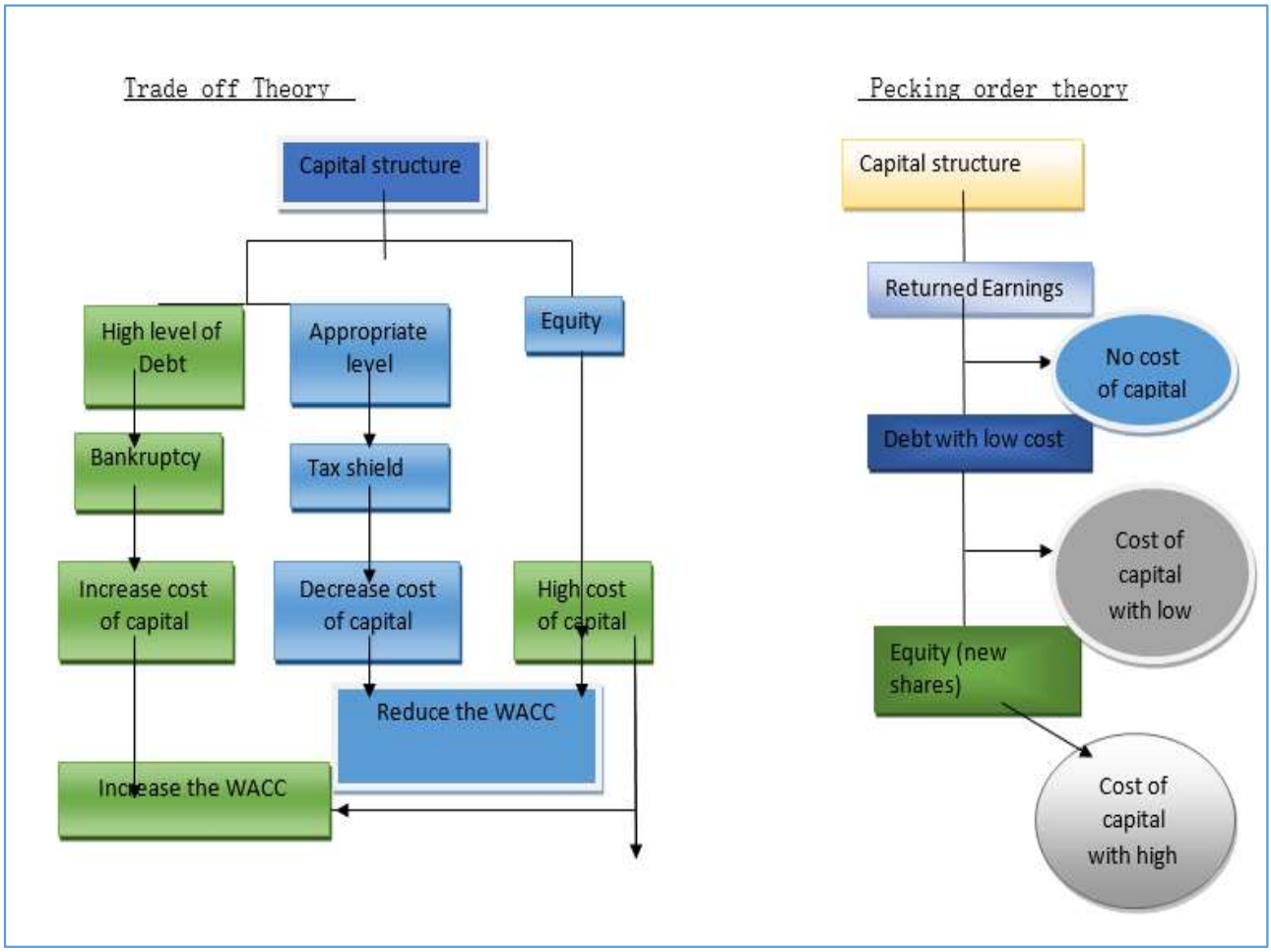
Kraus and Litzerberger developed the trade-off theory which states that an efficient capital mix depends on the benefits that can be derived from a particular source of financing as well as the costs involved . For instance, the debt financing has tax relief benefits while bankruptcy costs should be considered along the line. Considering the cost-benefit analysis of the option, decisions on capital mix will have a strong effect in influencing the company's performance.

