

The effects of Capital structure on the financial performance of large industrial listed firms in Nigeria

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Abstract

This research was aimed at exploiting the dynamic relationship between leverage and the value of the firm using the panel data of Nigerian firms couple with the use of partial adjustment model to establish the determinants of capital structure in Nigeria in relation with the main theories, it was observed that short term leverage constitute substantial proportion of the capital structure , while the concepts of trade-off theory and the pecking order theory could not adequately explain the capital structure decision in Nigeria, however there was a strong relationship between the leverage level and the value of the firm. It was also observed that the speed of adjustment to the target capital structure of Nigerian firm is relatively high when compared to the findings of western developed economies.

Keywords : Capital structure, Leverage, Target capital structure, Value of the firm and Adjustment speed

1.1 Background of the Study

This research study is aimed at establishing the determinants of capital structure in Nigeria and to determine the speed of adjustment of Nigerian manufacturing firms to the target capital level which can be called the equilibrium capital structure, while the determinants of the adjustment speed to the target capital will be evaluated.

The researcher observed that the major theories were formulated using the data from western developed economies of Europe and America with different socio-economic backgrounds, this research will contribute to knowledge by bridging the existing gap in the literature when this theories are tested using the data from Nigeria, however this will solve the problem of generalisation, while the result of this research should help the firms in Nigeria to response to financial distortions that could take the firm from the target capital and the attainment of the equilibrium position.

The concept of Capital structure examines the process of financing a company assets using the combination of equity and debt, this structure or composition of the firms liabilities could be used to attain the optimal capital structure.

The research paper published by Modigliani and Miller (1959) generated the controversy that triggers the huge academic discus that make capital structure one of the most popular aspect of the finance field, they observed that based on the assumption of perfect market the choice of capital structure does not affect the value of the firm. The academic debate that was generated by this study and realising that the real life is characterised with imperfect situation they conducted further studies that seems to accept the existence of an imperfect situation Modigliani and Miller (1963) then suggested a functional relationship between the value of the firm and the capital structure.

The question of the existence of an optimal capital structure was addressed by the introduction of the Trade-off theory, this theory argued that more benefits are derived when the firm financed it activities with the use of debt, that is debt finance is more beneficial and could move the firm closer to it equilibrium position ,while the ownership interest is protected in terms of profitability and maintenance of stake in the firm, ownership dilution could be a big challenge to a growing firm that decided to finance its activities with the issue of equity because new investors might come with new culture and objective that is compatible with the objective of the growing firm , this could lead to a conflict of interest and another distraction to the firm development.

This research study will critically evaluate the basic capital structure theories ; the Trade-off theory and the Pecking order theory to ascertain their relevance to the developing economics of Africa and particularly the efficacy of the concepts in Nigeria.

2.1 Literature Review

Capital structure as an aspect of corporate finance has been grossly neglected until the paper presented by Modigliani and Miller (1958). This paper was titled “the cost of capital, corporation finance and the theory of investment” based on the fundamental assumption of perfect financial market, they concluded that the value of the firm is not affected by the choice of finance or the capital structure when they stated that “regardless of the financing used, the marginal cost of capital to a firm is equal to the average cost of capital which is in turn equal to the capitalization rate for an unlevered stream in the class to which the firm belongs” and the optimal capital structure should not be a problem since the value of the firm is said to be indifferent to the capital structure and the finance options of the use of debt and equity. This position was supported with the argument that choice of financing does not affect the question of whether or not the investment is worthwhile but they noted that there is a possibility for the managers to prefer one form of financing to the other.

This work generated huge amount of interest and comment, mostly on the basic assumption of perfect financial market, the array of critics that followed lead to an amendment to this paper by Modigliani and Miller(1963) when the simplified basic assumption of a free and perfect market was relaxed to allow for a more realistic proposition, they then observed that based on the tax effect of debt finance the value of the firm could be influenced by the choice of finance and the capital structure therefore the attainment of the optimal capital structure becomes a major problem.

Titman and Wessel (1988) empirically analysed the optimal capital structure theory using the measure of short term debt, long term debt and convertible debt instead of the use of the aggregate measure of total debt, they discovered the major determinants of capital structure such as asset structure, non-debt tax shields, growth, uniqueness, industry classification, size, earnings, volatility and profitability. They however observed that the firm’s leverage is negatively related to the uniqueness of the line of business of the firm and concluded that the transaction cost is a major determinant of the choice of capital structure, the short term debt is negatively related to the size of the firm. This was supported by the findings of Alve and Francisco (2013) when they described these determinants as firm-level variables.

