Capital Structure and Financial Performance of Quoted Manufacturing Companies in Nigeria

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Abstract
The study focused on capital structure and financial performance of quoted manufacturing companies in Nigeria. It employed ex-post facto research design and extracted data from annual reports of a cross section of manufacturing companies from 2016 to 2025. It employed capital structure variables such as total debt to total asset, total debt to total equity, short term debt to total asset and long-term debt to total assets while return on asset was adopted for financial performance. The study carried out unit root test to ascertain the stationarity of variables and all the variables were stationary. Panel data regression analysis was adopted to estimate the variables. The results substantiates that total debt to total asset ratio has both negative and insignificant impact on return on asset of quoted firms in Nigeria while total debt to total equity ratio, short -term debt to total assets ratio and long-term debt to total assets ratio have positive but insignificant impact on return on asset of quoted firms in Nigeria. Based on these findings, the study recommends that The Management of Nigerian quoted manufacturing firms should be concerned about the level of their total debt to total equity, for better financial performance. This is because the findings of this study revealed a positive and significant relationship between total debt to total equity and return on asset. Also, stakeholders of quoted Manufacturing firms in Nigeria should increase the level of total debt to total assets and long-term debt of any firm in order to improve financial performance.

Keywords: *Total debt to total asset ratios, total debt to total equity ratios, short-term debt to total assets ratio, long-term debt to total assets ratio, financial performance.*

1.0 Introduction

Over the decades, the determination of capital structure of a firm and its impacts on shareholders' value creation has attracted researchers' attention in the literature of finance. It has always been a topic of debate as different researchers have different views and theories concerning the determination of an optimum capital structure to minimize a company's cost of capital and maximize its value (Serwadda, 2019). Making financing decision is one of the major challenges entities in Nigeria encounter. An optimal capital structure is usually the one that reduces the cost of a company's funds while maximizing the capital gains attributed to the shareholders (Hasan, *et al*., 2020). Thus, firm managers take it as a priority to adopt a healthy financing mix in order to maximize performance (Ogebe, Ogebe & Alewi, 2013).

According to Bariweni, 2019, capital may be referred to as the means of funding a business. This capital can be derived from two main sources. These sources are internal and external sources. The internal source refers to the funds generated from within an enterprise which is mostly the retained earnings. Firms may in the same vein look outside to source for their needed funds to enhance their activities Any fund sourced outside the operation of the organizationis called external financing. The external funding may be obtained by increasing the number of co-owners of a business or outright borrowing in form of loan, be it short- or long-term loan and or both. (Eniola, Adewunmi & Akinselure, 2017). In 1963 M&M included also the effect of taxes in their work. M&M argue that the ratio of corporate tax is equal to the current value of savings from taxes. Therefore, the firm can decrease its weighted average cost of capital (WAAC) by increasing the debt percentage in the capital structure, since such companies pay less tax, due to the tax shield phenomenon (Brigham & Ehrhardt, 2010).When tax is included, firms can benefit from the increment of the debt percentage in the structure of capital due to the tax shield, as a result, the weighted average cost of capital (WAAC) will decrease, whereas the firm's value will increase (Pan, 2012).This requires the firm to make a trade- off between the cost of debt and the benefits of using debt. Capital structure has long been an important issue from the strategic management standpoint since it is linked with a firm's ability to meet the demands of various stakeholders (Roy and Minfang, 2017). Debt and equity are the two major classes of liabilities, with debt holders and equity holders representing the two types of investors in the firm. Each of these is associated with different levels of risk, benefits, and control. Debt holders exert lower control, they earn a fixed rate of return and are protected by contractual obligations with respect to their investment. While, equity holders are the residual claimants, they bear most of the risk and have greater control over decisions (Aransiola & Oluwadetan, 2015)

Consequently, firms with the right capital structure should be able to improve on their market share, finance its operations, grow in the long run and improve on its value added and profits. Evidently, firms going through financial distress always have issues with its operational functions, high labor turnover and organization dysfunction. This is because financial distress shifts from wealth creation to funding debt instruments (Maina & Ismail, 2014)

