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# Capital Structure and Value of Nigerian Manufacturing Companies

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## Abstract

*This study provides current evidence on long term controversies surrounding the relevance of capital structure to the value of firms as desideratum for effective debt policy decisions by corporate organisations. Ex-post Facto design was employed for random selection of 10 manufacturing firms across 6 real sectors of Nigerian manufacturing industry. The study estimated balanced panel data with Panel (OLS) Regression techniques using 180 observations. From findings, the results of preferred Random Effect estimation at 5% level of significance show that measures of capital structure such as debt-to-equity and debt-to-total assets have insignificant effects on value of firms when proxy by Tobin's Q. Thus, the study re-affirms the claim of M-M Approach that capital structure does not matter when it comes to firm's performance in term of stock market efficiency. In practice, therefore, management should consider the use of debt as last option for financing profitable projects.*

**Keywords:** Capital Structure; Debt; Equity; Value; Tobin's Q; Fixed Effect Model; Random Effect Model.

**JEL Classification:** G30, G32, C20, C23.

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## 1. Introduction

In corporate finance, long term controversies surround the relevance of capital structure to yield impact on value of firms (Durand, 1952; Modigliani & Miller, 1958). Durand upheld that capital structure maximizes the value of the firm which by implication illustrates that capital structure has positive value on firm's value. Whereas, M-M provide evidence that the value of a firm is irrelevant of how firms are financed. The need to resolve such controversy necessitates that financial managers are expected to choose the best option for a given project to be funded and strike the right balance between optimal capital structure that increase returns and minimize cost. This is particularly important to improve the efficiency and performance of firms in terms of maximization of wealth for both firms and the providers of funds.

In empirical financial literature, evidence has produced mixed results about relationship between capital structure and performance of firms. On one side, some proponents such as Mardones and Cuneo (2020), Vijayakumaran (2017), Ahmed (2017), Riazl and Qazim (2016), Hang (2015), Nikoo (2015), Fosu (2013) and Akhtar et al (2012) found positive relationship between company performances particularly and the way capital structure is composed. On the other side, authors like Nguyen and Nguyen (2020), Ajayi and Obisesan (2020), Ahmed, Awais and Kashif (2018), Asrawi (2017), Vuong (2017), Olajide, et al (2017), Ajayi and Araoye (2017), Lenka (2017), Phan (2016), Lawal and Edwin (2014), Al-Taani (2013), Robert (2013), and Leon (2013) observed negative relationship between capital structure and financial performance of firms while Mehmood et al (2019) provides a mixed result. Unfortunately, a study that attempts to provide recent evidence relative to impact of capital structure on company performance particularly within the context of Nigerian manufacturing companies is missing or non-existent according to the researcher's information.

In recent time, the Nigerian economy and its markets at large have undergone structural economic imbalances principally due to factors such as acute fluctuations in exchange rate movement between 2016 and 2020 with attendant effect of rising inflation and interest rates which consequently led to economic recession in 2016. Again, in 2020, rising exchange rate coupled with global pandemic Covid-19 also in part led to another economic recession surfaced in the country most especially in the 2<sup>nd</sup> and 3<sup>rd</sup> quarters. These facts, in some ways, impact directly the administration and financial management of large manufacturing corporations particularly in the area of capital structure. Therefore, an empirical research to confirm the effective interference of the

capital structure in the performance of Nigerian listed manufacturing companies on NSE is essential.

## **2. Literature Review**

In corporate organisation, capital denotes long-term funds of the organisation. These funds are grouped into equity capital and debt capital. An equity capital represents funds contributed by the owners of an organisation and includes ordinary shares, preference shares and retained earnings. While debt capital implies funds obtained on long-term basis from the outside the basic difference between the two sources of capital is that claims on income and assets by suppliers of equity capital are subordinated to those of suppliers of debt capital. Generally, the use of debt in company for financing operations is termed as leverage. Financial leverage, according to Modigliani and Miller (1958), as cited in Ahmed, Awais and Kashif (2018), is the degree to which a firm has funded its business operations through outside resourced (Modigliani and Miller, 1958). Leveraged businesses have additional capital available to finance its operations and expansions compared to an unleveraged business solely dependent on equity (Strebulaev and Yang, 2013). Leverage involves the use of fixed costs to magnify a firm's return (Pandey, 2005). However, more leverage position of a firm implies more debts in its capital structure. Meanwhile, increases in leverage results in increased return and risk, whereas decreases in leverage result in decreased return and risk (Imad, 2013).