### 3.1.4. Pecking Order Theory

Pecking order theory was modified by Myers and Majluf modified in 1984. This theory emphasized that there should be a specific order of sourcing for funds. The theory places emphasis on the cost implications and degree of asymmetric information. Preference is given to internal sources which are reserves and other earning retained. The next best option is debt financing, while financing through equity should be considered as the last option. It is established that where the degree of asymmetric information is higher, the cost of funding will be higher.

**Figure 3**

*Trade-off Theory and Pecking Order Theory*




Note. Moh'd Zira Al-Hadid 2017, p.14

### 3.2. Emprical Literature

Zeitun & Tian (2007) studied the capital structure of one hundred and sixty-seven Jordanian companies (167) over a period of 15 years spanning 1989-2003. Market value was significantly positively impacted by Debt with a short maturity date but ROA and ROE were negatively affected by total debt proportion in total capital. Akinyomi (2013), in the capital mix structure of three manufacturing companies selected at foods and beverages sector of consumer goods on the Nigerian Stock Exchange. Regression analysis, indicates that debt/equity, short-

term financing and long-term financing are significantly positively correlated to financial performance indicators. Food and beverages sector in Nigeria was examined in the study.

A study of 32 Nigerian listed firms and the effects of capital structure on their financial performance were assessed using panel data regression analysis by Appah, Okoroafor and Bariweni (2016). During the study period, the selected companies' annual financial statements were analyzed. Based on regression analysis, STD, LTD and TD all negatively affect the ROA and ROE of the selected companies. In another study by Ashraf, Ammen, and Shahzadi, K (2017), capital structure was examined as a factor of profitability in 18 cement companies. Performance indicators for cement companies were negatively impacted by long-term debt ratios, but ROA and ROE were positively impacted. ROE was significantly affected by the debt equity ratio, but ROA was not. Compared to total assets, short-term assets positively impacted ROA and ROE. It is interesting that this study produced mixed results regarding cement companies' profitability in Pakistan.

Akingunola, Olawale, and Olaniyan (2018). A study conducted on twenty-one Nigerian companies from 2011 to 2015 found a direct and significant effect of short-term debt on the profitability of the companies examined. Similarly, Uremadu and Onyekachi (2018) examined how corporate capital structures impact on the performance indicators of companies in consumer goods in Nigeria. Regression analysis indicates that DER has no significant effect on ROA when compared to LDTA.

Oke, Saheed, and Quadri (2019) examined capital structure mix of six conglomerate firms on the Nigerian Stock Exchange from 2008 to 2017. SDTA significantly influenced ROA for the companies. Accordingly, short-term debt financing is the most effective way for conglomerate companies to finance their assets. Akinleye and Akomolafe (2019) carried out research on the appropriate capital mix for some companies used in their study. The results showed that long-term debt financing had a significant positive effect on the profitability of the selected companies, whereas short-term debt financing had a significant negative impact. Profit after tax was significantly influenced by share capital, with a coefficient, while share premiums had a negligible impact.

Mukumbi, Eugine, and Jinghong (2020). Based on the results, the selected companies' financial performance was positively influenced by their capital structure. This would indicate that the financial performance of firms increased as debt financing increased. According to the study, debt financing should be a greater than equity financing for improvement in financial performance and increase in shareholder wealth. Also, Dinh and Pham (2020) investigated capital mix and its effect on the profitability of thirty (30) pharmaceutical companies listed in Vietnam. The company's annual reports from 2015 to 2019 were analyzed to collect secondary data. ROE was negatively affected by equity financing using least square regression as the estimation model. Conversely, DER, TDTA, and LDTA, all significantly affect ROE. The study supports the trade-off theory of capital mix structure. Pharmaceutical companies are the only ones included in this study. According to Winata, Endri, Yuliantin, and Hamid (2020), capital mix structure affects the value of listed companies on the Indonesia Stock Exchange. DER and TDTA are used to measure capital structure. Therefore, debt to equity negatively affected the value of selected companies.

