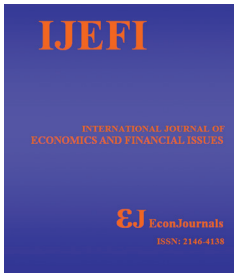

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Dynamic Modeling of Market Value and Capital Structure in Nigerian Firms

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ABSTRACT

In this paper, the researchers employed panel generalised method moments to examine the controversy facing the dynamic relationship between market value of firms (MvFs) and capital structure. The made use of twenty four quoted firms from ten sectors in Nigeria between 2010 and 2017 inclusive. Modigliani and Miller (1958), states that the value of a firm should not depend on its capital structure whereas Myers (1984) static trade-off theory and income theory support the relevance of capital structure in determining the firm's value. However, this study revealed that both equity and debt capital instruments at first difference impact positively and significantly on the MvFs. That means the researchers findings support the argument that capital structure is relevant to MvFs. It is the opinion of the researchers that based on the outcome of this study, that firms should have a mix of both debt and equity in their financing structure in order to enhance the market value of the firm. It should be done in an optimal way so as to achieve the desired objective of increase in market value of the firm.

Keywords: Market Value, Equity and Debt Capital, Dynamic Modelling, Panel Generalised Method of Moments
JEL Classifications: G32, C58

1. INTRODUCTION

Many financial analysts posit that the performance (value) of a firm is dependent on the sources of Finance of such firm. Sources of finance of start-up capital of a firm are mixed in such a way as to deliver optimal result. Capital structure of a firm therefore is how the firm finances all its operations and at the same time growth, using different sources of finance. It is important to note that financing decision is a very critical role of a finance manager, as such the manager must decide on a very optimal financing option so as to remain afloat.

The two different sources of finance of a firm are debt and equity capital (EqC/Debt capital [DeC]). Debt comes by way of issuance of bonds, and/or long-term borrowings. It is a fixed commitment whose obligation must be met irrespective of the progress of the firm. EqC on the other hand is classified as common stock, preferred stock, or retained earnings. It is the capital contributed in exchange of shares of stock or ownership of a firm. Consequently, efficient capital structure of a firm is the optimal mix of the above-mentioned sources of funds in order to meet the organization's objective. (Chowdhury and Chowdhury, 2010) defined capital structure of a firm as the apportionment of its operating cash flow between debt holders and shareholders.

The relationship between capital structure decisions and firms' value cannot be overemphasized, and has been severally researched on in the past. There are two schools of thought on the relationship between capital structure and firms' value. While, Modigliani and Miller (1958) posit that given frictionless markets, homogeneous expectations; capital structure decision of the firm is irrelevant. Desai (2007) opined that firms of the same risk class could possibly have higher cost of capital with higher leverage, or their capital structure may affect the valuation of the firm, with

more leveraged firms, being riskier and consequently valued lower than the less leveraged firms. The problem of insolvency faced by various firms in Nigeria which has lead to the collapse of so many companies, aroused the interest of the researchers in this area. The researchers will want to find out whether capital structure of a firm can make the firm more valuable or not. Therefore, it will be good to know whether to raise DeC or EqC or the mix. The issue of finance is thus necessary that it's been known as an on the spot reason for business failing to start out within the 1st place or to progress. Thus it is necessary for firms in Nigeria to be able to finance their activities and grow over time, if they are ever to play an increasing and predominant role in creating value in the economy.

2. REVIEW OF RELATED LITERATURE

2.1. Theoretical Framework

Various researchers have done a lot of work in the area of theory of capital structure. One of the foremost works in this area came from Modigliani and Miller (1958), who are the proponents of Modigliani and Miller (M-M) theory of capital structure which states that under some assumptions, that the firm's value is not affected by the capital structure. The M-M theory assumes that the capital market is perfect where all players in the market have access to information, no transaction cost, bankruptcy cost and no taxation exist; equity and debt selection become moot and internal and external funds will be utterly substituted. Arguing further, the M-M theory of capital structure posits that the value of firms should not depend on the structure of the firm's capital. Expectedly, the M-M theory equally states that a firm should have the same market value and the same weighted average cost of capital (WACC) at all capital structure levels, since the value of a company should depend on the return and risks of its operation and not on the way it finances its operations. They concluded by saying that by the time these key assumptions are relaxed, capital structure may become relevant to the firm's value. There were some criticisms to the postulations of M-M which centred on the idealist posture of this theory. Researchers say that the assumptions of a perfect market, no bankruptcy and taxation costs are better imagined than real.

