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## CAPITAL STRUCTURE AND FIRM VALUE OF SELECTED QUOTED MANUFACTURING FIRMS IN NIGERIA

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### **Abstract**

*This paper examines the relationship between capital structure and firm value of selected quoted manufacturing companies in Nigeria. In pursuance of this, a sample of fifteen (15) randomly selected firms on the basis of data availability from the Nigerian Stock Exchange covering five sub-sectors were used for the study. The period for the study was six (6) years covering a period of 2012 to 2017. The data were analysed using descriptive statistics, correlation analysis and Panel Ordinary Least Square (OLS) regression technique. Based on the data analysed, the study revealed that leverage, tangibility of asset, profitability and age of a firm have significant relationship with firm value. However, the size of a firm has a negative and insignificant relationship with firm value of selected quoted manufacturing firms in Nigeria. The study therefore recommends that financial managers should institute sound, efficient and coherent capital structure management policies such that will enable them determine the right mix or combination of debt, equity or both that will enhance firms' value in Nigeria. The study also recommends that firms should expand to a level it does not result to diseconomies of scale and the eventual fall in the value of the firm. Where the size becomes so large, strong and effective controlling and management structures should be put in place, particularly in the quest to gear up the firm's value.*

**Keywords:** Capital Structure, Debt, Equity, Firm value, Nigeria.

**JEL Classification:** L1, L6, C33

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### **Introduction**

An organization spread its resources in its business to produce a surge of working capital stream. After making some compulsory payment in terms of taxes, the firm makes allocations to the suppliers of its capital and hold back what is left for use in its business? If an organization is all equity financed, the whole after-tax working capital for each period adds to the advantage of owner of the business (in the form of dividend and retained earnings). If as an alternative, the organization has borrowed a part of its capital, it must devote a bit of the borrowed capital to service this obligation. Furthermore, debt holders have the major right to a firm's cash flow; the owners of the business are only eligible to the left over. The firm's decision of capital structure defines the apportionment of its operating cash flow between debt holders and shareholders (Chowdhury & Chowdhury, 2010).

Managers of the firms strive for the use of resources so as to remain above board and enjoy competitive advantage. In view of the above, managers pay attention carefully to select a capital mix of debt and equity so as to achieve optimization and therefore improve their firm value (Ibrahim, 2017). Researches have been done, both theoretical and empirical on the area of capital structure since the path-breaking work by Miller and Modigliani published in 1958.

While there is plethora of empirical studies on the issue of capital structure and value of the firms, most of the studies have however be mainly focused on developed economies, with scarce literature on developing countries, especially the oil producing economies. In addition, majority of the empirical studies on the nexus between capital structure and

firm value in Nigeria (Onayemi, Akindapo, Ojokuku, Adegboyega & Abayomi, 2010; Iorpev & Kwanum 2012; Dada & Ghazali, 2016; and Ibrahim, 2017) reported inconclusive and mixed results. Hence, researchers still cannot agree on the magnitude of the impact (San & Heng, 2011) and this has remained a debatable issue. For instance, the study by Chowdhury and Chowdhury (2010), and San and Heng (2011) established that most firms do not have optimal capital structure because managers do not have incentive to maximize firm value due to their compensation not generally linked to it. With the crash of the stock market which led to substantial reduction in the value of equity coupled with increased cost of borrowing, researchers have progressively focused on the relationship between capital structure and firm value. It is against this backdrop that this study seeks to examine the relationship between capital structure and firm value of selected quoted manufacturing firms in Nigeria within the period of 2012 to 2017.

This study is structured as follows: In section two, we discuss the array of relevant literature, followed by section three, where the methodology of the study is discussed. Thereafter we present the data analysis, results and discussion of findings in section four. Section five is conclusion and policy recommendations.

### Literature Review

A number of studies have been conducted to establish the relationship between capital structure and firm value. For the purpose of this study, the empirical literature was structured to capture each of the independent variables (leverage, tangible asset, and profitability, size of the firm and age of the firm) against the dependent variable (firm value).