In terms of composition, debt component of capital structure is usually expressed in form of ratio of assets (total assets in most cases) and equity (or shareholders' equity). The total debts to total assets measure the amount of the total funds provided by outsiders or creditors as a ratio of total assets of an organisation. Thus, total debt to total assets relatively measures the total amount of debt to assets. A low ratio will be preferred by creditors for all debts because it provides cushion against creditors losses in the event of firm liquidation as high ratio indicates greater financial risk. In addition, it helps investors in analyzing the overall debt burden on the company as well as a firm's ability to pay off its debt and returns on investment in the future especially during uncertain economic times. Moreover, debt structure of firms can be estimated at disaggregated levels. It may be on short-term or on long-term basis. Short-term estimation implies debts structure determination within an accounting period (that is on short-term) basis. On such basis, short-term debts can be expressed in relation to total asset of a firm in one an accounting period. The ratio implies what percentage of the assets is financed by short term debt. Short term debt represents debt due for

repayment within or less than 12 months and it includes creditors and accruals (Akinyomi, 2013). The measure indicates company's ability to meet its current or short-term financial requirements in which a lower debt ratio usually implies a more stable business with the potential of longevity. On long-term basis, firm's financial resources which maturity period exceeds an accounting period can be expressed relatively as ratio of firm total assets. Long term debt to total assets ratio is the ratio that measures the ability of a company to meet its financial requirements which are incurred for business operations in the long run. The higher the level of long term debt, the more important it is for a company to have positive revenue and steady cash flow. However, a high ratio does indicate a higher degree of business risk which implies increased debt stock position.

Theoretically, The Traditionalist School states that there is a great combination of debt and equity that maximizes the value of the firm. The leading studies or front runners of this approach are Durand (1952, 1959). The traditional approach to leverage assumes that the value of the firm can be increased or the cost of capital reduced through judicious use of leverage. The approach suggests that the value of the firm increase or the cost of capital decreases initially within a reasonable limit of debt after which further increase in leverage reduces the value of the firm or increases cost of capital (Olowe, 2011). Thus, in the traditional approach, an optimum capital structure exists and it occurs when the market value of the firm is maximized and the cost of capital is at minimum. However, Modigliani and Miller (1958) (M-M) challenged the traditional view as to the effect of leverage on value of the firm. M-M argues that without taxes, the cost of capital and market value of the firm is indifference or remain constant throughout all degrees of leverage. M-M claims that, by following some assumptions about a perfect market free from taxes, the way companies finance themselves is irrelevant, that is, the market value of a leveraged firm is the same as that of a non-leveraged firm.

Recent empirical evidence in capital structure relative performance of firms has been provided by Lenka (2017) and Ahmed et al (2018). Lenka (2017) study provides empirical evidence of relationship between leverage and corporate performance of 14 major and diverse business sectors in Czech Republic. The cross-sectional analysis of the published data indicates that leverage (debt ratio) has a substantially negative effect on corporate performance when the return on equity (ROE) is used as an indicator of corporate performance in the Czech Republic over the period covered by the study. The results of the study regression analysis confirmed negative relationship between the company profitability and the use of debt in majority of business sectors (Agriculture, fishery, and forestry; Construction, Wholesale and retail trade, repair of motor vehicles and

motorcycles; Professional, scientific and technical activities; Administrative and support service activities). The study found opposite relationship in one business sector only (Mining and quarrying) where positive relationship between the company profitability and leverage was confirmed. The study affirms that corporate leverage and performance varies across industries.

Ahmed et al (2018) applied random effect model to analyze ten years multivariate panel data obtained from Karachi Stock Exchange (KSE) 100 index listed securities in Pakistan. The findings of the study indicate that capital structure shows a negative relationship with the Returns on Assets which implies that listed firms when increasing the overall capital base may also consider full utilization of the additional resources. Return on equity is impacted by the leverage ratio of debt to capital where a negative relationship is present that indicates increase in leverage may reduce the returns generated by the firm on its equity. In addition, the capital structure of the business was also found as significant variables impacting Tobin's Q negatively related. The finding implies that an increase in capital structure for listed firms translate into an increment of book value of assets that the firm choose in its financial records.

In Nigeria, Lawal et al (2014) studied the effects of capital structure on performance of manufacturing companies in Nigeria for the period 2003 to 2012. Descriptive and regression technique were employed. The result revealed negative relationship between total debt to total equity and financial performance. Amos and Francis (2014) also investigated the relationship between shareholders wealth and debt-equity mix of 60 listed non-financial companies in Nigeria from 1997 to 2011. The result showed a significant negative relationship between total debt to total equity and return on assets and earnings per share. Babalola (2014) conducted a triangulation analysis of capital structure and firms performance in Nigeria using thirty-one (31) manufacturing firms for the period 1999 to 2012. The result reveals a significant relationship between total debt to total equity and financial performance. Still in Nigeria, Aransiola and Oluwadetan (2015) examined the relationship between capital structure and profitability of quoted manufacturing companies in Nigeria. Using data extracted from the Nigerian Stock Exchange fact book and annual reports of the selected companies. The study showed that there is negative relationship between total debt to total assets ratio and financial performance.