Consequently, more work has been done in this area which includes that of Myers (1984) who proposed the static trade-off theory supports the relevance of capital structure in determining the firm's value. This theory suggests that corporations have optimum capital structure and that they move towards the target, and that when debt is employed in capital structure, firms are faced with the challenges of tax break and bankruptcy price, thus the need for trade-off between the two. This theory advises firms with high growth opportunities to borrow less because it is more likely to lose value in financial distress. This is as a result of trade-off theory prediction that safe corporations i.e. firms with a lot of tangible assets and a lot of subject financial gain to defend, should have high debt ratios. While risky firms i.e. firms with a lot of intangible assets that the worth can disappear just in case of liquidation, ought to rely more on equity financing. Trade-off theory predicts that more profitable firms should mean more debt-serving capacity and more taxable income to shield; therefore, a higher debt ratio will be envisaged.

Another theory of capital structure is the traditional theory. In Ejem and Ogbonna (2019), Cuthbertson and Nitzsche (2001) the traditional theory argues that as the firm acquires increasing amount of debt, then the WACC (overall cost) first falls but eventually rises, thus leading to an optimal debt to equity ratio. Okpara (2012) recorded that the traditional theory focuses on the judicious mix of debt and EqC. He contended that judicious mix of debt and EqC increase the value of the firm. In the words of Van Horne (2002), the traditional approach to valuation and leverage assumes that there is an optimal capital structure and that the firm can increase the total value of the firm through judicious use of leverage. This theory was brought to limelight by David Durand and Solomon Ezra, they maintained that the use of low-cost debt can change the market value of the firm (Ndubuisi, 2003). Pandey (1999), the traditional view, which is also known as intermediate approach, is a compromise between the net income approach and the net operating approach. According to this view, the value of the firm can be increased or the cost of capital can be reduced by a judicious mix of debt and EqC.

Net income theory, according to Broyles (2003), Pandey (1999) and Van Horne (2002) net income theory suggests that companies should borrow as much as possible in order to take full advantage of the cost of debt. The assumption is that the cost of debt and equity remain constant as borrowing is increased. On this basis, it would be best to borrow as much as possible in order to minimize the overall cost and maximize the market value of the firm (Ejem and Fijoh, 2013). This shows that, in the net income view, capital structure is relevant in determining the firm's value.

In his pecking order theory Donaldson (1961) opined that "managers tend to finance new projects by first using internally available funds, with external funds being their last choice." Stockholder theory was the work of Friedman (1962) and it says "the primary responsibility of firm managers is to attain shareholder wealth (profit) by any legal means" in trade-off theory Kraus and Litzenberger (1973) stated that "there is an optimal capital structure that derives from balancing the benefits of tax from using debt against the costs associated with debt, such as bankruptcy or financial distress." In the agency theory Jensen and Meckling (1976) recommended that "capital structure decisions must be taken to reduce agency costs by decreasing the costs of EqC with high leverage levels, thus increasing the firm's market value. Hence, leverage is that the answer to any conflict which may arise."

The cash flow theory of Scott (1981), decided that "if the firm has enough cash flow to pay its expenses, especially debt, it will be able survive" stakeholder theory of Freeman(1984), declared that "stakeholders are the drivers of a firm's success." Free cash flow (FCF) of Theory Jensen (1986) is of the opinion that "FCF might have a negative effect on corporate performance. A firm's manager would possibly waste FCF or and invest it in negative net present value projects." Dual-investor theory of Schlossberger (1994) states that "all parties (stakeholders and stockholders) are important to ensure a firm's survival and success" in their stewardship theory Davis et al. (1997) declared that "management is personally motivated by willingness to achieve, gain satisfaction through successfully performing challenging work, and implement

responsibility and authority to benefit the firm." In their market timing theory Baker and Wurgler (2002) observed that "managers, depending on their definition of firm value, tend to issue equity when they feel that the market overvalues their company."

2.2. Empirical Framework

Ejem and Ogbonna (2019) in their study using Nigerian data on quoted firms considered one of the influential questions in corporate finance: Does M-M proposition 1 on capital structure and firm's value stand? The researcher fit the three conventional panel data models; pooled regression, fixed effects and random effects models, to panel data, consisting of 10 cross-sectional units that are observed annually for 6 years from 2010 to 2015. The results show that, although, the fixed effects model outperformed the pooled regression model based on likelihood ratio test, the random effects model, which assumes that the unobserved firm-specific factors are uncorrelated with the capital structure variables, however, outperforms the fixed effects model based on the Hausman specific test. Also discovered in their research that both equity and long-term debts have a positive and significant relationship with a firm's market value, with their joint influence explaining approximately 73% of the variation in market value per share. There is also evidence of a cointegrating relationship in the market value model, thus, both equity and long-term debt have long run relationship with firm market value. Therefore, the researchers concluded that equity and long-term debt are significant explanatory factors for a firm's value in Nigeria. In other words, a judicious mix of equity and debt can enhance a firm's value.