According to Abdullah and Tursoy (2021) on non-financial German companies that were examined over a 25-year period. Regression showed the significant effect of capital structure mix on the financial performance of the selected companies. Low interest rates and

lower debt costs contributed to this. The trade-off theory therefore matches capital structure. A study conducted by Endri, Ridho, Marlapa, and Susanto (2021) examined forty-two listed mining companies on the Indonesian stock exchange. As independent variables, DER, DAR, LDTE, LDTC, and growth are used to determine the capital structure. ROA and EPS were positively but insignificantly affected by DER, whereas ROE was negatively impacted; ROA and EPS were significantly negatively affected by DAR, but ROE was significantly positively affected by DAR; ROA and EPS were significantly positively affected by LDTC. ROE was significantly negatively affected by LDTC, and EPS was insignificantly positively affected by LDTC. It significantly affected ROE and EPS, but had no significant impact on ROA. In terms of ROA, ROE, and EPS, growth has a significant positive impact.

According to Opoku-Asante, Winful, Sharifzadeh, and Neubert (2022), the capital structure of some Nigerian and Ghanaian companies was associated with their financial performance. Both Ghanaian and Nigerian companies achieve similar results. In this study, only total debt was found to be negatively correlated with financial performance. Debts can result in poor profitability. Using seventy-two (72) telecommmunication companies in the United States from 2012 to 2020, Habibniya, Dsouza, Rabbani; Nawaz and Demiraj (2022) examined the impact of capital structure on profitability using (ROA) and (ROE) measured by total liabilities to total assets (TLsTAs) and total equity to total assets (TETAs). TLsTAs significantly impacted ROA at 1% significance level, TLsTAs had a statistically significant positive effect on ROE. The results are complicated and mixed. In their research, Kurniashi, Rustam, Heliantono and Endri (2022) analyzed the effect of capital mix structure and cost of capital and firm value for the period 2013-2020, using the financial data of selected pulp and paper companies in Indonesia. The study reveals capital mix affects firm value positively.

### 3.2.1. Gaps in the Empirical Literature Review

Most of the earlier studies on capital mix structure analysis commonly used ratios are debt to equity, and debt to assets ratio. This study segreagates capital mix structure into debt/equity ratio, debt asset ratio, short term debt and long-term debt to total assets ratios. Also, none of the previous studies used ROA, ROE and NPM in a study. All these performance indicators will be examined in conjunction with the capital structure in this study. These financial indicators are of vital importance to all stakeholders, but investors and management need them the most. A study conducted in Indonesia, Kurniashi et al (2022), is the only previous study to extend to 2020. Accordingly, this study examines ten Nigerian manufacturing companies that are involved in consumer goods, industrial goods, and health care covering a twelve-year period from 2009 to 2020. These companies were chosen because they manufacture essential goods that are necessary for the well-being and survival of the people. A second reason for selecting them was their availability of financial data throughout the period.

## 4. Methodology

### 4.1. Sampling Technique and Data Collection

In this research work, secondary data were extracted from audited accounts of the selected manufacturing firms. The sample for consumer goods is six (6), Industrial goods two (2), and health care two (2). These companies were purposely selected among the firms listed on the Nigerian Stock Exchange because of their significance in providing or manufacturing

essential goods which are necessary for the well-being and survival of the populace. Availability of their financial data thoroughtout the period under consideration is another reason for their selection.

### 4.2. Theoretical Framework

The theory upon which this study is based is Trade-off theory. It is expected that financing business using debt is expected to reduce the cost of capital because of tax savings which in turns improves business performance. It is also expected that the rate of returns will be greater than the cost of debt, therefore with the use of debt, profitability is expected to increase.

**Model Specification and Measurement**

**Model Specification**

ROA= f (DER, TDTA, SDTA, LDTA) ……. (1)

ROE = f ((DER, TDTA, SDTA, LDTA)) …… (2)

NPM = f ((DER, TDTA, SDTA, LDTA)) …… (3)

In order to estimate the coefficients of independent variables, the panel data regression is expressed in linear form as follows:

$ROA_{it} = \beta_0+\beta_1 DER_{it}+\beta_2 TDTA_{it} + \beta_3 SDTA_{it} + \beta_4 LDTA_{it} + U_{it}$…… (4)

$ROE_{it} = \beta_0+\beta_1 DER_{it} +\beta_2 TDTA_{it} + \beta_3 SDTA_{it} + \beta_4 LDTA_{it} + U_{it}$ …… (5)

$NPM_{it} = \beta_0+\beta_1 DER_{it} +\beta_2 TDTA_{it} + \beta_3 SDTA_{it} + \beta_4 LDTA_{it} + U_{it}$ …… (6)

Where:

i = cross-sectional

t = time series

$\beta_0$ = Intercept or the constant parameter;

$\beta_1$ -- $\beta_4$ = are the shift parameters;

U = Stochastic error term.