Given the importance of financing decisions and the implications on the performance of the firm, there has been a plethora of empirical research assessing the effect of capital structure on the overall performance of firms. Emerging countries have attracted attention of many scholars, mainly due to growth and investment opportunities present in those countries. China has dominated this literature; researchers trying to understand what have been happening in Chinese firms, and why they are so competitive. Chen *et al* (2016) examines the determinants of capital structure of Chinese-listed companies, and finds evidence of a negative relationship between firm's profitability and its level of debt. Similarly, Huang and Ritter (2009) in a different sample finds that profitability is significantly and negatively related to leverage. He concludes that though China is still in the transition from planned economy to market economy, the factors determining leverage are not different from other countries. Analysing data of Iranian firms, Pouraghajan (2012) investigates the relationship between capital structure and financial performance; returns on assets (ROA) and returns on equity (ROE) were used as proxies of financial performance while debt ratio and other measures are included to account for capital structure. The author finds evidence that firms can improve their performance by reducing the debt ratio. The impact and the extent of relationship between capital structure and financial performance of firms have attracted the attention of various researchers, which have also revealed conflicting findings. For instance, in Nigeria, most of the studies did not consider

appropriate proxies on capital structure and financial performance. Some of these studies which include Bello and Onyesom (2005), Salawu (2007), Babalola (2012), Yinusa and Babalola (2012), Sebastian and Rapuluchukwu (2012), Idode, Adeleke, Ogunlowo and Ashogbon (2014), have created a vacuum that need to be filled. For example, Salawu (2007), in his study of the effect of capital structure on financial performance of selected listed firms in Nigeria between 1990 and 2004 focused on short term debt. The study did not include other forms of financing, thus the finding could only be used in the context of debt financing not debt and equity financing. Also, even within the scope of debt financing, only the short term aspect of the debt was covered in the study. In actuality, a study on capital structure is supposed to cover both types of financing.

The main objective of this study is to examine the impact of capital structure on financial performance of quoted manufacturing companies in Nigeria. The specific objectives of the study are:

(i) To determine the extent to which total debt to total asset ratios affect financial performance of quoted manufacturing companies in Nigeria

(ii) To evaluate the effect of total debt to total equity ratio on financial performance of quoted manufacturing companies in Nigeria;

(iii) To assess the impact of short-term debt to total assets ratio on financial performance of quoted manufacturing companies in Nigeria; and

(iv) To examine the influence of long-term debt to total assets ratio on the financial performance of quoted manufacturing companies in Nigeria.

2.0 Review of Related Literature

Concept of Capital Structure

The ratio of various sources of funds used in a business is conceptualized as capital structure.

Capital structure plays an important role in the firm's survival and growth, particularly on the financial performance towards achievement of goals and long-term objectives. (Martis 2013).

Capital refers to the total amount of funds supplied by both owners andcreditors. The question arises: what should be the appropriate proportion between equity capital and debt capital? The answer to this question centers on the financial policy of individual firms. In one company, debt capital may be nil or zero while in another company, such debt capital may even be greater than the equity capital. The index between the two is usually expressed in terms of a ratio, which denotes the capital structure of a company (Olusola, et al., 2020).

According to Okeke, (2019), capital structure refers to the combination of internal and external sources of capital to fund firm's operations. Such sources include equity share capital, retained earnings, preference share capital, loans, debentures, and other sources of finance.

Capital structure determinant serves as a strong pillar that gives a competitive edge to an organization (Kumar, 2017). Getahum (2016) defined capital structure as the mix of different sources of capital such as equity shares, preference shares, debentures, long-term loans and retained earnings. The firm needs to make investments in order to at least remain in business. To finance these investments, the firms can use internal finance sources such as retained earnings and issuing of shares to the public or use external finance sources such as loans or bonds. The term ''capital structure'' refers to the relationship between the various long-term and short=term sources of financing such as equity capital, preference share capital and debt capital.