Ehrhardt and Brigham (2003) confirmed the existence of the optimal capital structure and that this is the combination of debt and equity that will lead to optimal value of the firm, however the value of the firm was defined as the present value of all the expected future cash flow to be generated by assets when discounted with the weighted average cost of capital (WACC), This was supported by Wet (2006) when he concluded that the optimal capital structure will lead to the lowest WACC.

Maghyreh(2005) observed that capital structure have become the most controversial aspect of corporate finance due to the interplay of the two main capital structure theories, the trade-off theory and the Peeking order theory, he stated further that these two theories do have a significant impact on the fundamental agency cost problem. He argued that M&M hypothesis is irrelevant today because of the unrealistic and simplified assumption of perfect capital market, he then concluded that the firms capital structure is an important determinant of the value of the firm and that leverage play a significant role to determine the performance of the firm and by extension the value of the firm. This fact was established with the use of banks reluctance to lend to highly geared firm with debt constituting a high proportion of the capital structure, this finding was supported with the study conducted by Rocca(2007)

Carpentier (2006) tested the irrelevant proposition that the value of the firm is not affected with a change in the firm’s leverage level using the M&M hypothesis and the Pecking order theory to determine the long term effect of capital structure change, She concluded that the relationship was not significant to predict a causal relationship between the leverage level and the value of the firm, while Ebaid (2009) also observed a weak relationship between the capital structure and the performance of the firm. However a research study conducted in India by Sinha and Bansal (2013) argued that Modigliani and Miller’s proposition that the value of the firm is influenced by the choice of financing the activities of the firm is relevant to Indian firms. This observation was supported by Fareed et al (2014) in the study of the textile industry in Pakistan, they argued that there is a weak relations between capital structure and the firms’ performance based on the observed low value of the goodness of fit of the adopted model and they then concluded that there could be other valuable variables.

Watson and Head (2006) observed the existence of a trade-off when a firm finances its activities usually between debt and equity financing they argued that debt financing is a more convenient source of fund for project finance for the owners interest could be protected and debt finance does not lead to the dilution of ownership interest that

associated with equity finance, therefore with debt the firm can raise fund for the firms growth without negatively affecting the ownership interest of the equity holders.

Justin Pittit (2007) emphasised the importance of tax benefit when the firm's activities are financed with debt he argued that debt financing is tax efficient ,since the interest on debt is an expense for tax purpose, this is a major advantage that will lead to a better operating cash flow and cost of capital will be reduced , he stated further that based on the Trade-off theory of capital structure, there will be a deliberate effort by the firm to attain an optimal capital structure , this could be achieve through the striking a balance between the cost of the firm's debt and the expected benefit. This was supported and developed further with the study conducted by Stretcher and Johnson (2011) .

The work of Myer (1984) was responsible for the popularity of the Pecking Order theory, in his research study he observed that before the issue of new equity, the firm will prefer the use of internal sources and then debt financing, he argued that the firm will first exploit the use of internal financing and will even prefer the use of debt financing to the equity finance. This was supported with the work of Sheikh et al (2011) when they argued that the composition and the feature of most financial market system forced companies to rely on internal financing for the finance of their activities and when internal financing is exhausted they then borrow from banks and non-bank financial institution for the external fund needs. If the firm could not generate adequate retained earning debt should be used, it was believed that a normally operated firms will not resort into the use of equity therefore the deficit will be matched with the use of debt.

Seppa(2008) tested the validity of the Pecking order theory in respect of Estonian non financial firms and observed that the relationship between profitability and leverage was negative and statistically significant. He also discovered a positive significant correlation between leverage and tangibility while a weak relationship between leverage and size of the firm was observed he noted that the importance of tangibility reduces with the increase in the size of the firm. He also concluded that the concept of pecking order theory was relevant to capital structure decision in Estonia, this was supported by the finding of Alve and Francisco (2013) except for the weak and mixed results for market-to-book as an explanatory variable.

Salawu(2007) conducted research using randomly selected companies in Nigeria to illustrate the factors that determines the capital structure of a firm and contrary to what was obtained in the western developed countries, he observed that leverage of Nigeria firms were dominated by short term debt, and this was the consequence of the of the financial market development and the availability of long term credit . He also observed that there was a positive correlation between leverage and growth opportunities, dividend paid and the size of the company. This result was consistent with the findings of Salawu, and Agboola, (2008), however both studies concentrated on the use of fixed effect to test the trade-off theory which could not establish a causal relationship.

A contrary result obtained by Akinyomi and Olagunju (2013) when they observed a negative relationship between leverage and the size of the firm, this is another attempt at the study of the static trade off concept while the adjustment to the target capital structure was ignored.

