

Testing The M & M Relevance and Irrelevance Theories of Capital Structure in Quoted Manufacturing Firms in Nigeria

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ABSTRACT

The study empirically test the Miller & Modigliani (1958, 1963) irrelevance and relevance theory of capital structure in Nigeria. Thus, 16 manufacturing firms listed on the Nigerian Stock Market for the period 2010 to 2020 were tested. Three capital structure variables such as short-term debt to equity ratio, long-term debt to equity ratio and total debt-to-equity ratio (independent variables) were regressed against firm value (dependent variable). The fully modified ordinary least squares (FMOLS) was employed in the analysis of the data, and the empirical results obtained from the two models indicate that the M & M irrelevance and relevance theory does not hold in the Nigerian manufacturing firms within the investigating period. The study recommends that manufacturing firms in Nigeria should begin to focus attention on other factors outside capital structure that could possibly influence the value and performance of the firm. Some of the likely factors could be dividend policy and firm's specific factors such as total assets, profitability, liquidity, risk exposure, growth among others.

Keywords: Capital Structure, Firm Value, Investment Decisions, Manufacturing Firms, Econometric and Statistical Methods

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1. Introduction

One of the most fundamental issues faced by the chief executive officer at the management level of a company is the capital structure decision which relates to the management of the proportion of debt and equity in the company's assets, which in turn affect the company's overall performance. According to Alifani and Nugroho (2013, p.3), Nguyen (2020, p.4), firms need to make strategic financial decisions in order to maximize the company's value by adjusting its current capital structure in order to obtain optimality; this also aligns with the earlier submission of Ross (2008) capital structure decision.

There are two main schools of thoughts in the area of capital structure theory, these are the traditional and the irrelevancy theories. While the traditional theory whose major proponent include Durand (1952, 1959) believed that the overall market value of the firm is determined by its capital structure; but Modigliani and Miller (1958) argued otherwise. This off course ushers in the modern theory of capital structure which began with their famous proposition describing the conditions of capital structure irrelevant. According to the theory, the overall market value of a firm is not affected by the capital structure employed, rather it is purely independent because, managers do have access to financial markets and the same applies to companies and investors which position them for homemade advantage. This view was also corroborated by Luigi and Sorin (2011).

However, M & M (1963) later reviewed their previous stand on absence of taxes in perfect market by introducing corporate income taxes due to the tax benefit accruing from the use of debt. When this was done, capital structure significantly affect the value of firm. Since then, “many theories of capital structure have been developed including trade off theory, signaling theory, pecking order theory, agency cost theory, life cycle theory and flexibility theory among others; after so many innovations, capital structure remains one of the most controversial and debatable issues in corporate finance”.

The M-M theory has been heavily criticized by several experts that it does not hold for all firms as they supposed, whether there is tax or no tax situation. Hence, the purpose of this paper is to empirically investigate whether the M & M (1958, 1963) theories holds in quoted manufacturing firms in Nigeria. Also, many empirical studies carried out in this area.

are shrouded with mixed findings. For instance, Javed and Akhtar (2012), Ajibola, Wisdom and Qudus (2018) found that capital structure significantly and positively affect firm’s value; those of Toraman et al. (2013) submitted a significant negative relationship. However, those of Ibrahim (2009), Abdul (2012), Alifani and Nugroho (2013) observed capital structure has no significant effect on the overall market value of the firm. Given this conflicting findings, one cannot tell whether or not if capital structure has significant effect on firm’s value in Nigeria, hence the reason for this current study.

Again, in terms of method of data analysis, it was observed in the reviewed empirical literature, including those of M & M (1958, 1963) who employed two-stage instrumental variable approach, Javed and Akhtar (2012) used correlation and regression test, Ibrahim (2009), Toraman et al. (2013), and Abdul (2012) employed OLS. This study differs from the above in that it employed the fully modified ordinary least square (FMOLS) in its empirical analysis of data. To the best of the researchers’ knowledge, no study employed the fully modified ordinary least square which is adjudged to be very effective in a study of this nature because, it is a non-parametric analysis that addresses the issues of small sample and endogeneity biases.

The rest of the paper is therefore structured as follows, section two addresses the literature review, section three focuses on the method of data analysis, section four deals with the data analysis and interpretation of results, while section five concludes.