According to Bassey *et al.,* (2011), capital structure comprises of the optimal mix of debt and equity. A firm's capital structure decision includes its choice of a target capital structure, the

average maturity of its debt, and the specific types of financing it decides to use at any particular time. As with operating decisions, managers should make capital structure decisions that are designed to maximize the firm's value. From the last definitions, the capital structure can be defined as the mixing of financial sources to finance the firms' operations. Financial sources can include the debt and equity that can be used by the firms. Raluca (2014) categorises capital structure into four main parts: capital and retained profits, family loans, debt, and equity. Alternatively, Getahun (2014) suggests five types of source of finance, namely owner equity, related person debt, trade credit, bank loan, and other debt or equity such as credit cards, venture capital, and government loans. On the other hand, Hoa and Zainab (2018) categorise it into three types. These include private investment (eg, personal monies, funds from friends and families), public investment (eg, funds from issue of shares) and government loans.Theoretical literature has documented a number of definitions of the term "capital structure". Like most other terms in finance, no consensus exists on any of the definitions. According to Afred (2007), a firm's capital structure refers to the combination of its financial liabilities and its equities. It is the way a corporation finances its assets through combination of equity and debt. In accordance with this, Abdul (2010), Saad (2010), Shehu (2011), Magara (2012) and Isaac (2014) referred to it as a mix of different types of securities (long-term debt, common stock) which are issued by a firm to finance its assets. Semiu and Collins (2011) also referred to it as the proportions of capital at work in a business by type, namely, equity capital and debt capital, each of which having its own benefits and deficiencies. From the foregoing, capital structure is simply a relative proportion of various sources of funds used by a firm in its operations and in financing ofits assets. It comprises of a firm's retained earnings, debt financing (borrowing) and equity financing (equity shares). Modigliani and Miller (1958) theorem is the widely recognizedcapital structure theory in the literature of finance.It is the foundation of capital structure theory which has been cited by many researchers. It is identified as a sort of structure with which firms receive direction and orientation concerning their business operations. It is also the heart of both a market economy and a democratic society. It is said to be the financing performance of a firm (Suleiman, 2013). In addition, capital structure represents a decision-making process of business firms with the aim of maximizing return on investment, as well as boosting the efficiency of financing and dividend decisions (Chandrasekharan, 2012). Financing decisions generally facilitate the survival and growth of a business enterprise. It calls for the need to channel efforts of business towards realizing efficient decision that will protect the shareholders interest. Capital structure decision is thus, considered as one of the effective tools of management used in managing the cost of capital. It is a substantial part of wise corporate stewardship and managers efforts to find the appropriate capital structure that will yield results in terms of risks and return pay-off for shareholders.

Concept of Financial Performance

The measure of how well a firm can use assets from its primary mode of business to generate revenues is referred to as financial performance. The term is also used as a general measure of a firm's overall financial strength over a given period. The financial performance analyzes how effective and efficient a company generates revenues and manages its assets, liabilities, and the financial interests of those who have staked interest in the companies. (Olusola, et al, 2020).
Financial performance measures a firm's ability to generate profits through the use of its assets.
There are several measures adopted by a firm in measuring its financial performance and arising from this; there is no consensus as to which measure or variable should be applied to proxy

performance of a firm. Thus, different financial ratios have been applied in measuring performance and which have been used by different authors in examining capital structure and profitability, these measures include; Return On Equity, Return On Income, and Return On Income, Return On Capital Employed, etc. Financial Performance measure is usuallyfocused on profitability and other financial health of the firm (Owolabi & Obida, 2012).

According to Rahul (2017) a company's performance is its ability to achieve its target objectives from its available resources. For a firm to make a profit, it must be able to generate revenue more than the direct and indirect costs incurred in generating the revenue. The wealth maximization of shareholders is the ability of a company to witness growth and stable dividend payment or capital gain arising from appreciation in the worth of the firm's market shares. The shareholder's wealth is very important as it determines the investment decisions of the shareholders and as such proper attention should be paid to it by management (Ong and Teh, 2011).Financial performance of a firm can increase the income of its staff, rendering quality product or services to its customers and creating more goodwill in the environment it operates. A company that has good performance can generate more returns which can lead to future opportunities that can in turn create employment and increase the wealth of people. The accounting-based performance measures that are most commonly used include: Return On Investment (ROI), Return On Equity (ROE), Return On Asset (ROA) as was found in the studies of Abdul (2016), Babalola (2014), Shehu (2011).