### Debit Ratio (Leverage) and Firm Value

Debit (Leverage) ratios indicate the extent to which a firm has used debt and its ability to meet debt obligations. Leverage is that portion of a firm's fixed costs that presents risk on the firm. Several studies have used either market or book value as measure of leverage (Harris & Raviv, 1991; Rajan & Zingales 1995). As Harris and Raviv (1991) argued different measures of leverage can produce different results and also can affect the interpretation of the results. Ross (1977) opines that the value of firms will rise with leverage, since increasing leverage increases the market's perception of value. Stulz (1990) argued that debt can have both a positive and negative effect on the value of the firm (even in the absence of corporate taxes and bankruptcy cost). Aggarwal and Kyaw (2006) also posit that, debt can have both positive and negative effects on the value of the firm so that the optimal debt structure is determined by balancing the agency costs and other costs of debts as a means of alleviating the under and

over-investment problems. Rayan (2008), and Dada and Ghazali (2016) found an inverse relationship between financial leverage and firm value. According to McConnell and Servaes (1995), the influence of debt on firm value depends on the presence of growth opportunities. For firms facing low growth opportunities, the debt ratios are positively related to firm value. For firms facing high growth opportunities, the debt ratios are negatively related to firm value. The negative relationship between leverage and firm value were also supported by Feidakis and Rovolis (2007), Dang (2013), and Aggarwal and Padhan, (2017).

### Tangible Asset and Firm Value

Agency cost theories and information asymmetry theories stress that the capital structure decisions are impacted by asset structure. High compositions of fixed assets offer more collateral value, hence providing a safety cushion backup. With more tangible assets the firm has more collateral to offer and hence, can invest in more projects due to fund availability (Aggarwal & Padhan, 2017).

Empirical evidence reveals mix conclusion on the effect of tangibility on capital structure across various studies. While Booth, Aivazian, Demirguc-Kunt and Maksimovic (2001) found negative relationship between tangibility and firm value, Feidakis and Rovolis (2007), Antoniou, Gunney and Paudyal (2008), Dang (2013), Aggarwal and Padhan, (2017) and Ibrahim (2017) found a positive significant relationship. Having the incentive of getting debt at lower interest rate, a firm with higher percentage of fixed asset is expected to borrow more as compared to a firm whose cost of borrowing is higher because of having less fixed assets (Ibrahim, 2017).

### Profitability and Firm Value

The greater the profitability of a firm, the more assignable profit there is, and the higher is the value of the company. The pecking order theory expects a negative relationship between firm profitability and debt issue as shown in studies by Bevan and Danbolt (2004), Antoniou, Gunney and Paudyal (2008), Voutsinas and Werner (2011), Aggarwal and Padhan, (2017), and Ibrahim (2017). With more profitability leading to higher retained earnings firms would use internal funds first, then issue debt and then issue equity as a last resort. Hence, with higher profitability the firm value should increase. However, the tradeoff theory expects a positive relationship between firm leverage and profitability since it lowers the cost of financial distress. We have used return on assets (ROA) as a measure of firm profitability. It has been used in various studies including Rajan and Zingales (1995), Al-Fayoumi and Abuzayed (2009), and Shah and Jam-e-Kausar (2012).

### Size and Firm Value

Large firms due to diversification benefits, economy of scale, and more capacity and resources, and cushion against adverse cash flow fluctuations tend to be more leveraged (Dada & Ghazali 2016; Aggarwal & Padhan, 2017). Beck, Demirgüç-Kunt and Maksimovic (2005) argued that firm size has a strong association with firm's survival, profitability and productivity; though, depending on their legal and financial policy effects, and their size. A lot of studies have shown considerable evidence that a significant relationship exists between size and firm leverage. For instance, Rajan and Zingales (1995) showed a positive relationship between leverage and size due to reduced information asymmetry. It supports the agency theory. Most of the studies have shown a positive relationship between size and firm value such as those of Booth *et al* (2001), Jermias (2008), Aggarwal and Padhan (2017) while other studies such as Kodongo, Mokoaleli-Mokoteli, and Maina (2014) and Ibrahim (2017) showed a negative relationship between size and firm value.