2. Literature Review

2.1. The Theory of Modigliani and Miller

The assumptions of MM proposition were based on perfect market situation as follows: (i) no taxes (ii) no transaction costs (iii) no bankruptcy costs (iv) symmetry of market information among market participants. Also, the average expected future operating incomes of a firm are represented by subjective random variables. Again, “firms can be categorized into similar risk class. M-M initially assumed that no corporate income taxes exist, they later remove this assumption; hence, with the above assumptions, we can better appreciate the M-M position through their propositions I and II (Ismail, 2006; Olowe, 2008)”.

2.2. The MM Proposition I theory

It argues that where there is no company’s taxes, a firm's capital structure does not matter (irrelevance). By way of homemade leverage, investors can minimize the effects of corporate leverage. However, in reaction to series of criticisms M-M (1963) modified the above theory to include corporate taxes, since interest charges payable on debt are tax deductible. Hence, “this tax advantage will enable debt to have an impact on the value of the firm or weighted

average cost of capital; and M-M further re-emphasis that with corporate taxes, the market value of a firm will increase or the average cost of capital will decrease as a result of tax deductibility of interest charges (Olowe, 2008, p. 467; Ajibola, et.al, 2018)".

So, in the case of perpetual debt the value of a levered firm is given by:

$$V_L = V_U + t_c D \dots\dots\dots (2.1)$$

Therefore, it should be noted that debt is valuable to the firm because of its ability to shield the firm from taxes.

2.3. The MM Proposition II theory

MM II proposition defines the cost of equity for a levered firm, "and that firms in the same risk class, the cost of equity is equal to the constant average cost of capital plus a premium for financial risk which is equal to debt-equity ratio times the spread between the constant average cost of capital and cost of debt (Olowe, 2008, pp. 467-468)". Therefore, "without corporate taxes the expected return on equity is positively related to leverage, because the risk to equity holders increases with leverage, hence, a greater proportion of debt lowers the company's WACC". However, with the introduction of corporate taxes coupled with the savings benefits accruable from it, adjustment in the ratio of debt-to-equity significantly influence WACC. In other words, "with corporate taxes there is still a positive relationship between debt and the cost of equity, but the cost of equity is lower than it would be without taxes; and, the proposed relationship is given as follows:

$$R_E = R_0 + D/E (1 - t_c)(R_0 - R_D) \dots\dots\dots (2.2)$$

However, by setting $t_c = 0$, the equation reduces to MM Proposition II without taxes".

2.4. Criticisms of Modigliani and Miller Theory

According to Olowe (2008, pp. 467-468), the validity of the M-M theory is predicated on its assumptions: if the assumptions do not actually hold (especially the existence of a perfect capital market), then the theory would be invalid; but in real life situation, imperfections do exist in the market which often create room for arbitrage process not to be restored to equilibrium. Therefore, the following imperfections were noticeable and which of course negate and invalidate the M-M theory:

- (i) In reality, there exist different rates of interest for borrowing and lending by firms and individuals and not fixed interest rate.
- (ii) The so called personal or homemade leverage and corporate leverage are not perfect substitutes (Van Horne et.al, 1989).
- (iii) Transaction costs can render it impossible for arbitrage to work.
- (iv) Institutional restrictions may also be capable of restricting the workability of arbitrage. For instance, some institutional investors like pension funds and insurance firms are disallowed to engage in home made leverage (Van Horne et.al, 1989); and
- (v) Corporate taxes can also affect the working of arbitrage (Olowe, 2008).

It was on the basis of the above criticisms that M-M were led to modify their theory in 1963 by incorporating corporate taxes, interest charges and bankruptcy costs.

2.5. Empirical Literature

Several empirical studies have been carried out across the globe on the M & M (1958, 1963) irrelevancy and relevancy theory of capital structure in relation to firm's value. However, for the purpose of this study, few of them are examined below. For instance, Ibrahim (2009) examines the impact of debt on firms' performance in Egypt over the period 1997 to 2005 using multiple regression model, the findings indicate that debt structure has weak effect on firms' overall performance.