ROA, ROE and NPM are dependent variables as proxies for performance measurements. While, DER, TDTAR, SDTD are proxies for capital structure. These variables were selected as financial metrics because they are critical to decision making by various stakeholders: shareholders, managements, creditors, bankers, investors, statutory regulators and others.

#### 4.2.1. 'A-priori' Expectation

The 'a priori' expectation in the models is that debt equity ratio is expected to have a direct impact on the financial performance. İt is equally expected that total debt to total assets, long-term funding and total assets will be potively related to performance. This is based on the assumption that the capital structure is appropriately mix with equity and debt. The effect of short-term duration debt may be positive or negative effect. This depends on the magnitude of the amounted sourced from short-time to finance the assets of the company. Thus it is expressed as : $\beta_1, \beta_2, \beta_4 > 0$

**Table 1**

*Measurement of Variables*

| | | |
|---|---|---|
| ROA | Net Profit after taxes/total assets | Dependent Variable |
| ROE | Net Profit after taxes/ Shareholder Equity | Dependent Variable |
| NPM | Net Profit after taxes/Turnover | Dependent Variable |
| DER | Debt/Equity | Independent Variable |
| TDTA | Total Debt/Total Asset | Independent Variable |
| SDTA | Short-term Debt/Total Asset | Independent Variable |
| LDTA | Long-term Debt/Total Asset | Independent Variable |

Note. Authors Compilation 2021

### 4.2.2. Data Analysis Methods and Estimation Techniques

In the study, cross-sectional and time series data were used in a balanced panel dataset. The estimation models are pooled ordinary least squares (OLS), fixed effect models, and random effect models. Hausman specification tests will be conducted to determine the appropriate model for the estimation of coefficients. It may be appropriate to use an OLS model when there are no unique characteristics among companies. In cross-sectional analyses, fixed effect models are used when the unique features of companies do not change over time. An analysis of cross-sectional companies with systematic random effects will be conducted using random effect models if the companies' unique, time-constant features are uncorrelated with their independent variables.

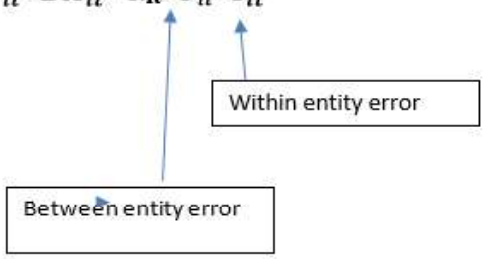
#### 4.2.2.1. Fixed Effect Panel Data

The equation for the fixed effects model becomes:

$$Yit = \beta 1Xit + \alpha i + uit \qquad [eq.1]$$

#### 4.2.2.2. Random Effect Panel Data Regression

$$Y_{it}=BX_{it}+\alpha_{it}+u_{it}+\varepsilon_{it} \quad \text{[eq.2]}$$




## 5. Presentation and Discussion of Results

### 5.1. Presentation

#### 5.1.1. Descriptive Statistics

Table 1 below presents the descriptive statistics. The average ROA is 0.0865191 equivalent to 9%, while the mean of ROE is 0.2149472 representing 21%. The figure of 0.3768599 for NPM represents 38% gross profit margin on the average. The DER is 1.45:1. The average TDTAR is 0.53:1. SDTAR is 0.2022715:1, LDTAR debt is 0.3329034:1. The maximum ROA is 0.2795998, while 1.338432, 29.82333, 7.403083, 0.880996, 0.674413 and 0.7382042 are for ROE, NPM, DER, TDTAR, SDTAR and LDTAR, respectively.