3.1 Methodology and Conceptual Framework

The first challenge faced is the measure of capital structure is the determination of leverage , however leverage will be adopted as the measure of capital structure . Titman and Wessels (1988) adopted the use of financial leverage in their study , they used both the book value and the market value of equity . Rajan and Zingalys (1995) measured leverage as the proportion of total debt to total capital, this was adopted by Mazor (2007) while Kakani (1999) expanded the measure of leverage to include the total leverage , short term leverage and long term leverage. This study will adopt the use of the total leverage , short term leverage and the long term leverage for the measure of leverage.

This research will be based on a panel data of selected non-financial companies that are listed at the Nigeria stock Exchange (NSE30) for the period between 2008 and 2012, this is the group of 30 biggest listed firms in Nigerian , The base year of 2008 was selected to reduce the effect of the structural break due to the global economic recession of 2008, however the factors used for the selection are :

1. The firms with continuous data for the Five years period
2. The availability of the firm's data in the relevant data base

Based on the criteria listed above 16 listed firms was selected this then resulted into 80 observations.

The data for the financial fundamentals of the selected companies is obtained from the Orbis database for the standardised information that can be compared globally and this also ensure the integrity and the reliability of the data and the research process due to a significant reduction in data bias.

The empirical framework for the critical examination of the capital structure determinants and the speed of adjustment to the target capital will be constructed based on the Myer(1984), Rajan and Zingalys (1995) Shyam-Sunder and Myers (1998) and Cotei (2011) to determine the model that will be used for the determination of the fixed effect and the dynamic partial adjustments.

The fixed effect model will be used to determine the target leverage that will optimize the value of the firm.

$$LEV_{it}^* = \alpha_i + \beta X_{it-1} \dots\dots\dots(1)$$

Where X_{it-1} is the vector of observed firm characteristics that is the independent variables, the total debt will be regressed against the firm characteristics based on the trade-off theory.

$$LEV_{it}^* = \alpha_i + \beta_1 Prof_{t-1} + \beta_2 Tang_{t-1} + \beta_3 Tax_{t-1} + \beta_4 Size_{t-1} + \beta_5 GR_{t-1} + \epsilon_t \dots\dots\dots(2)$$

Where;

- LEV_{it}^* is the target leverage based on total debt
- Prof is the measure of profitability, this is measured as the earnings after interest and tax per total asset, Prof = EBIT/Total Asset
- Tang is the measure of tangibility , this will be calculated as the total fixed assets per total asset
- Tax is the use of effective tax rate for the measure of tax shield, the effective tax rate is calculated as the corporate tax divided by the earnings before interest and tax, this is based on the works of Hovakimian et al (2001), karadeniz et al (2008)
- GR is the measure of growth level based on the use of Market-to-Book.
- Size is measured as the logarithm of total asset. (Log TA)

The market-to-book variable will be use to represent the growth variable, this is measured as, total liabilities plus market capitalisation divided by total assets, the market-to-book variable was used to represent growth variable by Myers (1977), Rajan and Zingale (1995), Booth et al (2001) , Nunkoo and Boateng (2010), Hovakimian and Guangzhong (2011)

While t-1 is the time dummy variable

The fixed effect could be divided into two components;

The Short-term leverage components that can be represented as;

$$LEV_{it}^* = \alpha_s + \beta_s X_{it-1} \dots\dots\dots(3)$$

The long-run leverage components that can be represented as;

$$LEV_{L,it}^* = \alpha_L + \beta_L X_{it-1} \dots\dots\dots(4)$$

The partial adjustment model will be derived to determine adjustment coefficient using the target capital and the adjusted leverage based on the dummy time .

$$LEV = \alpha_t + \beta_t (LEV_t^* - LEV_{t-1}) + \epsilon_t \dots\dots\dots(5)$$

The adjustment coefficient will be determined based on the short term debt and the long term debt to determine the impacts of these factors on the final result.

$$LEV_L = \alpha_L + \beta_L (LEV_L^* - LEV_{L,t-1}) + \epsilon_t \dots\dots\dots(6)$$

$$LEV_S = \alpha_s + \beta_s (LEV_S^* - LEV_{t-1}) + \epsilon_t \dots \dots \dots (7)$$

However,

$$\alpha_L + \alpha_S = \alpha_t$$

$$\beta_L + \beta_S = \beta_t$$

The adjustment coefficient of the target leverage and the lagged leverage is better measure of the speed of adjustment based on the summation of the short term adjustment coefficient and the long term adjustment coefficient that will result into the joint adjustment coefficient.