Mondher (2011) re-examined the M & M (1958) irrelevancy theory in the US Electric Utilities and Oil firms over the period 1990-1998. The outcome of the investigation completely contradict the submission of M & M and holds that firm's performance is significantly affected by capital structure. Saeedi and Mahmoodi (2011) examined the effect of capital structure on firm's value in Tehran Stock Exchange for the period 1995 to 2011. The panel data analysis was used and the results revealed that leverage significantly affect firm's value.

Javed and Akhtar (2012) examine capital structure and financial performance in Pakistan over the period 2004-2008 using Correlation and Regression Test. They found that debt, size and growth significantly impact firm's value. In Pakistan the effect of capital structure decisions on firm's value was examined by Abdul (2012) for a period of 7 years (2003 to 2009) using the OLS technique. They found that short term debt-to-total assets and total debt-to-total assets have significant negative effect on firm's value, but when return on equity was used, the above variables were negative and insignificantly related to firm's value.

Toraman et al. (2013) examined what factors affect Turkey firms' capital structure decisions for the period 2005 to 2011. The multiple regression was employed it was observed that short term debt-to-total assets, long term debt- to-total assets negatively impact performance on one hand, while operating income positive impact performance on the other hands.

Alifani and Nugroho (2013) reviews and re-proves M-M theories using Indonesia's cigarette companies for the period 2003 to 2012. It was observed that where there is no cost of transaction, bankruptcy cost and information asymmetry, M-M theories holds.

Asiri and Hameed (2014) investigate the effect of capital structure on firm's value using the panel least square for the period 1995 to 2013. Their findings indicate that firm size significantly affect firm's value. The study of Cline (2015) on US Banks for the period 2002 to 2013 employed statistical analysis found that less than half of the M & M offset of lower debt cost and induced increase in unit cost of higher-cost of equity is attained in practice. Nwachukwu and Akpeghughu (2016) investigate the extent to which capital structure have affected deposit money banks' value in Nigeria over the period 2005 to 2014. They employed the OLS econometric method and the observed a significant negative effect of debt and return on investment on the overall value of banks; however, equity was seen to have significant positive effect on banks value.

Aggarwal and Padhan (2017) investigate the effect of capital structure on selected BSE listed Indian hospitality firms for the period 2001 to 2015. The pooled regression analysis was employed and the results revealed that quality, leverage, liquidity, size and economic growth positively and significantly affect firm's value. Olaniyan, Soetan and Simon-Oke (2017) examine the effect of capital structure on the overall market value of firms in Nigeria for the period 2001 to 2015. Using the GMM, the empirical results indicate a significant inverse effect of capital structure on firm's value. Also, "Ater (2017) examined the effects of capital structure the value of the firms in Kenya over the period 2011 to 2015; the multiple regression was used and the result showed that capital structure has significant positive effect on the value of non-financial firms in Kenya".

In another related study, Ajibola, Wisdom and Qudus (2018) employed panel least square analysis on the relationship between capital structure and firms' value in Nigeria over the period 2005 to 2014. It was found that long term debt ratio and total debt ratio have significant positive effect on firms' value. On the other hands, the same hypothesized variables were found to have a weak negative impact on firms' value when ROA was used.

In Nigeria, "Asen et.al (2021) examined the effect of capital structure on the performance of 15 manufacturing firms for the period 1999 to 2018 using the panel data analysis; the empirical results showed that SDTA, SIZE, LDTA, and TDTA have significant positive effect on performance". Luu (2021) examined the effect of Vietnam chemical firms' capital structure on performance over the period 2012 to 2019 using the panel least square method. The results indicate a significant negative effect on firms' value.

3. Methodology

The population of the study is all the listed manufacturing firms in Nigeria for the period 2010 to 2020; while the sample size comprises sixteen (16) listed manufacturing firms. The convenience sampling which is a purposive non-probability sampling method was adopted in the selection of the sample size.

3.1. Sources of Data

The data used in this study are secondary data sourced from the respective firms audited financial statements for the year 2010 to 2020.

