THE DEVELOPMENT OF DEBT TO EQUITY RATIO IN CAPITAL STRUCTURE MODEL: A CASE OF NIGERIAN MANUFACTURING FIRMS

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Abstract:

The arguments on the responsiveness of capital structure leverage to sets of its major determinants have dominated the corporate finance literature. There is however no consensus regarding the direction of effects of these determinants on debt to equity ratio. In contribution to existing literature, this study explored development of debt to equity ratio in capital structure in the Nigerian context. The method of estimation used is the Panel-Fully Modified Ordinary Least Squares (FMOLS). The Pedroni cointegration test was employed to test for long-run relationship. The descriptive statistics and the panel unit root test are the preliminary test. We ascertained that our series are stationary, and normally distributed as precursor to determining if the variables are cointegrated. We established that there is a long-run relationship between debt to equity ratio and tangibility, profitability, firm growth and firm size. The panel regression estimate confirmed the trade-off theory and the pecking order hypothesis in Nigeria as tangibility was found to have positive effect on corporate leverage. However, the finding with regards to growth and firm size supports the trade-off theory while discrediting the pecking order assumption. Profitability on the other hand confirmed the pecking order theory for Nigeria and shows that profitability has negative effect on debt to equity ratio. The robustness and reliability of the findings was embedded on the controls for residual weaknesses and disturbances.

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1. Introduction

The corporate finance literature has traditionally focused on the study of long-term financial decisions, particularly investments, capital structure, dividends or company valuation decisions. However, the key developments of capital structure with keen emphasis on debt to equity ratio need to be carefully analyzed. Gomez et al., (2012) state that if financing decisions are not right it will definitely affect the value of the firm. Supporting this assertion, Oino (2014) argues that bankruptcy is ultimately an outcome of high exposure to debt. The maximization of shareholders' wealth remains the main objective of any profit-making organization. Ukaegbu & Oino (2012) highlight the need for finance managers to maintain the appropriate selection mix between debt and equity. In response to fewness of studies on this field, this study attempt to evaluate appropriate capital structure model from the perspective of the Nigerian manufacturing sector. Determining the optimal capital structure is often a daunting challenge for managers. Handoo & Sharma (2014) emphasise that in periods of credit expansion, firms find it very difficult to maintain an ideal liquidity level. When credit expands, liquidity contracts and firm, firms that mostly have do not have predictable cash flow rely on borrowing when usually translates to accumulation of excess debt.

Gleason, Mathur & Mathur (2000) suggest that every firm has a specific strategy which is critical to improving the performance of a firm especially when the firm is facing diverse level of debt and equity integrated in the capital structure. Achieving the optimal mix of debt and equity is difficult to attain (Ukaegbu & Oino, 2014). Ramalho and Silva (2007) opine that variation in size has considerable influence in determining the capital structure compositions. Manufacturing firms have broad access to external financing and eventually they rely more on internally generated funds resulting from profitable operations compared to smaller firms like the SMEs (Uyar & Guzelyurt, 2015). Coleman (2000) supports this view and argued that small firms are normally unable to secure adequate sources of finance and this consequently results bankruptcy and failure. A few studies have actually attempted to determine the factors that determine capital structure. For instance, Anuar & Chin (2016), Hashemi (2013), Al-Najjar & Taylor (2008) state that growth, firm size and profitability influence the composition of debt in capital structure, while Gomez et al. (2001) and Ondieki, Gaster & Moraa (2013), and Saarani & Shahadan (2013) in their study suggest that liquidity is also a determinant of debt in capital structure. It is important to understand on how firms choose their financing choices by examining the relationship between capital

structure and firm's profitability and gauges the main attribute of capital structure that could influence on the firm's profitability because long-term survivability of the firm heavily depends on its profitability and to know sound of capital structure decision made. Since interest is tax deductible in Nigerian tax systems, so that we expect that it will impact the capital structure decision made by the firm. Thus, study of capital structure would provide valuable insights on how strategic decision on implementing investments would affect firm values, which in return, used to determine the firm position in the market.

The major contribution of this study to existing knowledge is in adopting dynamic analytical approach lacking in existing literature. The robustness of our parameters will be tested while a panel cointegrating association, which is rarely applied in panel estimation, will be determined. The panel dynamic OLS has been found a major breakthrough in panel data processing and will be employed in estimating our baseline linear function. The need to fill these gaps in knowledge is the major motivation for this study.