### Age and Firm Value

The age of a firm is a standard measure of reputation in capital structure models (Ibrahim, 2017). The firm age is associated with ample of experience, expertise and reduction in perceived risks (Mahajan & Singh, 2013) since old firms are expected to have large market shares, high clientele patronage, customer loyalty, well established logistic channels, and business associates with various factors of production. Thus, older firms tend to be more profitable due to their well-established operational strategies in producing various goods/services to meet various customers' demands. As a firm continues longer in business, it establishes itself as an ongoing business and therefore increases its capacity to take on more debt; hence age is positively related to debt. However, Graham, Hazarika and Narasimhan (2011) posit that young firms tend to be prone to distress during a negative stock business period. Similarly, Carroll (1983) observes that young firm is prone to failure because of diversion of their resources to establish internal routines, developing credible exchange relationship, and training of the employees. Studies such as Diamond (1984) and Ibrahim (2017) showed a significant positive relationship between firm's age and firm value.

### Methodology

The secondary source of data was employed. The data were collected from annual reports and statements of account of the companies under consideration. The data were obtained from the Nigerian Stock Exchange (NSE). The group to which this study intends to generalize its findings is all the manufacturing firms in the Nigerian Stock Market since the study borders on the establishing

the relationships between capital structure and firms' value in Nigeria. Consequently, the population of the study consists of the entire manufacturing firms listed in the Nigerian Stock Exchange. A sample of fifteen (15) randomly selected firms on the basis of data availability from the Nigerian Stock Exchange covering five sub-sectors are used for the study. The period for the study is six (6) years covering 2012 to 2017. Companies were selected randomly from each of the specified segments to be included in the sample. The selection of the fifteen firms is done to give the five sub-sectors a fair representation. The fifteen (15) firms are from the three manufacturing subsectors and will be allocated to each sector according to the number of firms listed under the segment to include Industrial goods segment, Consumer goods segment (food and beverages), Insurance, and Oil and gas segment. The data for the study are computed on annual basis for the analysis of the study.

Two broad techniques employed in the data analysis in this study are the statistical and econometric techniques. The statistical tools to be employed are descriptive statistics and correlation analysis. Descriptive statistics are used because they provide simple summaries about the samples and their measures and thus generate the initial characterization of the data set. Moreover, correlation analysis is used in the study to investigate the preliminary interactions and relationships among the variables of the empirical analysis. Finally, the panel data regression technique is used to analyze available data in order to examine the influence of capital structure variables on firm's value.

### Model Specification

The model specified in this study demonstrates that firm value per share responds effectively to capital structure adopted by a particular firm. Stock value (SV) is taken as the dependent variable. The explanatory variables of interest are debt ratio (DR) (the proxy for leverage or capital structure defined as the ratio of total debt/total assets), tangibility of assets (TANGASS) (the ratio of fixed assets over total assets), PROF (measured by return on total asset), SIZE (the proxy for natural logarithm of total asset) and AGE (the age of firm defined as the number of years after establishment). Stock value (SV) (proxy for firm's value is the dependent variable of the study. Debt ratio (DR) (the proxy for leverage or capital structure) is the explanatory variable while all other variables are control variables.