Also, Dahiru (2016) investigated the impact of capital structure on financial performance of listed manufacturing firms in Nigeria. The study used Generalized Least Square (GLS) multiple regression to analyze the secondary data extracted from the annual reports and accounts of the 31 sampled firms for the period 2009

to 2014. The study found that total debt to total assets and long-term debt to total assets have significant negative impact on the financial performance of listed manufacturing firms in Nigeria while short-term debt to total assets has significant positive impact on Nigerian manufacturing firms' financial performance. From the above-cited literature, the researcher discovered that recent study providing evidence on effect of capital structure on financial performance of manufacturing companies in Nigeria is still unavailable. Therefore, the current study aimed at providing such recent evidence.

### **3. Methodology**

This study employs Ex Post Facto research design variant of quantitative research design given its greater flexibility to test hypotheses about cause and effect between independent variable and dependent variable, capital structure and performance of listed firms in Nigeria real sector in this case. Thus, independent variable is presumed as the cause, and the dependent variable is the potential effect. As expected, the population of this study consists of all manufacturing companies listed on Nigeria Stock Exchange. According to Nigeria Infopedia<sup>1</sup>, the total number of real sectors in Nigerian manufacturing segment stands at six (6). These are consumer services sector, health care sector, basic materials sector, consumer goods sector, industrial sector, and oil and gas sector. Meanwhile, the total number of companies in all the real sectors of Nigerian manufacturing segment is eighty-nine (89) listed companies as put forward by Nigeria Infopedia<sup>1</sup>. The study adopts multi-stage sampling method. Out of the 89 listed companies, 45 companies have reports on their financial activities published up till 2015 and beyond. Surprisingly, as discovered by the researchers, only 10 companies published their reported annual accounts till the end of 2019 financial year. For uniformity of data period as balanced panel data, these 10 companies were taken as final population of the study.

The use of Krejcie and Morgan (1970)'s sample size determination formula as observed in Amusa and Saka (2017) to determine appropriate sample size yielded the same number of population (10) as sample size. In other words, all the ten (10) companies were selected for further analysis. Krejcie and Morgan (1970) as employed in Amusa and Saka (2017) sample size determination is stated as follows:

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<sup>1</sup> Nigerian Infopedia, (2021). Manufacturing Companies in Nigeria. Retrieved January 10, 2021 from <https://nigerianinfopedia.com/manufacturing-companies-in-nigeria/>

$$S = \frac{X^2 NP(1 - P)}{d^2 (N - 1) + X^2 P(1 - P)}$$

Where  $s$  = sample size;  $X^2$  = table value of chi-square at 1 degree of freedom for desired confidence level (0.95);  $N$  = population size (10); and  $P$  = population proportion (0.5). The result yields a sample size of 10 companies. Secondary data on all key variables were obtained from Annual Reports of 10 selected manufacturing companies quoted on the Nigerian Stock Exchange<sup>2</sup>.

Furthermore, this study employs a non-common variable TOBIN'S Q in literature to measure the value of firm. The measure, Tobin's Q, possesses predictive validity (Wolfe, 2003) and has been recognized as a sophisticated performance measures. The model developed for the study is based on the relationship between the dependent variable (as measured by Tobin's Q), explanatory variables (total debt to equity ratio, total debt to total asset ratio), and control variable (proxy by company size). The study considered quoted manufacturing companies on the Nigeria Stock Exchange floor for a time lag between 2002 to 2019; a period of seventeen (18) years.

The functional relationship between firm's performance (in term of Tobin's Q,) independent variables, and control variable is specified as:

$$Tobin's Q_{it} = f (DEQ_{it} + DTA_{it} + SIZ_{it}) \quad (1)$$

$$Tobin's Q_{it} = \alpha_i + \beta_1 DEQ_{it} + \beta_2 DTA_{it} + \beta_3 SIZ_{it} + \varepsilon_{it} \text{ (Fixed Effect)} \quad (2)$$

Where;

- ✓ DEQ = Total Debt to Equity ratio;
- ✓ DTA = Total Debt to Total Asset;
- ✓ SIZ = Company Size
- ✓  $\alpha$  = constant;
- ✓  $\varepsilon$  = error term;
- ✓  $t$  = Time dimension;
- ✓  $i$  = individual firm; for  $i = 1, 2, \dots, N$  cross-section units and periods  $t = 1, 2, \dots, T$ .
- ✓ The *a priori* Expectation is such that  $\beta_1, \beta_2, \beta_3 > 0$ .