3.2. Model Specification

In order to empirically tests the M & M relevance and irrelevance theory of capital structure in manufacturing firms in Nigeria, two models are formulated (i.e. relevance and irrelevance theories) such that short-term debt to equity ratio, long-term debt to equity ratio, total debt-to-equity ratio and firm size, firm age and firm growth (control variables) are regressed against Firm's Value. Thus, the models are specified mathematically as follows:

3.2.1. Model 1 (Irrelevancy Theory)

$$F_{VALUE} = F(STDE, LTDE, TDETE, FISZ, FAGE, FGRTH) \quad 3.1$$

Econometrically, the above model is stated as follows:

$$F_{VALUE} = \alpha_0 + \alpha_1 STDE_{it} + \alpha_2 LTDE_{it} + \alpha_3 TDETE_{it} + \alpha_4 FISZ_{it} + \alpha_5 FAGE_{it} + \alpha_6 FGRTH_{it} + U_t \quad 3.2$$

Where:

F_{VALUE} = Firm's Value (Proxied by Tobin Q)

STDE = Short-Term Debt to Equity Ratio.

LTDE = Long-Term Debt to Equity Ratio.

TDETE = Total Debt-to-Equity Ratio,

FISZ = Firm Size

FAGE = Firm Age

FGRTH = Firm Growth

U_t = The Error Term

*The condition is that; the three (3) independent variables are expected to be insignificant (it does not matter whether the three (3) independent variables are positive or negative).

3.2.2. Model 2 (Relevancy Theory)

In the case of model 2, since the argument by Miller and Modigliani relevance theory is on the ground that “the use of debt positively affect the value of the firm, and firms that have high leverage of debt enjoy of tax shield (tax deductibility)”. Thus, debt is good according to M & M relevance theory. Given this tax scenario, a moderating variable (tax rate) that interacts with other variables to impact on the dependent variables is introduced. Thus, the relevance theory model is stated in its econometric form as follows:

$$F_{VALUE} = \alpha_0 + \alpha_1 Tr \times STDE_{it} + \alpha_2 Tr \times LTDE_{it} + \alpha_3 Tr \times TDETE_{it} + \alpha_4 Tr \times FISZ_{it} + \alpha_5 Tr \times FAGE_{it} + \alpha_6 Tr \times FGRTH_{it} + \epsilon_{it} \quad 3.3$$

Where:

F_{VALUE} = Firm’s Value (Proxied by Tobin Q)

Tr = Tax Rate

ϵ_{it} = The Error Term

Other variables are as earlier defined

*The conditions under which Miller and Modigliani relevance theory holds is that “the coefficients of the three (3) variables are expected to be positive and significant”.

3.3. Method of Data Analysis

Two methods are used in the analysis of this study; these are correlation coefficient, descriptive statistics and the Fully Modified Ordinary Least Squares (FMOLS). The correlation coefficient and the descriptive statistics were used to ascertain the background characteristic among the data set, and while the FMOLS was employed for the main estimation of the study. The FMOLS is a non-parametric analysis and is usually used instead of the OLS estimator due to its ability to incorporate small sample size and endogeneity biases by using the leads and lags of the first-differenced regressors; “It also imposes additional

requirements that all variables should be integrated of the same order [i.e., I(1)] and that the regressors themselves should not be cointegrated (Philips, 1993)”.

3.4. Measurement and Definition of Variables

Table: 3.1.

Measurement and Definition of Variables

“S/N	Variables	Type of Variable	Measurement	Apriori sign
1	TOBIN_Q	Dependent Variable	Tobin’ s Q (Firms Value) measured as Market value/assets Replacement Cost	+
2	STDE	Independent Variable	Short-term debt to equity ratio	+
3	LTDE	Independent Variable	Long-term debt to equity ratio	+
4	TDETE	Independent Variable	Total debt to equity ratio	+
5	FISZ	Independent Variable	Firm Size (measured as log of total assets)	+
6	FAGE	Independent Variable	Firm Age (the number of years since the firms have been in operation)	+
7	FGRTH	Independent Variable	Firm Growth, measured as Market to Book value”	+

Source: Author’s Compilations, 2021.

4. Data Analysis and Interpretation of Results

In this section, the methods of data analysis earlier established in section three are brought to bear.

4.1. Descriptive Statistics

In Table 4.1, a clear explanation of the summary statistic of the characteristics and relationship among the hypothesized data are presented below:

Table 4.1.