**Table 2**

*Descriptive Statistics*

| Variable | Obs | Mean | Std.Dev. | Min | Max |
|---|---|---|---|---|---|
| ROA | 120 | 0.0865191 | 0.0958604 | -0.1804474 | 0.2795998 |
| ROE | 120 | 0.2149472 | 0.2705338 | -0.5109267 | 1.338432 |
| NPM | 120 | 0.3768599 | 2.717123 | -0.268242 | 29.82233 |
| DER | 120 | 1.45251 | 1.118644 | 0.2420378 | 7.403083 |
| TDTAR | 120 | 0.535155 | 0.146077 | 0.1948715 | 0.880996 |
| SDTAR | 120 | 0.2022715 | 0.1244715 | 0.0378208 | 0.674413 |
| LDTAR | 120 | 0.3329034 | 0.1569491 | 0.0173689 | 0.7382042 |

Note. Authors Compilation 2021

#### 5.1.2. Correlation Analysis

Table 2 below presents the correlation analysis. There exists a strong positive relationship of 0.842446 between ROA and ROE. Also, there is a very weak positive relationship of 0.023507 between ROA and NPM. Also, there are weak positive correlations of -0.052086, 0.009956, 0.043833, and a very weak negative correlation between ROA and DER, TDTAR and SDTAR, and LDTAR, respectively. On the relationship among ROE and other

variables, there are moderate positive relationships of 0.413655, 0.301922, between ROE and DER, TDTAR, respectively. There is a weak direct positive relationship of 0.27149 and 0.065669 between ROE, SDTAR, and LDTAR respectively. Weak negative relationships was established between NPM and the DER, TDTAR and LDTAR, whereas a weak positive relationship was discovered between NPM and SDTAR.

**Table 3**

*Correlation Matrix*

| | *ROA* | *ROE* | *NPM* | *DER* | *TDTAR* | *SDTAR* | *LDTAR* |
|---|---|---|---|---|---|---|---|
| ROA | 1 | | | | | | |
| ROE | 0.842446 | 1 | | | | | |
| NPM | 0.023507 | -0.00648 | 1 | | | | |
| DER | 0.052086 | 0.413655 | -0.09076 | 1 | | | |
| TDTAR | 0.009956 | 0.301922 | -0.17064 | 0.860829 | 1 | | |
| SDTAR | 0.043833 | 0.27149 | 0.043831 | 0.325272 | 0.335243 | 1 | |
| LDTAR | -0.0256 | 0.065669 | -0.19359 | 0.543193 | 0.664745 | -0.48099 | 1 |

Note. Authors Compilation 2021

### 5.1.2. Regression Panel Data Analysis

**MODEL 2 - ROA: f (DER, TDTAR, SDTAR, LDTAR)**

Table 4 below presents the random effect model of the panel data. It shows a negative coefficient of -0.005411 for DER. The implication is that every N1 increase in DER leads to a fall in ROA by -0.005411k in ROA. The probability value of 0.657 confirmed the statistical insignificance of the coefficient. There is a positive coefficient of 11.0294 for TDTAR. However, there are negative coefficients of -11.13071 and -11.00871 for SDTAR and LDTAR, respectively. The probability values indicate that capital structure mix had no significant effect on ROA.

**MODEL 2 - ROE: f (DER, TDTAR, SDTAR, LDTAR)**

In the table 4 below the Random effect model 2 indicating a positive coefficient of .0925067 for DER. The probability value of 0.007 confirmed the statistical significance of the coefficient. In the same direction, there is a positive co-efficient of 12.4309 for TDTAR with ROE. However, there are negative coefficients of -12.64258 and -12.71858 for SDTAR and LDTAR with ROE, respectively. Apart from the DER, all other coefficients are statistically insignificant.

**MODEL 3 - NPM: f (DER, TDTAR, SDTAR, LDTAR)**

In the table 4 below the Random effect model indicating a positive coefficient of .497372 for DER with NPM. The probability value of 0.253 confirmed the statistical insignificance of the coefficient. In the same direction, there is a positive insignificant co-efficient of 252.3028 of TDTAR with NPM. However, coefficients of -257.2123 and -259.4546 of SDTAR and LDTAR, respectively, confirmed inverse relationship of SDTAR and LDTAR with the NPM. The negative relationships are not statistically significant with the probability value of 0.773 and 0.711, respectively.