Capital structure and Firms' Performance

Several studies have emphasized the impact of capital structure on performance of the firm. Firms that wish to maintain appropriate capital structure tend to minimize financing costs and maximise firm performance (Boodhoo, 2009). Alternatively, firms may underestimate the costs of bankruptcy that indirectly increase the level of debt. Higher levels of debt may result in lower performance. Ebaid (2018) in his scholarly works argued that, financial leverage had a positive effect on the firm's return on equity provided that earnings' power of the firm's assets exceeds the average interest cost of debt to the firm. Gambo, Ahmed and Musa (2016) also found significantly positive relationship between debt ratio and measures of profitability. However, some studies have shown that debt has a negative effect on firm profitability. Fama and French (1998), for instance argue that the use of excessive debt creates agency problems among shareholders and creditors and that could result in negative relationship between leverage and profitability. In addition, theoretically, there is inconclusive evidence on the association between debt level and firm performance. Modigliani and Miller (1958) expect no association between the debt level and performance. Modigliani and Miller (1963) and trade-off theory predict positive association between the variables. In contrast, agency theory expects a negative association between debt level and firm's performance. Despite inconclusive evidence on the issue, this current study assumes that the right capital structure choice may lead to good performance of the firm.

Theoretical Framework

Trade- off Theory

The trade-off theory states that the cost of debt is always cheaper than the cost of equity because tax can be deducted from the interest on debt. Theory of trade-off holds that firms only borrow to an extent where tax shield on debt financing immediately offset total cost that is usually associated with debt financing. (Thabit & Jasim, 2019).

This is one of the basic theories that have dominated the capital structure theory which recommends that optimal level of debt is where the marginal cost of debt is equal to its marginal benefits. The results of MM (1958), depend on the assumption that there are no bankruptcy costs. However, bankruptcy can be quite costly. Firms in bankruptcy have very high legal and accounting expenses, and they also hardly retain, customers and employees. Brigham (2011) Bankruptcy related problems are most likely to occur when a firm has a larger portion of debt in its capital structure. As a result, bankruptcy costs discourage firms from pushing their use of debt to excessive levels. According to the trade-off theory, the optimal capital structure does exist. The firm's optimal capital structure will be the trade-off among the effect of corporate and personal taxes, bankruptcy costs and agency costs. The primary motive of a firm is to substitute debt for equity, vice versa in order to arrive at optimal debt ratio and maximize firm's value.Thus, trade-off theory can be simply put as balancing the different benefits and costs associated with debt financing in order to have optimal capital structure.

Tax shield is also essential point of the theory. Firms can deduct interest payment of debt from tax, as a result net income of the firms will enhance. In order to maximize tax shield, firms may choose higher debt levels. According to Niu(2008), the trade-off theory predicts that firm profitability increased if the benefits of the tax shield offered by debt are maximized.

Irrelevance Theory

This is a theory of corporate capital structure which posits that financial leverage does not affect the value of a company, if income tax and distress costs are not present in the business environment. The irrelevance proposition theorem was developed by Merton Miller and Franco Modigliani in 1958.In developing their theory, Miller and Modigliani first assumed that firms have two primary ways of obtaining funding: equity and debt. While each type of funding has its own benefits and drawbacks, the ultimate outcome is a firm dividing up its cashflows to investors, regardless of the funding source chosen. If all investors have access to the same financial markets, then investors can buy into or sell out of a firm's cashflows at any point. This means that in the absence of taxes, bankruptcy costs, agency costs and asymmetric information, and in an efficient market, the value of a firm is unaffected by how that firm is financial.