Descriptive Statistics

	Mean	Med	Max	Min	Std. Dev.	Skew	Kurt	J-B.	Prob.
F _{VALUE}	2.2333	1.5686	9.2873	0.3096	1.7261	1.8234	6.4266	166.95	0.0000
STDE	48.109	40.934	376.41	9.5378	35.589	6.0119	50.570	16050.	0.0000
LTDE	27.934	33.148	4867.3	-8933.8	827.00	-6.672	94.924	57521.	0.0000
TDETE	2.4733	1.4157	202.90	-118.68	19.010	5.8462	88.837	50032.	0.0000
FSIZ	7.4673	7.5956	8.6836	5.2473	0.7943	-0.7456	3.0560	14.846	0.0005
FAGE	31.181	36.000	55.000	2.0000	13.752	-0.7445	2.4078	17.118	0.0001
FGRTH	4.2073	2.4115	75.571	-168.66	16.030	-7.2305	88.218	49808.	0.0000

Source: Author's compilation (2021)

The average firm's value (F_{VALUE}) is ₦2.2333 billion Naira for the entire sample, while the median value is 1.5686. The data is clearly skewed to the right, and that is why the mean value exceeds those of the median value. The skewness value of 1.8234 shows that the distribution is positively skewed to the right. The maximum value of the entire sampled manufacturing firms was about 9.2873, while the minimum value is 0.3096. Thus, the overall market value of some of the firms are higher than others. "There also appeared to be quite a lot of variations in the firms' capital structure, the standard deviation value of 1.7261 is very large compared to the mean value of 2.2333: this simply suggests a high level of variability of the pattern of performance either across the firms or overtime within firm". The significant nature of Jaque-Bera (J-B) is an indication of heterogeneous and non- normal distribution of the data set.

The mean value for short-term debt to equity ratio (STDE) is 48.109, while the maximum value is 376.41. By this result, it becomes glaring that more manufacturing firms in Nigeria employed majorly short-term debt to equity ratio. This is also an indication that the risk associated with the use of short-term debt to equity ratio is very high, as indicated by the high value of the standard deviation value (35.589) compared to the mean value of 48.109. Hence, the skewness coefficient of 6.0119 indicates that the distribution is positively skewed to the right, which was a common feature of the pattern capital structure (STDE) employed by the firms.

The average value for long-term debt to equity ratio (LTDE) stood at 27.934, with a higher maximum value of 4867.3. The high difference between the maximum value and the minimum value is an indication that most manufacturing firms in Nigeria prefer using long-term debt to equity ratio than short-term debt to equity ratio. Even the risk associated with this financing choice is very high as suggested by the high value of standard deviation of 827.00, which is far higher than those of the mean value for the sampled firms. The variable is not normally distributed and is negatively skewed to the left, while the J-B statistic value is significant at the 1% level.

The mean value for total debt-to-equity ratio (TDETE) is 2.4733 and is very low compared to those of STDE and LTDE. The maximum value is 202.90 while the minimum value stood at -118.68. This suggests that though, many firms are enjoying this pattern of capital structure,

however, some other firms are struggling as they are negatively impacted as indicated by the negative sign of the minimum value. The standard deviation of 19.010 is very high and it suggests a very high variations in the use of total debt-to-equity ratio as well as associated risks among the sampled firms in Nigeria. The skewness coefficient of the variable is positive and the J-B statistic value (50032) is very high and is significant at the 1% level. It simply suggests that the variable is not normally distributed.

4.2. Correlation Analysis

Furthermore, we present the ordinary correlations matrix coefficients to examine the background behavioural patterns in the data set with respect to the relationship between stock market performance and banking sector development in Nigeria. The results of the correlation matrix in table 4.2 below showed that firm's value (F_{VALUE}) Proxied by Tobin Q has a weak negative correlation values of -0.011857, -0.029317, -0.048725 and a weak positive correlation values of 0.236712, 0.204889 and 0.303274 with short-term debt to equity ratio (STDE), long-term debt to equity ratio (LTDE), total debt-to-equity ratio (TDETE), firm size (FSIZ), firm age (FAGE) and firm growth (FGRTH). On the other hands, short-term debt to equity ratio (STDE) are also weakly correlated with the other variables.