The functional form of this model is thus expressed as:

$$SV = f(DR, TANGASS, PROF, SIZE, AGE) \dots \dots \dots (1)$$

The econometric form of the model can be specified as:

$$SV_{it} = \alpha_0 + \alpha_1 DR_{it} + \alpha_2 TANGASS_{it} + \alpha_3 PROF_{it} + \alpha_4 SIZE_{it} + \alpha_5 AGE_{it} + \epsilon_{it} \dots \dots \dots (2)$$

Where;  
 SV = Stock Value (a measure of firm value)  
 DR = Debt ratio (a leverage)  
 TANGASS = Tangibility of Asset  
 PROF = Profitability  
 SIZE = Size of firm  
 AGE = Age of firm  
 $\alpha_0 \dots \dots \alpha_5$  = Coefficients  
 $\epsilon_{it}$  = random error term

The apriori expectations in the model are:  $\alpha_1 > 0, \alpha_2, \alpha_3, \alpha_4, \alpha_5 > 0$

This means that with the exception of debt (leverage) which is expected to be either greater than zero or less than zero, in line with diverging results, all other variables are expected to be greater than (>0). All the variables used in this study as independent variables are considered to be related to the capital structure policy decision variables of the respected firms.

**Method of Estimation**

The model specified in equation 2 above is based on the panel regression analysis procedure that is used

$$Y_{it} = f(X_{it}, \beta) + \delta_i + \gamma_t + \epsilon_{it} \dots \dots \dots (3)$$

The leading case involves a linear conditional mean specification, so that we have:

$$Y_{it} = X_{it}'\beta\delta_i + \gamma_t + \epsilon_{it} \dots \dots \dots (4)$$

Where  $Y_{it}$  is the dependent variable,  $X_{it}$  is a vector of regressors, and  $\epsilon_{it}$  are the error terms, for  $i = 1, 2, \dots, M$ , cross-sectional units observed for dated periods  $t = 1, 2, \dots, T$ . The  $\alpha$  parameter represents the overall constant in the model, while the  $\delta_i$  and  $\gamma_t$  represent cross-section or period specific effects (random or fixed).

in this study. The main advantage of the panel data analysis is that it comprehensively takes the individual characteristics of the different firms used in the study. It is generally observed that firm-level behaviour is a strong factor in the determination of dividend policy and hence, this differentiation may bring endogeneity bias into the estimation. The panel data analysis helps to correct this inherent estimation problem. The basic class of models that can be estimated using panel techniques may be written as:

A central assumption in random effects estimation is the assumption that the random effects are uncorrelated with the explanatory variables. One common method for testing this assumption is to employ a Hausman (1978) test to compare the fixed and random effects estimates of coefficients. This test is also used to examine the randomness of the data distribution in this study.

**Presentation and Discussion of Results**

**Descriptive Statistics**

**Table 1: Descriptive Statistics of the Capital Structure Variables and Firm Value**

Variables	Mean	Median	Max.	Min.	Std. Dev.	Skew	Kurt.	J-B	Prob.
SV	7.20	2.16	15.80	1.27	1.78	1.25	8.12	78.10	0.00
DR	1.05	0.71	4.73	0.02	0.92	1.59	4.40	58.20	0.00
TANGASS	18.60	10.30	17.10	2.10	0.62	3.91	3.13	21.60	0.00
PROF	0.69	0.51	2.76	0.06	0.58	1.41	4.36	40.28	0.00
SIZE	14.29	8.57	211.20	-12.90	22.14	4.10	29.63	928.90	0.00
AGE	29.20	21	98	14	20.83	1.37	3.30	31.53	0.00

Source: Results extracted from E-views (2018)

Table 1 above presents the descriptive statistics of the sample data on the variables used for the analysis. The descriptive statistics show that the mean value of firm earnings (SV) is 7.20 while its median value is 2.6. The maximum and minimum values are 15.8 and 1.27 respectively. The skewness is 1.25; kurtosis is 8.12, while the standard deviation is 1.78.

In the case of the explanatory variables, the mean value of debt ratio (proxy for leverage or capital structure) is 1.05, with maximum and minimum values of 4.73 and 0.02. Tangibility of Assets (TANGASS) has a mean value of 18.6, with maximum and minimum values of 17.1 and 2.1 respectively. Profitability has a mean value of 0.69, with maximum and minimum values of 2.76 and 0.06, and a standard deviation of 0.58. Size has a mean value of 14.29, with maximum and minimum

values of 211.2 and -12.2, respectively. Age has a mean value of 29.2, with maximum and minimum values of 98 and 14 respectively. This means that the age of the firm ranges from 14years to 98years with an average value of 29years and a standard deviation of 21years.