The value of the firm is measured using the firms performance determinants, ROE and ROA will be used as the measure of the firm's performance based on the work of Majumdar and Chhibber (1999) Abor (2005), Maghyereh (2005) , Abor (2007) and Ebaid (2009).

4.1 Analysis and findings

Based on the static and the dynamic capital structure model adopted, three definitions of capital structure was used for the regression analysis: total leverage, long term leverage and the short term leverage, however this study was aimed at testing the stated hypothesis to illustrate the interpretation of the main theories, the trade-off theory and the pecking order theory as they relate to large firms in Nigeria.

TABLE 1: Descriptive statistics

	LEV	LEVLT	LEVST	PROF	TANG	SIZE	TAX_SH	GROWTH
Mean	0.673806	0.213372	0.460435	0.225618	0.566092	5.768466	0.312107	1.888805
Median	0.690806	0.175908	0.421614	0.238121	0.566558	5.752029	0.313898	1.166248
Maximum	0.845777	0.431280	0.714941	0.406803	0.808442	6.516872	0.810424	5.579438
Minimum	0.506232	0.112924	0.283155	0.034081	0.385488	5.291660	0.093563	0.603169
Std. Dev.	0.090891	0.088867	0.118051	0.114289	0.111799	0.348785	0.116474	1.380148
Skewness	-0.083080	0.784603	0.489676	-0.319362	0.300809	0.498554	2.337322	1.262827
Kurtosis	2.153021	2.501891	2.027150	2.240837	2.126691	2.308765	12.67968	3.536209
Jarque-Bera	0.931228	3.388154	2.381958	1.230370	1.405767	1.840036	144.4356	8.333058
Probability	0.627750	0.183769	0.303924	0.540541	0.495155	0.398512	0.000000	0.015506
Sum	20.21419	6.401146	13.81304	6.768538	16.98276	173.0540	9.363216	56.66416
Sum Sq. Dev.	0.239576	0.229021	0.404147	0.378798	0.362469	3.527883	0.393417	55.23947

Table1 show the descriptive statistics of the samples, the mean leverage of sample was 67% while maximum was 85% and the minimum was 51%. The gap seems to be wide but there was a fair distribution of the samples, however it becomes obvious that the leverage is dominated by the short term leverage, with a ratio of 2:4 between the long term leverage and short term leverage.

In this research study, there are three definition of leverage; the total leverage that is illustrated in table2 , the long-term leverage shown in table3 and the short-term leverage shown in table4.

The regression analysis was illustrated in table3 using the panel least squares method, the R² which is the leverage coefficient was low at 0.4055 however the validity of the data and the analysis result was based on the value of F-statistic and the probability value that confirm that the result are valid and good for using the independent variable for the explanation of the behaviour of the dependent variable.

TABLE 2: Regression analysis of Total Leverage

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PROF	-0.565649	0.171145	-3.305084	0.0030
TANG	0.100224	0.176071	0.569224	0.5745
SIZE	-0.079991	0.071467	-1.119274	0.2741
TAX_SH	0.009796	0.127933	0.076572	0.9396
GROWTH	-0.022423	0.011819	-1.897213	0.0699
C	1.245409	0.387313	3.215510	0.0037
R-squared	0.405510	Mean dependent var		0.673806
Adjusted R-squared	0.281658	S.D. dependent var		0.090891
S.E. of regression	0.077035	Akaike info criterion		-2.112257
Sum squared resid	0.142425	Schwarz criterion		-1.832017
Log likelihood	37.68385	Hannan-Quinn criter.		-2.022606
F-statistic	3.274146	Durbin-Watson stat		0.790575
Prob(F-statistic)	0.021490			

Table2 show a negative and significant relationship between the leverage and profitability which is consistent with pecking order theory and the finding of Rajan and Zingales 1995, Booth et.al(2001).

Tangibility also have a positive but not significant relationship with leverage level, this is consistent with the trade-off theory and the pecking order theory. The growth opportunity has a negative and significant relationship with leverage, this is consistent with the agency cost hypothesis based on Titman and Wessel (1988). There was a negative relationship between the leverage and the size of the firm but not significant however this is consistent with the pecking order theory. There was a low positive and not significant relationship between the tax shield and leverage, This is consistent with the trade-off theory.