However, long-term debt to equity ratio (LTDE) is seen to have significant positive correlation values of 0.863018 and 0.914769 with total debt-to-equity ratio (TDETE) and firm growth (FGRTH). Also, a strong positive correlation exist between total debt-to-equity ratio (TDETE) and firm growth (FGRTH). All the other variables are weakly correlated. We therefore conclude that, the correlation matrix results obtained in Table 4.2 indicate the absence of multicollinearity among the hypothesized variables in the model. Hence, the results are valid for policy decisions.

Table 4.2.

Pairwise Correlation Matrix

	F_{VALUE}	STDE	LTDE	TDETE	FSIZ	FAGE	FGRTH
F_{VALUE}	1						
STDE	-0.011857	1					
LTDE	-0.029317	0.029964	1				
TDETE	-0.048725	0.078237	0.863018	1			
FSIZ	0.236712	-0.021755	0.029944	-0.016643	1		
FAGE	0.204889	0.141061	0.081281	0.077043	0.336890	1	
FGRTH	0.303274	0.057563	0.914769	0.747178	0.105298	0.159518	1

Source: Author's Compilations (2021).

4.3. The Fully Modified Least Squares (FMOLS) Estimates

4.3.1. Analysis of Model 1 (Irrelevancy Theory)

The results of the Fully Modified Least Squares (FMOLS) estimation for testing the M & M irrelevance theory of capital structure in manufacturing firms in Nigeria is presented in table 4.3. From the results, "the diagnostic indicator is impressive, as the model has shown to have a good predictive ability as is shown in the high R squared value of 0.94, indicating that over 94 percent of the systematic variations in the Nigerian manufacturing firms' value is captured by changes in the explanatory variables". The adjusted R-squared value of 0.93 percent is equally very high and it implies that the model has a high predictive ability.

Table 4.3.

Irrelevance Theory of Capital Structure of Manufacturing Firms in Nigeria (FMOLS)

Variables	Coefficient	T-Ratio	Prob.
STDE	0.003354	2.126046	0.0369*
LTDE	0.001383	1.951346	0.0549*
TDETE	-0.115190	-5.552522	0.0000**
FSIZ	0.227233	0.506823	0.6138
FAGE	-0.184997	-5.638100	0.0000**
FGRTH	0.217447	11.50247	0.0000**
F _{VALUE} (-3)	-0.262050	-4.693862	0.0000**
R ² = 0.94	$\bar{R}^2 = 0.93$		

Source: Author's compilations 2021: Note: ** sig at 1% level; * sig at 5% level.

A close examination of the coefficients reveals that “the three coefficients of determination (short-term debt to equity ratio (STDE), long-term debt to equity ratio (LTDE) and total debt-to-equity ratio (TDETE)) are significant at the 5 percent and 1 percent significance level”. Two of the control variables (firm age (FAGE) firm growth (FGRTH)) also passed the 1 percent level of significance, suggesting that they are not potent factors that could affect the value of the firm. By implication, and judging from the M & M appriori expectations necessary for the irrelevance theory to hold is that the three variables (STDE, LTDE, TDETE) should be insignificant, irrespective of whether they are positively or negatively signed. It therefore follows that the irrelevance theory advocated by M & M (1963) does not hold in the Nigerian manufacturing firms because the three variables were significant. This finding is seen to align with those of Hirshleifer (1966), Stiglitz (1969) and Harris and Raviv (1991) who variously refuted the existence of irrelevancy theory of M & M (1958).

4.3.2 Analysis of Model 2 (Relevancy Theory)

Haven tested for the irrelevancy theory, in this section we went further to also test for the relevance theory of capital structure by introducing a moderating variable (tax rate) into model 2 that should interact with other variables to impact on the dependent variables. The argument as advocated by M & M is that the use of debt should positively affect the value of firm due to tax shield (tax deductibility) benefit. Thus, “the results of the Fully Modified Least Squares (FMOLS) estimation for the M & M relevance theory of capital structure in manufacturing firms in Nigeria is presented in table 4.4: in the results, the diagnostic indicator, of 0.82 percent though slightly lower than those of the irrelevance theory in Table 4.3 above, is also impressive, coupled with the adjusted R-square value of 0.78 percent which indicates good predictive ability of the model”.

Table 4.4.