Lawal (2014) examined capital structure and the value of the firm of Nigeria banking industry using ordinary least squares technique and white HAC heteroskedasticity and observed that the debt instrument play significant role in magnifying the value of the Nigeria banking firms, while equity role is partially significant.

Oboh et al. (2012) investigated corporate structure and corporate market value with empirical evidence from Nigeria. The study employed multiple regression estimators and discovered that significant relationship exist between non-financial firm's market values and their debt-equity ratios and a negative relationship between a firm's total-debt/total capital ratio and its market value.

Supa (2012) employed multiple linear panel regression models to examine the factors influencing capital structure decisions so as to maximize the value of a firm, and a dynamic panel regression model using one-step and two-step Arellano and Bond generalized method of moments (GMM) estimation approach to determine the speed of adjustment towards target capital structure, and observed that a positive relationship exist between a firm's debt and its median industry leverage.

Antwi et al. (2012) had critical look at the capital structure and firm value in Ghana cross sectional analysis. The study used all the 34 companies quoted in the Ghana stock exchange for the year ended December 31, 2010. The result revealed that emerging market like Ghana, EqC market as a component of capital structure is relevant to the value of a firm and long term debt was also found to be the major determinant of a firm's value.

3. METHODOLOGY

3.1. Sources of Data and Tools for Analysis

The data employed in this paper are sourced from annual reports and accounts of twenty-four quoted firms of the ten sectors in Nigeria for market value of firms (MvF), EqC and DeC from 2010 to 2017. In testing for multicollinearity, the correlation matrix is engaged in this study, also to examine if long run relationship exists between the dependent and independent variables in this paper, Kao residual cointegration is used. To capture the dynamic relationship between capital structure and MvF, the researchers used panel GMM.

3.2. Model Specification

The function model is as follows;

$$\text{Market value} = f(\text{Capital structure}) \quad (1)$$

$$\text{Market value} = f(\text{EqC, DeC}) \quad (2)$$

While the explicit form in first difference is;

$$MvF=b_0+b_1MvF_{t-1}+b_2EqC+b_3EqC_{t-1}+b_4DeC+b_5DeC_{t-1}+e_{t-1} \quad (3)$$

$$logMvF=b_0+b_1logMvF_{t-1}+b_2logEqC+b_3logEqC_{t-1}+b_4logDeC+b_5logDeC_{t-1}+e_{t-1} \quad (4)$$

Where,
MvF = Market Value of firm, EqC = Equity Capital, DeC = Debt Capital, e_{t-1} = Idiosyncratic term.

3.3. Apriori Expectation

The operation definition is; market value = f (EqC, DeC), b_1, b_2> 0< 0. The researchers expect proportionate combination of EqC and DeC influences either positively or negative on the MvFs.

4. DATA ANALYSIS AND RESULTS

Table 1 below reveals the correlation of the variables. The correlations between EqC, DeC and MvF are 0.753959 and 0.723618 respectively, between EqC and DeC is 0.260719. The highest value here is 0.75 which informs that the variables are not linearly correlated. Therefore, the researchers have sufficient evidence to announce the absence of multicollinearity in the model.

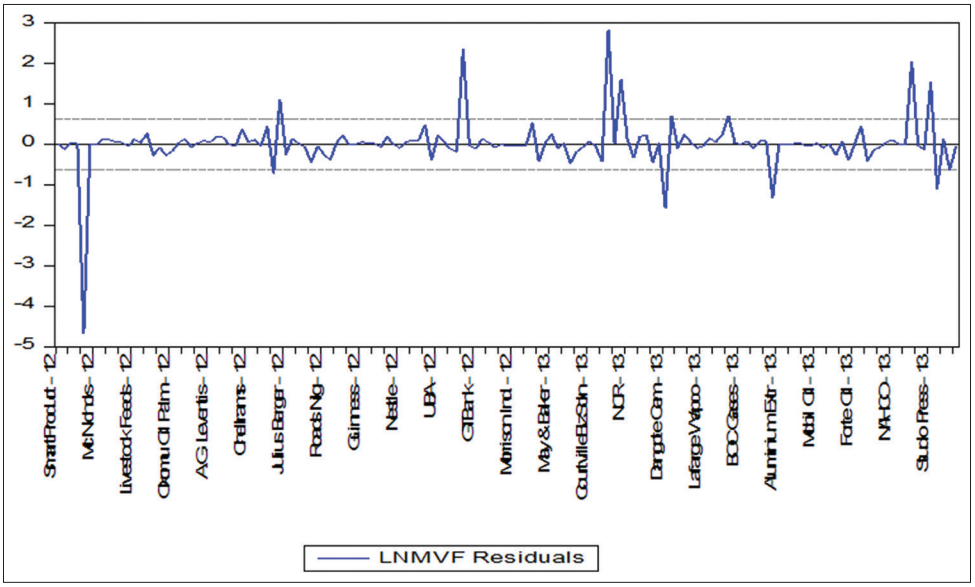
Table 2 below indicates that long run relationship exists between capital structure and market value. The Kao cointegration is normally stated in null hypothesis form, which is "no cointegration." The result in Table 2 shows that ADF t-statistic is −1.860012 with probability value of 0.0314. Here, the null