TABLE 3 : Regression analysis of Long term Leverage

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PROF	0.179075	0.112526	1.591405	0.1241
TANG	0.376792	0.143929	2.617904	0.0148
SIZE	-0.001197	0.016775	-0.071353	0.9437
TAX_SH	0.018387	0.116699	0.157557	0.8761
GROWTH	-0.021156	0.009593	-2.205377	0.0368
R-squared	0.455794	Mean dependent var		0.213372
Adjusted R-squared	0.368721	S.D. dependent var		0.088867
S.E. of regression	0.070607	Akaike info criterion		-2.312357
Sum squared resid	0.124634	Schwarz criterion		-2.078824
Log likelihood	39.68535	Hannan-Quinn criter.		-2.237648
Durbin-Watson stat	0.788384			

Table3 was to illustrate long-term debt definition of leverage, it shows a positive but not significant relationship with profitability and tax shield while tangibility has a positive and significant relationship however there is a negative correlation between long-term leverage and both size of the firm and growth and growth opportunities while size was not significant, growth opportunities was.

TABLE 4 : Regression analysis of Short term Leverage

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PROF	-0.361308	0.148408	-2.434562	0.0224
TANG	-0.532644	0.189824	-2.805994	0.0096
SIZE	0.143344	0.022124	6.479061	0.0000
TAX_SH	-0.048701	0.153911	-0.316426	0.7543
GROWTH	0.016389	0.012652	1.295382	0.2070
R-squared	0.463582	Mean dependent var		0.460435
Adjusted R-squared	0.377755	S.D. dependent var		0.118051
S.E. of regression	0.093122	Akaike info criterion		-1.758806
Sum squared resid	0.216792	Schwarz criterion		-1.525273
Log likelihood	31.38209	Hannan-Quinn criter.		-1.684097
Durbin-Watson stat	1.184951			

Table4 show a negative and significant relationship between short-term leverage and both profitability and tangibility, there is a negative relationship between short-term leverage and tax shield while there is a positive relationship between the size of the firm and leverage and a weak positive relationship between short term leverage and growth opportunities, the strong negative relationship between short-term leverage and tangibility could be due to the fact that firms with tangible assets could attract long term finance therefore they might not go for short term finance which seem to be more expensive.

The robustness of the analysis was tested using the serial correlation model, the the result of autocorrelation and partial correlation are normal while the q-statistic show a reasonable sum of the probabilities, this is used to confirm the validity of the result

The validity of the hypothesis was tested using the pairwise Granger causality tests, the result in table8 show that leverage could not be adequately explained in term of causality by independent variable, this outcome was affected by the size of the sample which was considered to be small to establish causality.

The speed of adjustment which was measured using the tool of GMM (Generalised method of moments) seems to be high at 0.8782 which could be translated to 87.82 percent.

Table 5 : The effect of leverage on ROA

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LEV	0.397450	0.044851	8.861634	0.0000

Table 5 show the of leverage on the value of the firm using ROA (Return on assets) , there is a positive and significant relationship between capital structure and the value of the firm, though R^2 indicated that leverage could adequately explain the behaviour and the changes in the value ROA.

Table 6 : The effect of Leverage on ROE

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LEV	0.977473	0.099372	9.836465	0.0000

Table6 show the relationship between leverage and the value of the firm measured with ROE (Return on equity) there is a positive and significant relationship between capital structure and the value of the firm.

Conclusion

Capital structure have become very controversial with the increase in the volume of attention given to this aspect of corporate finance, however the major theories such as the trade off theory, the pecking order theory and the concept of agency theory are formulated based on the studies conducted in the western developed countries hence the need to confirm the validity of these concept lead to the conduct of this research study and to be able to advise Nigerian firm on way to optimise the firm.

It should be noted that the negative and significant relationship between leverage and profitability and not significant relationship between leverage and other determinants as tangibility, growth opportunity, the size of the firm and tax shield indicates a weak or partial validity of the pecking order theory and the trade off theory therefore the weak value of R-squared implied that leverage structure of Nigerian firms cannot be adequately explained by these theories.

This research confirm the validity of the theories tested on Nigerian firm and that the value of the firm and the capital structure are highly correlated therefore the firm could maximised it's value with the deep understanding and manipulation of the variables with significant relationships.

This study could be considered as a major deviation from the study of static trade-off theory in Nigeria, a deliberate attempt is made to investigate the dynamic trade-off theory and the pecking order theory and it was discovered that Nigerian firms could need about three years to adjust to the target capital whenever there is a disruptions in the market.

This study is faced with the limitations of the impact of generalisation since only large listed firms were selected and the omission of financial institutions from the sample, while there is need to examine the high value of the speed of adjustment to the target capital. It is expected that a more detailed study conducted with all the firm listed in the Nigerian Stock Exchange included to eliminate the sampling bias problem and the effect of other variable not tested in this study could also be addressed.

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