**Table 4**

*Panel Data Regression Results*

| | | | |
|---|---|---|---|
| **CONST.** | **ROA** | **ROE** | **NPM** |
| Coefficient | .1081993 | .2194094 | 3.033242 |
| Prob. | 0.012 | 0.060 | 0.022 |
| **DER** | | | |
| Coefficient | -0.005411 | 0.0925067 | 0.497372 |
| Prob. | 0.657 | 0.007** | 0.253 |
| **TDTAR** | | | |
| Coefficient | 11.0294 | 12.4309 | 252.3028 |
| Prob. | 0.632 | 0.849 | 0.777 |
| **SDTAR** | | | |
| Coefficient | -11.13071 | -12.6058 | -257.2123 |
| Prob. | 0.629 | 0.847 | 0.773 |
| **LDTAR** | | | |
| Coefficient | -11.00871 | -12.71859 | -259.4546 |
| Prob. | 0.633 | 0.846 | 0.771 |
| **No of Observation** | 120 | 120 | 120 |
| **No of Groups** | 10 | 10 | 10 |
| **R-Square** | 0.4063 | 0.4596 | 0.4286 |
| **Wald Test** | 5.84 | 12.50 | 6.28 |
| **P-square** | 0.2115 | 0.0140** | 0.1790 |
| **Hausman Test** | 2.93 | 5.01 | 1.90 |
| Chi-square p-value | 0.5688 | 0.2863 | 0.7534 |
| Estimation Model | Random effect | Random effect | Random effect |

Note. Authors Compilation 2021.

Sig at 5% level, ** ROA, ROE, NPM, DER, TDTAR, SDTAR, LDTAR

## 6. Discussion of Results

As indicated in the descriptive statistics, the average ratio is above the ideal ratio. It means that the firms were over-leveraged or high-geared. The implication here is that the companies are exposed to more risks which will necessitate an increase in demand for higher returns by the providers of funds. The companies are obliged to pay the interest on borrowed fund whether the business is profitable or not. Companies are burdened by the increase in interest rates. In addition to the average, over half of the assets were financed by total debt. A business' debt-to-assets ratio shows how much debt supports its assets. Present or future creditors are more at risk when the ratio is higher. About 20 percent of the assets value were financed on a short-term basis. Based on the companies' total assets, this reflects their short-term financing strategy. One-third of LDTAR is financed by long-term funds, which translates to 33 percent of total assets. A conservative financing strategy was adopted by these companies.

### 6.1. The Effect of Capital Structure on Return on Assets (ROA)

#### 6.1.1.The Effect of DER on ROA

A statistically insignificant negative effect of DER was observed on ROA in the study. According to traditional theory of capital structure, if the leverage (gearing) level should increase beyond a reasonable level, it could worsen the effect of DER on ROA. The present study is in line with th theory of traditional capital structure in which debt financing increases capital costs and financial risk. Consequently, the company's financial performance suffers. The study aligns with Lawal, Edwin and Adisa (2014) and Akeem, kiyanjui and Kayode (2014) and Deepika, (2015) that total debt/total equity ratios had adverse effects on firms' profitability. This result, however disagree with the result of Edri *et al* (2021) who found a positive insignificant effect of DER on ROA.

#### 6.1.2. The Effect of TDTAR, SDTAR and LDTR on ROA

A positive but insignificant relationship was established between ROA and TDTAR. This outcome agrees with Akinyomi (2013). However, there are likelihood of two options, if the long-term funding is properly structured, the financial performance will be significantly improved, otherwise it will get to a level whereby the profitability will be eroded because of the high risk associated with debt financing. Traditional capital structure theory is based on this argument. However, there was a negative insignificant effect of SDTAR, LDTR, on ROA. These results are in agreement with the outcome of the study by Uremadu and Onyekachi (2018). If the trends continue, significant adverse consequence of capital mix on ROA is eminent. It is therefore advised for companies to carefully manage the debt proportion in asset financing.