The theory is often criticized; the criticisms focus on the lack of realism in removing the effects of income tax and distress costs from a firm's capital structure. Because many factors influence a firm's value, including profits, assets and market opportunities, thus, testing the theorem becomes difficult. According to this theory, the valuation of the company will remain the same regardless of its capital structure. The role of interest rates, taxes, and external factors that could significantly affect its operational expenses and valuation in the firm's book of account is totally eliminated.

Empirical Literature

Arikekpar (2020), on the impact of capital structure on firm performance of some selected manufacturing companies in Nigeria. The study employed the annual financial statements of five manufacturing companies listed on the Nigerian stock exchange ranging from 2014-2018. It used fixed effect regression model to test the significant impact of capital structure on firm's performance, Hence, return on asset (ROA), return on equity (ROE) and earnings per share EPS were used as proxies for firms' performance while equity ratio and debt ratio as indicators for capital structure.The findings revealedthat capital structure has positive significant effect on financial performance of selected firms in Nigeria. The study recommends that the

manufacturing companies should implement policies that will encourage increase in their profit after tax, dividends and turnover as these variables can lead to a positive significant change in the company's performance as well as the market capitalization value.

Pham (2020), examined the effect of capital structure on the financial performance of pharmaceutical enterprises listed on Vietnam's stock market. The study collected 30 pharmaceutical enterprises listed on Vietnam's stock market from the period 2015 through 2019. The least square regression (OLS) was used to test the effect of capital structure on the firms' financial performance. The results showed that the financial leverage ratio (LR), long-term asset ratio (LAR) and debt-to-assets ratio (DR) have positive relationship with firm performance. Ajayi and Obisesan (2020) studied the impact of capital structure and financial performance of listed manufacturing firms in Nigeria, using fixed effect regression estimation model to analyze the data.A significant negative relationship was established between performance which was proxied by return on investment and leverage of the firms over a period of five years.Binh and Tram (2020), studied the relationship between capital structure and performance of the firm. There were 50 papers with 340 studies chosen from 2004 to 2019, of which data range from 1998 to 2017. Descriptive and quantitative analysis were conducted and the results confirmed that corporate performance is negatively related to capital decisions, which inclines toward trade-off model with agency costs and pecking order theory.

Adeoye and Olojede (2019) examined the impact of capital structure on the financial performance of listed deposit money banks in Nigeria. In the study, they used a cross sectional time series secondary data covering the period of seven years (2012-2018). This data was extracted from the audited financial statement of ten (10) banks listed on the floor of stock exchange in Nigeria. The descriptive statistics, Pearson moment correlation and multiple linear regressions were used. The correlation results showed that capital structure is negatively correlated with financial performance (ROA and ROE). Result from panel regression revealed that debt to equity though significant, impacted negatively on return on assets and return on equity, while asset tangibility impacted significantly on return on asset but insignificantly impacted on return on shareholder's funds. Also, Age have a significant impact on return on asset and insignificant effect on return on equity. In another study by Serwadda (2019) which focused on the effects of capital structure on banks' performance in Ugandan for a periodof ten years, 2006 – 2015. Panel regression models were used to determine the effects of capital structure on bank performance. The results indicated that there is a positive relationship between capital structure variables such as long-term debts, total debts with net interest margin and bank performance. The results also found a positive relationship between total debt and return on assets. The same results showed a positive relationship between total debt and returns on equity. Notwithstanding, there is a negative relationship between short term debt and return on assets.

Nguyen and Nguyen (2020), investigated the effect of capital structure on non-financial listed companies in Vietnam. The study used the panel data of research sample includes 488 non-financial listed companies on the Vietnam stock market for a period of six years, from 2013 to 2018. The result showed that the effect is stronger in state-owned enterprises than non-state enterprises in Vietnam.