<sup>2</sup> The Nigerian Stock Exchange (2020) Fact Book. Retrieved 20 January 2021 from <http://www.nse.com.ng/>

The intercept,  $\alpha_i$  as a measure of Fixed Effect Model (FEM) implies that although the intercept may differ across the 10 sampled companies each company's intercept does not vary over time; that is, it is time invariant (Gujarati, 2004).

Also, the study relies on Equation 2 to develop Random Effects Model. However, instead of treating  $\alpha_i$  in the equation, the researchers assume that the intercept is a random variable with a mean value of  $\alpha_i$  and the intercept value for each manufacturing company is expressed as;

$$\alpha_i = \alpha_i + \epsilon_i \quad i = 1, 2, \dots, 10 \quad (3)$$

Where;  $\epsilon_i$  is a random error term with a mean value of zero and variance of  $\sigma^2_\epsilon$  (Gujarati, 2004).

By substituting equation 3 into equation 2, the researcher obtains;

$$Tobin's Q_{it} = \alpha_i + \beta_1 DEQ_{it} + \beta_2 DTA_{it} + \beta_3 SIZ_{it} + \omega_{it} (Random Effect) \quad (4)$$

Where;

$$w_{it} = \epsilon_i + \mathcal{E}_{it}$$

$w_{it}$  = composite error term;  $\epsilon_i$  = cross-section, or individual-specific error component; and  $\mathcal{E}_{it}$  = combine time series and cross-section error component. The variables employed in this study are described as follows:

The Tobin's Q - The Tobin's Q is a statistic that serves as a proxy for the firm's value from an investor's perspective (Wolfe and Sauaia, 2003). By measurement, it is the ratio between the market value of the firm's assets and the replacement value of those assets calculated as follows:

$$Tobin's Q = (MVS + MVD)/RVA$$

Where:

- ✓ MVS = Market value of all outstanding stock
- ✓ MVD = Market value of all debt
- ✓ RVA = Replacement value of all production capacity

**Total Debt to Equity Ratio (DEQ)** – Total Debt to Equity Ratio is a proxy for estimating the level of leverage of a company. DEQ is calculated as;

$$Debt\ to\ Equity = \frac{Total\ Debt}{Total\ Equity}$$

Where Total Debt is sum of Long-term debt and Current Liabilities, while Total Equity is sum of ordinary shares, capital reserves, and retained profits.



**Total Debt to Total Asset Ratio (DTA)** – Total Debt to Total Asset Ratio is another important proxy for estimating the level of leverage of a company. In line with literature, DTA is calculated as;

$$\text{Debt to Equity} = \frac{\text{Total Debt}}{\text{Total Assets}}$$

**Company Size (SIZ)** – Company size represents organisation dimension and it is captured by taking logarithm value of the total assets. It is proxied by natural logarithm of total assets of the firm:  $SIZ = \log(\text{Total Assets})$ .

The study employed both Random Effects Model (RE) and Fixed Effects Model (FE) estimation techniques of Panel (OLS) Regression method to analyze equation 2 and 4. The use of these techniques was based on the number of cross-sections (manufacturing firms) selected for the study, the nature of data obtained and to account for heterogeneity among the units of the analysis. Hausman specification test was conducted to detect the most appropriate model between FE and RE models.

#### 4. Results and Discussion

The table 1 below presents the results from the analysis of balanced panel data collected on 10 sampled manufacturing companies that are quoted on the floor of Nigeria Stock Exchange of between 2002 and 2019, yielding 180 observations. The analysis shows valuation of the company with regard to impact of capital structure on company performance.

**Table 1.** Panel Model Results (Fixed Effect Model and Random Effect Model)

Variables	Fixed Effect			Random Effect		
	Coeff.	Std. Error	Prob.	Coeff.	Std. Error	Prob.
Intercept	3.2879	1.1761	0.4499	1.3690	1.3800	0.7244
DEQ	-2.2751	5.6806	0.9147	-6.7936	6.3341	0.7279
DTA	5.5646	6.0885	0.6469	3.3939	7.3928	0.4018
SIZ	2.1455	6.4604	0.0075	8.0788	1.0490	0.0000
R <sup>2</sup>		0.2996			0.1672	
Adjusted R2		0.2207			0.1415	
Prob. (F-statistics)		0.0011			0.0000	
Durbin-Watson		1.7519			1.8002	
No. of Obs		180			180	
Breuch-Pagan				Chi <sup>2</sup> (2)= 39.43 / Prob. 0.4970		
Effect Specification	Cross-Section Fixed Dummy			Cross-Section Random: 0.0180 Idiosyncratic Random: 0.9820		