**Correlation Analysis**

In order to examine the relationship among the variables, the correlation analysis is used. The result of the correlation tests is reported in Table 2. In the correlation matrix, all the relevant capital structure variables (except size) are seen to be positively correlated with firm’s value. This implies that increase in them will invariably stimulate stock value. The correlations among the independent variables indicate the variables are positively correlated with each other.

**Table 2: Correlation Results of the Capital Structure Variables and Firm Value**

Variables	SV	DR	PROF	SIZE	AGE	TANGASS
SV	1					
DR	0.28	1				
PROF	0.41	0.03	1			
SIZE	-0.19	0.28	0.14	1		
AGE	0.31	0.66	0.33	0.43	1	
TANGASS	0.31	0.40	0.02	0.19	0.36	1

Source: Authors’ Compilation (2018)

**Panel Regression**

In this section, an attempt is made to examine empirically the influence of capital structure and other relevant influencing variables in the determination of firms’ value in the sampled companies. The analysis is based on the panel data approach. We specifically analyzed our firm value

equation with the pooled OLS and the fixed effect approaches. A choice is made between these two approaches using the standard F-statistics. We also estimated the model with the random effect approach, however, using the Hausman test, the fixed effect is chosen as the best model. The result is presented below:

**Table 3: Panel Regression Results of the Capital Structure Variables and Firm Value**  
**Dependent Variable: SV**

Variables	Pooled OLS (1)	Fixed Effect (2)
Constant	0.53* (1.60)	0.21* (1.72)
DR	-0.92* (-1.89)	-1.15** (-2.28)
TANGASS	0.07* (1.75)	0.03* (1.93)
PROF	0.03 (1.47)	0.24** (2.42)
SIZE	-0.09 (-1.39)	-0.08 (-1.50)
AGE	0.09* (2.01)	0.13** (2.12)
R-Squared	0.52	0.74
Durbin-Watson	1.69	1.68
F-statistics <sup>9</sup>	19.86**	42.17***

**Note:** \*\*\*, \*\*, \* indicate 1%, 5% & 10% level of significance; <sup>9</sup>Standard F-test to choose between Pooled OLS & Fixed Effect Models; T-ratios are in parenthesis; Pooled OLS (Model 1); Fixed Effect (Model 2).

**Source:** Authors' Compilation (2018)

Using the standard F-statistics test approach to choose between the Pooled OLS and the Fixed Effect models, table 2 revealed that the F-statistics value of 42.17 for the fixed effect model exceeds that of the Pooled OLS of 19.86 and is significant at 1% level. This depicts that the fixed effect model is the best and most reliable model for the estimation of the firm's value equation.

An examination of the empirical results revealed that the R<sup>2</sup> value is 0.74. Given this impressive goodness of fit statistic, it is clear that 74 percent of the systematic variations in firms' value (proxied by Stock Value) is explained by the combined explanatory variables. This is an attestation to the good predictive ability of the model. The F-value of 42.17 is highly significant at the 1 percent level; a further attestation to the reliability and explanatory power of the model. Thus, the existence of a significant linear relationship between the dependent variable (firms' value) and the combine explanatory variables is validated. The Durbin Watson statistic of 1.68 is also quite impressive indicating that there is no autocorrelation in the empirical estimates, making the model reliably good for policy decisions.

The empirical results revealed the following findings:

(i) Debt ratio (the proxy for leverage or capital structure) is found to have a significant negative relationship (at 5 percent) with firm value of quoted manufacturing firms in Nigeria. This implies that higher debt ratio tends to have a dampening effect on firm value in Nigeria. This finding supports the result of Abor (2005) that various capital structure measures representing short term debt, long term debt and total

debt are negatively and statistically related to firm performance. This implies that unconscionable procurement of debt that without a tax shield may raise borrowing costs which exposes the firm to financial fragility with the resultant effect of bankruptcy risks and lower firm value. The negative relationship is consistent with the studies of Feidakis and Rovolis (2007), Rayan (2008), Dang (2013), Dada and Ghazali (2016), Aggarwal and Padhan, (2017).