Putu (2020), examined the role of profitability in mediating the effect of capital structure and liquidity on firm value in food and beverage sub-sector in Indonesian stock exchange during the period, 2013-2016. The sample was conducted using purposive sampling method and then the number of samples is 12 companies. The research data was secondary data obtained from the website of the Indonesia Stock Exchange and the Indonesia Capital Market Directory. Data analysis was by path analysis technique with IBM SPSS Statistic Version 22. The results of the

study indicated that: (1) the capital structure had negative and insignificant impact on profitability, (2) the liquidity had negative and significant impact on profitability. (3) the capital structure had negative significant impact on firm value. (4) the liquidity had a negative not significant impact on firm value. (5) the profitability had a positive and significant impact on firm value. (6) profitability is able to mediate the effect of capital structure on firm value significantly. (7) Profitability is able to mediate the effect of liquidity on firm value significantly.
Hossain, Khan and Khalid (2019), carried out an empirical analysis of capital structure and firms financial performance in a developing country. The study was conductedusing panel data procedure for a sample of Dhaka stock market, enlisted all IT firms during the year of 2013-2017. This study employed the three financial performance measures which include return on equity, return on asset, and earnings per share as dependent variables, while capital structure which include debt ratio (DR), equity ratio (ER), long-term debt ratio (LTDR), and short-term debt ratio (STDR) were used as independent variables. The studied revealed that capital structure has positively significant impact on return on asset (ROA).
Rahman et al (2020) examined the impact of financial leverage on profitability of listed textile firms in Bangladesh. Analysis was carried out using pooled ordinary least square. The results found that there is a significant negative relationship between leverage and firm's profitability.
Another study by Ajibola, Wisdom and Qudus (2018), on capital structure and financial performance of listed manufacturing firms in Nigeria between the periods of 2005-2014, using panel methodology for the analyses of the data. The study discovered that there is a positive statistically significant relationship between long-term debt ratio, total debt ratio, and return on equity while LTD, STD and TD had negative relationship with ROA. It also discovered that equity finance can increase firm's performance because equity holders (residual claimants) have direct control over resource allocation in order to maximize shareholders' wealth.

Methodology

An *ex-post facto* research design will be employed. This design will be used because the researcher has no control over the exogenous variable and whatever happens occurred before the research. Furthermore, ex-post facto design is used when researchers are trying to ascertain and cause and effect of relationships that exist between two variables.
The population of this study is made up of those elements that helped in generating the data that is used in achieving the objectives of the study. As such, the population of the study is made up of all the fifty-nine (59) manufacturing companies listed in Nigeria stock exchange (NSE, 2021).
The sample size of 10 listed manufacturing firms will be selected from the population based on judgmental sampling. Judgmental sampling is a non-probability sampling technique where researchers selects units to be sampled based on his own existing knowledge. The 10 listed firms is in line with the works of Fuller (1976) as cited in Bassey and Tapang (2012) stating that it is common in research studies to use at least 10% of population size, because sample size of at least 10% of the universe is proven to be more than adequate in research projects. For the purpose of this study 10 listed manufacturing firms were used as the sample size of the study. The firms selected must be listed between 2016 and 2025.
The data for this research is secondary data. The data was obtained from the annual reports and accounts of the sampled manufacturing firms and Nigerian Stock Exchange Fact Book. Secondary data was used due to the nature of the variables under study.

Dynamic Panel data regression model was used to analyze the data in order to establish relationship between the variables. A panel data regression model is made up of three different models namely; pooled data regression model, fixed effect model and random effect model.

$ROA_{it} = \beta_0 + \beta_1 DR_{it} + \beta_2 ER_{it} + \beta_3 STDR_{it} + \beta_4 LTDR_{it} + \varepsilon_{it}$

However, the current model is as follows:

$ROA_{it} = \beta_0 + \beta_1 TDTA_{it} + \beta_2 TDTE_{it} + \beta_3 STDTA_{it} + \beta_4 LTDTA_{it} + \varepsilon_{it}$

Where:

ROA = Return on asset

β_0, $\beta_1 - \beta_3$ = parameters to be estimated

TDTA = Total Debt to total asset ratio

TDTE = Total Debt to total equity ratio

STDTA= Short term debt to total asset

LTDTA= Long term debt to total asset

ε = error term signifying other variables not captured in the study

$_{it}$ = Firm i at time $_t$

4.0 Results Discussion

Data Presentation

The data extracted were estimated based on regression analysis to determine the effect of the independent variables on the dependent variable. Total Debt to Total Asset (TDTA), Total Debt to Total Equity (TDTE), Short term Debt to Total Asset (STDTA) and Long term Debt to Total Asset (LTDTA) were used as the independent variables while Return on Asset (ROA) was used as the independent variable. The significant of the overall model were based on values of adjusted R square which is the coefficient of determination and the F statistic. Specifically, the probability of the F-statistic test was used to test the hypotheses of the study to determine the relationship between the variables. The data for the various variables are shown in the appendix 2.

Data Analysis

Hausman Test

Table 1

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	7.061549	4	0.1327

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
TDTA	-	-31.177906	19.791646	0.2811

	35.972814			
TDTE	0.001279	0.021050	0.000188	0.1488
STDTA	36.188666	31.379719	19.724579	0.2789
LTDTA	35.846673	31.063169	19.853864	0.2830

Source: Extracted from Appendix 1

The Hausman test is used to determine whether to use fixed effects model or random effects model in panel data in analysis. Fixed effect is used when the P-value is less than 0.05 while the random effect is used when the P-value is greater than 0.05. In this case, random effect panel data is preferable. This is so because the null hypothesis accepted (p-value of 0.1327, which is greater than 0.05).

Panel Data Analysis

Table 2

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 07/31/26 Time: 16:34
Sample: 2016 2025
Periods included: 10
Cross-sections included: 10
Total panel (balanced) observations: 100
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.086127	0.059505	1.447391	0.1511
TDTA	-31.17791	28.12921	-1.108382	0.2705
TDTE	0.021050	0.021702	0.969996	0.3345
STDTA	31.37972	28.12614	1.115678	0.2674
LTDTA	31.06317	28.13222	1.104185	0.2723

	Effects Specification	
	S.D.	Rho
Cross-section random	0.116911	0.1532
Idiosyncratic random	0.274916	0.8468

	Weighted Statistics		
R-squared	0.891074	Mean dependent var	0.309928
Adjusted R-squared	0.886488	S.D. dependent var	0.829801
S.E. of regression	0.279573	Sum squared resid	7.425296
F-statistic	194.2884	Durbin-Watson stat	1.404827
Prob(F-statistic)	0.000000		

	Unweighted Statistics		
R-squared	0.921678	Mean dependent var	0.519392

Sum squared resid	8.870430	Durbin-Watson stat	1.175958

Source: Extracted from Appendix 1

The study revealed the effect of capital structure on the performance of quoted manufacturing firms in Nigeria. From the above result, the adjusted R squared showed that 0.891% of the total variation in return on asset (ROA) is as a result of variations in debt to total asset (TDTA), debt to total equity (TDTE), short term debt to total asset (STDTA) and long term debt to total asset (LTDTA). This implied that 89.1% of the sample variation in the dependent variable ROA is explained or caused by the explanatory variables (TDTA, TDTE, STDTA, LTDTA) while 11.4% is unexplained. The adjusted R^2 of approximately 88.6 indicates that if other factors are considered in the model, this result will deviate from it by only 0.50 (i.e. 89.1 – 88.6). This result shows that there will be a further deviation of the variation caused by the independent factors to be included by 0.5%. The regression results as presented in table 4.5 to determine the relationship between TDTA, TDTE, STDTA, LTDTA and ROA shows that when all the independent variables are held stationary; the ROA variable is estimated at 0.086127. This simply implies that when all independent variables are held constant, there will be a 0.086127 unit increase in the ROAof quoted manufacturing companies occasioned by factors not incorporated in this study. Thus, a unit increase in TDTA will lead to a decrease in ROA by 31.17791 units. Also, a unit increase in TDTE will lead to an increase in ROA by 0.021050 units. Furthermore, a unit increase in STDTAT will lead to an increase in ROA by 31.37972 units. Also, a unit increase in LTDTA will lead to an increase in ROA by31.06317 units.