Relevance Theory of Capital Structure of Manufacturing Firms in Nigeria (FMOLS)

Variables	Coefficient	T-Ratio	Prob.
TrSTDE	3.22E-05	0.093828	0.9254
TrLTDE	-0.000359	-1.152710	0.2513
TrTDETE	0.007037	0.588353	0.5574
FSIZ	0.384127	0.554649	0.5802
FAGE	-0.173210	-3.912039	0.0002**
FGRTH	0.040877	3.645141	0.0004**
R ² = 0.82	$\bar{R}^2 = 0.78$		

“Source: Author's compilations 2021: Note: ** sig at 1% level; * sig at 5% level”.

Now, looking at the relevance of the coefficients of the three variables of determination (tax rate x short-term debt to equity ratio (TrSTDE), tax rate x long-term debt to equity ratio

(TrLTDE) and tax rate x total debt-to-equity ratio (TrTDETE)); we observed that the three variables failed the 5 percent significance level. Meaning that, these variables are not significant determinants of the overall value of manufacturing firms in Nigeria. Thus, judging from the conditions under which Miller and Modigliani relevance theory to hold, “the coefficients of the three (3) variables (TrSTDE, TrLTDE and TrTDETE) should be positive and significant”. But in this context, TrLTDE is negative while those of TrSTDE and TrTDETE are positively signed; yet the three variables are not significant. This means that the relevance theory does not also hold in the Nigerian manufacturing firms irrespective of the amount of tax deductibility benefits enjoyed by them. This result further suggests that even with the introduction of “tax rate”, capital structure continued to be irrelevant to the determination of firms’ value in Nigeria within the investigating period. This result agrees with those of Predrag, Marina and Milan (2016) who submitted that irrespective of the tax deductibility benefits, leverage does not have significant effect on firm value. It however disagrees with those of Nenu et al. (2018), Mishelle (2021) who found that leverage has significant impact on the value of firms.

5. Conclusion

The study empirically tests the M & M relevance and irrelevance theories of capital structure in quoted manufacturing firms in Nigeria. The rationale for the study is based on the realization that the Miller & Modigliani (1958, 1961) theory is one of the most debated finance theories that has attracted so many attention among scholars across the globe till date. In order to ascertain whether any of these two theories holds in Nigeria, 16 manufacturing firms listed on the Nigerian Stock Market for the period 2010 to 2020 were tested. To this end, two models were formulated (i.e. relevance and irrelevance theories) such that short-term debt to equity ratio, long-term debt to equity ratio, total debt-to-equity ratio and firm size, firm age and firm growth (control variables) are regressed against Firm’s Value (proxied by Tobin Q). The fully modified ordinary least squares (FMOLS) was employed in the analysis of data, and the empirical results obtained from the two models indicate that: model 1 (irrelevance model), the three main variables (STDE, LTDE, TDETE) were all significant contrary to the appriori expectations that they must be insignificant. On the other hand, the result from model 2 (relevance model) showed that the three variables for consideration (TrSTDE, TrLTDE and TrTDETE) were not significant, even though TrLTDE was negative and those of TrSTDE and TrTDETE positive. This means that the relevance theory does not also hold in the Nigerian manufacturing firms irrespective of the amount of tax deductibility benefits. Thus, the conclusion is that M & M irrelevance and relevance theory does not hold in the Nigerian manufacturing firms within the investigating period.

5.1. Recommendations

Since the results have shown that irrelevance and relevance theory does not hold in Nigeria, it therefore follows that manufacturing firms in Nigeria should begin to focus attention on other factors outside capital structure that could possibly influence the value and performance of the firm. Some of the likely factors could be dividend policy, firm’s specific factors such as total assets, profitability, liquidity, risk exposure, growth among others.

Also, since long-term debt to equity ratio has no significant effect on firm’s value, rather, it has the tendency of reducing it as indicated by the negative sign of the coefficient, it therefore follows that manufacturing firms in Nigeria should employ pure equity financing rather than debt by issuing new shares to bring in more external ownership. This way, the value of the firms could be enhanced.

Lastly, there is need for Nigeria government to review the current company's tax laws especially the one that borders on tax rate/tax deductibility benefits which enables high levered firms to first settle all debt related obligations before their profits are taxed. This way, tax deductibility benefits could have the much needed positive impact on the overall value of manufacturing firms in Nigeria.

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