(ii) Tangibility of asset (TANGASS) is found to have a significant positive relationship (at 10 percent) with firms' value of quoted manufacturing firms in Nigeria. This is an implication that judicious and efficient use of asset resources will enhance firm value particularly when such resources are used to procure value-enhancing investments. This is consistent with the studies of Feidakis and Rovolis (2007), Antoniou, *et al* (2008), Dang (2013), Aggarwal and Padhan, (2017) and Ibrahim (2017).

(iii) Profitability is found to have a significant positive relationship (at 5 percent) with firms' value of quoted manufacturing firms in Nigeria. This is an indication that increased profitability stimulates firm value. Hence, with higher profitability the firm value should increase. This is in line with the trade-off theory which shows a positive relationship between firm leverage and profitability, since profitability lowers the cost of financial distress.

(iv) Size is found to be a negative and statistically insignificant with firms' value of quoted manufacturing firms in Nigeria. This implies that excessively large size

could have a dampening effect on firms' value and thus imply limit to growth and size of firms. As firms expand, diseconomies of scale associated with uncontrollably large size may result in the form of complexity and inherent problems in the management of financial and asset resources, which combines to reduce firm value. This is consistent with the studies of Kodongo *et al* (2014) and Ibrahim (2017).

- (v) Age of firms is found to have a significant positive relationship (at 5 percent) with firms' value of quoted manufacturing firms in Nigeria. This indicates that older firms may experience better capital structure performance due to better efficiency management and sustainability on account of their long stay in the business and having understood the intricacies and environment of the business better, which eventually enhances their value in the environment they operate. The firm's age is associated with ample of experience, expertise and reduction in perceived risks (Mahajan & Singh, 2013) since old firms are expected to have large market shares, high clientele patronage, customer loyalty, well established logistic channels, and business associates with various factors of production. Thus, older firms tend to be more profitable due to their well-established operational strategies in producing various goods/services to meet various customers' demands. As a firm continues longer in business, it establishes itself as an ongoing business and therefore increases its capacity to take on more debt. This is consistent with the studies of Diamond (1984), Dada and Ghazali (2016), and Ibrahim (2017).

Overall, the empirical results reveal the existence of a significant relationship between capital structure and firm value of quoted manufacturing firms in

Nigeria. This implies that sound performance-oriented capital structure decisions are critical to enhancing the market value of such firms as this in turn will determine their marketability to the public and the amount of investment they attract from prospective investors.

### Conclusion and Recommendations

This paper was set out to empirically examine the relationship between capital structure and firms value of quoted manufacturing firms in Nigeria. A sample of fifteen quoted firms between 2012 and 2017 were examined using descriptive statistics, correlation analysis and panel OLS regression technique. The various analyses were employed to examine the relationship between capital structure and firms value in Nigeria. The empirical analysis was done using panel least squares multivariate estimation method. The study revealed that leverage, tangibility of asset, profitability and age of a firm have significant relationship with firm value. However, the size of a firm has a negative and insignificant relationship with firm value of selected quoted manufacturing firms in Nigeria.

Based on the empirical findings of this study, the following policy recommendations are made. Firstly, financial managers should institute sound, efficient and coherent capital structure management policies such that will enable them determine the right mix or combination of debt, equity or both that will enhance firms' value in Nigeria. In addition, firm should expand to a level it does not result to diseconomies of scale and the eventual fall in the value of the firm. Where the size becomes so large, strong and effective controlling and management structures should be put in place, particularly in the quest to gear up the firm's value. Finally, government and policy makers should provide an enabling macroeconomic and political environment capable of enhancing firm value in Nigeria, particularly in the area of exchange rate and tax policies as well as appropriate legislation and institutional framework.

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