Table 1: Correlation matrix

	MvF	EqC	DeC
MvF	1.000000	0.753959	0.723618
EqC	0.753959	1.000000	0.260719
DeC	0.723618	0.260719	1.000000

Source: Authors' computation with E-view 10. MvF: Market value of firms, EqC: Equity capital, DeC: Debt capital

Figure 1: Residul Graph for LNEqC, LNDeC and LNMvF



Source: Authors' computation with E-view 10

Table 2: Kao residual cointegration

Technique	t-statistic	Prob.
ADF	−1.860012	0.0314

Source: Authors' computation with E-view 10

Table 3: Generalised method of moments

Dependent variable: LNMvF				
Method: Panel generalized method of moments				
Transformation: First differences				
Date: 09/07/19 time: 13:58				
Sample (adjusted): 2012 2017				
Periods included: 6				
Cross-sections included: 24				
Total panel (unbalanced) observations: 143				
Difference specification instrument weighting matrix				
Instrument specification: LNEqCLNEqC (−1) LNDeCLNDeC (−1)				
Constant added to instrument list				
Variable	**Coefficient**	**Std. error**	**t-statistic**	**Prob.**
LNEqC	0.552505	0.058679	9.415696	0.0000
LNDeC	0.134767	0.055963	2.408156	0.0173
Effects specification				
Cross-section fixed (first differences)				
Mean dependent var.	0.243567	Std. deviation dependent var.		1.011028
Std. error of regression	0.638113	Sum squared resid		57.41357
J-statistic	1.953553	Instrument rank		4
Prob (J-statistic)	0.376523			

Source: Authors' computation with E-view 10

hypothesis is rejected, since 0.0314 is <5% at 5% significance level. For that, the researchers have enough evidence to state that there is existence of long run relationship between market value and capital structure (EqC, DeC).

The researchers now progressed to estimating the model with panel GMM. The reason for using GMM is that the economy is dynamic; historical information determines the future.

Table 3 below reveals the estimation of the model using panel GMM at first difference. LNEqC has coefficient of 0.552505 with Probability value of 0.0000, while LNDeC parades coefficient of 0.134767 with probability value of 0.0173. This shows that both EqC and DeC instruments exert positive and significant impact on the value of firm. J-statistic is associated with coefficient of 1.953553 with probability value of 0.376523, which shows the model is significant and good to go.

Figure 1 below affirms the researchers' apriori expectation that proportionate combination of EqC and DeC influences either positively or negative on the MvFs. At Figure 1, firms at certain period influence either positive or negatively on the MvFs.

5. CONCLUSION AND SUGGESTION FOR POLICY MAKING

This study further examined the long-time controversies existing between various schools of thoughts on whether capital structure is either relevant or irrelevant to the MvFs. Prior to estimation of the model, the model was seen not to have problem of multicollinearity, also long run relationship was established between market value and capital structure. The results of these analyses reveal that at first difference, both EqC and DeC instruments impact market value positively and significantly. These results contradict propositions of Modigliani and Miller (1958), that the firm's value is not affected by the Capital Structure; firm should have the same market value and the same WACC at all capital structure levels, since the value of a company should depend on the return and risks of its operation and not on the way it finances its operations. This study corroborates the assertions of Myers (1984) static trade-off theory and Income theory which supports the relevance of

capital structure in determining the firm's value. It is the opinion of the researchers that based on the outcome of this study, that firms should have a mix of both debt and equity in their financing structure in order to enhance the market value of the firm. It should be done in an optimal way so as to achieve the desired objective of increase in market value of the firm.

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