Hausman Test	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
<i>Cross-section random</i>	0.6959	3	0.8742

Table 1 shows Fixed Effect (FE) and Random Effect (RE) for the impact of capital structure on market capitalization to total book value of assets of quoted manufacturing companies in Nigeria. Tobin's Q measures market capitalization to total book value of assets of quoted manufacturing companies in Nigeria. The output of FE indicates that, except SIZ, both DEQ and DTA have large beta coefficients than in RE model. Here, beta values measures the degree to which predictor variables (DEQ, DTA and SIZ) affects the dependent variable (TOBIN'S Q). The beta coefficients when FE was employed are -2.2751 (DEQ); 5.5646 (DTA) and 2.1455 (SIZ). When RE was employed the beta values are -6.7936 (DEQ); 3.3938 (DTA) and 8.0788 (SIZ) respectively. For both models, DEQ and DTA were found insignificant at significant at 5% levels of significance. However, SIZ as a variable measuring manufacturing company size was significant at preferred level of significance for both FE and RE Models. The result indicates increase or decrease in capital structure does not have significant impact on market capitalization to total book value of assets of quoted manufacturing companies in Nigeria. According to the study findings, only company size matters.

The joint probability of F-tests of DEQ, DTA and SIZ for both FE and RE revealed that selected variables are important and essential to explain variation in market capitalization to total book value of assets of quoted manufacturing companies in Nigeria. The F- statistics measures overall joint significance of both models. However,  $R^2$  in FE (29.9%) is relatively higher than RE but F statistics in both models is highly significant at 5% level. Again, for selection of appropriate model, Hausman test was conducted. The results of Hausman test are;  $\chi^2(2) = 0.69$  and Prob >  $\chi^2$  is 0.8742. This implies that Random Effect (RE) is more efficient than Fixed Effect (FE). In this case, Hausman test reveals that random effect is more appropriate to predict the impact of capital structure on performance of listed Nigerian manufacturing companies using Tobin's Q. Moreover, the non-significance of Breusch-Pagan / Cook-Weisberg test for heteroskedasticity in Table 1 (Random Effect) indicates acceptance of null hypothesis of constant variance for the model. Lastly, Durbin-Watson statistics of 1.80 reveals that there is no serial correlation among the disturbance terms of study preferred Random Effect model.

The study discovers that the performance of manufacturing companies in Nigeria is not significantly affected by their capital structure when firm value is proxy by stock market indicator such as Tobin's Q. This result was inconsistent

with the a priori expectation of the study and points that no matter the composition level of debt and equity in the capital structure of quoted manufacturing companies in Nigeria the relevant stakeholders such as shareholders and management should not expect any significance impact of such debt and equity composition on capital structures of quoted manufacturing companies in Nigeria.

This finding, however, is consistent with M-M Theory that capital structure has no relevance to firm value. According to this theory, without taxes, the cost of capital and market value of the firm is indifference or remain constant throughout all degrees of leverage.

This finding is consistent with results in previous studies by AlGhusin (2015); Machado et al (2015); and Kimathi, et al (2015). The implication of this finding is that management of manufacturing companies in Nigeria should focus more rigorously how to improve profitability level of available investment projects. The company dimension was found a significant factor that causes positive impact on performance of listed manufacturing companies in Nigeria when measured by Tobin's Q. This finding is consistent with previous finding by Acheampong, et al (2014) and Osunbade (2019).

## **5. Conclusion**

This study employed a standard measure of firm performance in terms stock performance (Tobin's Q) in relation to Nigerian manufacturing firms' capital structure using a relatively large panel data set. The results suggest that the manners manufacturing companies in Nigeria combine their capital structure have no significant impact on their performance. However, further finding reveals that company dimension has positive and significant impact on manufacturing firm's stock performance.

In other words, the study re-affirms the claim of M-M Approach that capital structure does not matter when it comes to firm's performance in terms of operating efficiency and stock market efficiency. Therefore, the study recommends that:

- (i) Management of manufacturing companies in Nigeria should use debt as last option.
- (ii) Firms should keep control over their debt capital because huge level of debt capital has insignificant impact on performance of manufacturing companies.

- (iii) Identifying weaknesses of investments may be best one to improve the firm's financial performance.
- (iv) Stable economic and political atmosphere should be possible to increase the financial performance of the listed companies.

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