The Durbin –Watson d statistic of 1.404827 lies inside the upper limit on the Durbin-Watson d statistic table at 5% level of significance at n =26 and k = 3. This signifies that there is no evidence of autocorrelation in the model. The result of the F-statistics shows that there is a significant relationship between the variables concerned. This is because the F-statistics has the value of 194.2884 with a probability value of 0.0000.

Test of Hypotheses

Hypothesis one

$H0_1$: Total debt to total assets ratio has no significant impact on return on asset of quoted firms in Nigeria.

Result from table 2 showed that the F statistic with 194.2884 has probability of 0.2705% level of significance. Since the probability of the F statistics is above 5% level of significance, we would accept the null hypothesis, H_0 and therefore conclude that total debt to total assets ratio has no significant impact on return on asset of quoted firms in Nigeria.

Hypothesis two

$H0_2$: Total debt to total equity ratio has no significant impact on return on asset of listed firms in Nigeria.

Result from table 2 showed that the F statistic with 194.2884 has probability of 0.3345% level of significance. Since the probability of the F statistics is above 5% level of significance, we would accept the null hypothesis, H_0 and therefore conclude that total debt to total equity ratio has positive but insignificant impact on return on asset of listed firms in Nigeria.

Hypothesis three

$H0_3$: Short-term debt to total assets ratio has no significant impact on return on asset of listed firms in Nigeria.

Result from table 2 showed that the F statistic with 194.2884 has probability of 0.2674% level of significance. Since the probability of the F statistics is above 5% level of significance, we would accept the null hypothesis, H_0 and therefore conclude that short-term debt to total assets ratio has positive but insignificant impact on return on asset of quoted firms in Nigeria.

Hypothesis four

$H0_4$: Long-term debt to total assets ratio has no significant impact on return on asset of listed firms in Nigeria.

Result from table 2 showed that the F statistic with 194.2884 has probability of 2723% level of significance. Since the probability of the F statistics is above 5% level of significance, we would accept the null hypothesis, H_0 and therefore conclude that long-term debt to total assets ratio has positive but insignificant impact on return on asset of listed firms in Nigeria.

5.0 Conclusion and Recommendations

Conclusion

This study focused on capital structure and financial performance of quoted manufacturing companies in Nigeria. Total debt to total asset, to tal debt to total equity, short term debt to total asset and long-term debt to total asset were used as measures of capital structure while return on asset was used to measure financial performance. Ten selected manufacturing companies were selected for the study for the period of ten years ranging from 2012-2021. The data collected were analyzed using panel data regression analysis. Based on the findings, the study concludes that total debt to total asset ratio has both negative and insignificant impact on return on asset of listed firms in Nigeria. While total debt to total equity ratio, short-tem debt to total asset and long-term debt to total asset have positive but insignificant impact on return on asset of listed firms in Nigeria. Hence the study concludes that capital structure has no significant impact on financial performance of quoted manufacturing companies in Nigeria.

Recommendations

Based on the findings of the study, the following recommendations were made:

(i)The Management of Nigerian listed manufacturing firms should be concerned about the level of their total debt to total equity, for better financial performance. This is because the findings of this study revealed a positive and significant relationship between total debt to total equity and return on asset.

(i) Stakeholders of listed Manufacturing firms in Nigeria should increase the level of total debt to total assets and long-term debt of any firm in order to improve financial performance. This is in line with the findings of this study that revealed a positive significant impact of total debt to total asset on financial performance of listed manufacturing firms in Nigeria.

(ii) The Management of Nigerian listed manufacturing firms should increase them commitments into short term debt to total asset in order to improve financial performance from their business operation. This is in line with the findings of this study that the short-term debt of listed manufacturing firms in Nigeria influences their financial performance positively.

(iii) Capital structure of a company ought to be adequately planned to safeguard the interest of the equity holders, shareholders and financial requirements of the firm.

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