### 6.2. The Effect of Capital Structure on Return on Equity (ROE)

#### 6.2.1. The Effect of DER on ROE

The study found a direct correlation between DER and ROE. Thus, increasing debt equity ratios leads to increasing ROE. An effect of positive significance is statistically significant. Therefore, debt is better for financing capital than equity, according to the Pecking order theory. Debt financing is argued to be less expensive than equity financing. According to the study, debt financing reduces costs through its tax yield effect. It is possible that this is why DER increases ROE in a positive way. This study agrees with those of Leon (2013) and Nirajini and Priya (2013), and Akinyomi, (2016). Opoku-Asate, (2022) also found a positive effect of capital structure on ROE. This result contracdicts that of Edri et al (2021) who found a negative significant impact of DER on ROE.

#### 6.2.2. The Effect of TDTAR, SDTAR and LDTR on ROE

There is a positive effect of TDTAR on ROE. Although, the effect is not significant. However, if there is appropriate long-term financing structure, the shareholders will benefit by improving their return. This study is in consonance with Dinh and Pham (2020), Abdullah and Tursoy (2021) who found positive impact of capital structure on ROE, however, their results are significant statistically which is against this study that established a positive but insignificant effect of long-term debt to assets on ROE. Thus, equity holders will benefit from this financing arrangement. This study is in agreement with Opoku-Asate, (2022). However, there are negative insignificant relationships among ROE, SDTAR, and LDTAR.

### 6.3. The Effect of Capital Structure on Net Profit Margin (NPM)

#### 6.3.1. The Effect of DER and NPM

On the effect of DER on net profit margin (NPM), a positive but insignificant statistical relationship was established. In the same direction, a direct positive relationship was also established between NPM and TDTAR. This study agrees with Akinleye and Akomolafe (2019) that established a direct and significant effect of long-term debt on profit adter tax. The outcomes are in consonance with the traditional theory theory. However, SDTAR and LDTAR, had negative but insignificant effect on NPM.

## 7. Conclusion and Recommendations

### 7.1. Conclusion

We investigated the financial performance of selected Nigerian manufacturing firms based on their capital structure. After analyzing and discussing capital structure, we can conclude that debt equity ratios (DER) have a marginal adverse effect on return on assets (ROA) of the selected firms. On the other hand, debt equity ratio (DER) has a positive significant effect on return on equity (ROE) and a positive but insignificant effect on net profit margin (NPM). All financial performance indicators are positively affected by total debt to total assets, but the effect is insignificant. An adverse insignificant effect was also found on all dependent variables for SDTA and LDTA. According to the study, none of the selected companies had an appropriate capital structure mix. Financial performance was not affected significantly by any of the elements of capital structure, except for debt-equity ratio, which had a significant positive effect on ROE. The appropriate optimal capital mix is possible with the lowest weighted average cost of capital. Thus, manufacturing companies must understand how capital structure theories apply to their business. The outcomes of this study are contrary to *a priori* expectation, except for the effect of DER on ROE.

A proper capital mix can enhance optimal performance in companies, according to the empirical findings of this study and failure in managerial ability will increase the financial risk and gearing level of the companies. This study will guide various stakeholders in the manufacturing companies in making appropriate financing and investment decisions.

### 7.2. Recommendations

The following policy recommendations are derived from the study's empirical findings, firstly, the companies must strive to maintain good and appropriate capital mix so as to ensure that capital structure elements have significant positive effect on ROA of the selected companies. Secondly, there is a need for companies to strive further to ensure that total debt to total assets, long term to total asset and short-term to total assets have positive and significant effect on financial performance. Thirdly, it is important that the selected companies achieve significant positive relationship between net profit margin and capital structure. This is of ultmost importance since profitability is a strong motivation and rationale for being in business. Generally, this study recommends that the companies selected for this study must always be guided appropriately in their capital structure decisions so as to optimize their financial performance of their companies.

## 8. Suggestion for Further Studies

The study was limited to a sample of ten (10) manufacturing firms purposively selected by the researchers. Although, these companies had major trading activities on the floor of Nigerian Exchange. However, the sample size can be increased to fifty firms from different sectors. This will form a good representation of the manufacturing firms in Nigeria. Moreover, the agriculture sector was not considered in this study despite its significant contribution to Nigeria's Gross Domestic Product. This study also did not consider unlisted on the Nigerian Exchange. Further researches in areas not addressed by this study are recommended by the authors in the future studies.

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