2. Literature Review

A firm's capital structure refers to the mix of its financial liabilities (Kochhar, 1997). It refers to a mixture of a variety of long term sources of funds and equity shares including reserves and surpluses of an enterprise (Pratheepkparth, 2011). Chou & Lee (2010) view capital structure as including a mixture of debt and equity financing. Whether or not an optimal capital structure exists in one of the most important and complex issues in corporate finance.

According to Pandey (2000) capital structure refers to the mix of long-term sources of funds, such as debentures, long-term debts, preference share capital and equity share capital including reserves and surpluses (i.e. retained earnings). In the words of Abor (2008), capital structure is defined as the specific mix of debt and equity a firm uses to finance its operations.

From the above discussion, two financing options are open to financial managers – debt and equity. Thus, the financial manager can increase shareholders' claim or increase creditors' claim on the assets of the firm. Shareholders' claim increases when shares are issued for public subscription while creditors' claim increases when the company borrows on a short-term or a long-term basis. The various means of financing company operations represent what is known as financial structure. The financial structure of a firm is shown on the balance sheet as combination of liabilities and equity.

Hamid, Abdullah & Kamaruzzaman (2015) explain that the importance of capital structure to users of financial information, such as to shareholders, creditors, investors,

regulators, analysts and other stakeholders cannot be overemphasised. It is critical since the decision on capital structure impacts on the performance of the firms (Gill et al., 2009; Shubita & Alsawalhah, 2012). Moreover, capital structure also avails users and managers the required information geared towards having a grasp of how strategic decision in the firms affects organizational performance and value creation. Essentially, to main firm's sustainability, Ting & Lean (2011) opine that firms must come up with a focused strategy that enhances the reliance on internal financing in lieu of external finances. However, at any point where external financing must be sought, Shubita and Alsawalhah (2012) suggest that the firms will prioritize secured debt over risky debt and, as a last resort; firms are ideally expected to only issue equity or common stock. Azhagaiah & Gavoury (2011) contend that tax system also influence management decisions on how debt is to be financed.

In a system where interest from the external financing or debt is not tax deductible, firms will have no preference for the firms as to whether they use debt or equity to finance their assets since there is no difference between the two choices. Thus, the firm will not choose debt financing as their capital structure since they will not receive any tax advantages of debt. Whilst, where interest is tax deductible, the firm would maximize the value of their firms by using 100 percent debt financing. This is due to the tax benefit that the firm able to enjoy using the debt financing as their capital structure (Hamid, Abdullah & Kamaruzzaman, 2015). However, Nadaraja et al., (2011) stress that overdependence on debt financing will ultimately drive the firm to default risk with increased likelihoods of bankruptcy. Hence, balancing both cost and benefits is crucial in arriving at optimal capital structure level.

Firms that are highly leveraged are such firms with high-growth opportunity. High-growth firms are more likely to rely on external financing. Bhaduri (2002), Chen (2004), Tan and Jang (2005), Norvaisiene and stankevciene (2007), Oyesola (2007), Shah and Khan (2007), Al-Najjar and Taylor (2008), and Cespedes et al. (2009) in Anuar and Chin (2016) posit that there exist a strong association between growth and total debt. According to Saraani & Faridah (2013), It is becoming evident that for growth firms, investment projects with positive net present value may be rejected especially when face d with underinvestment problem.

A firm with high asset tangibility is more likely to issue secured debts than firms whose asset tangibility is low. When a firm has vast amount of fixed assets, it stands a chance to secure credit facilities at a cheaper rate as these assets can be collateralized. Debt structure in manufacturing firms may also affected by the maturity period of externally acquired finances. Most manufacturing firms are big firms and more likely to use long-term debts compared to small firms that may rely on credits with less maturity period (Sogorb-Mira, 2005). The nature of association between capital structure and firm's profitability also remains contentious. While Hall et al., (2004) argue that there is

a negative relationship between leverage and profitability; Nguyen and Ramachandran (2006) contend that there is no strong evidence of association between profitability and firm leverage.

2.1 Empirical Review

Didier & Schmukler (2013) examined the extent to which firms use capital markets to acquire financing and grow in China and India. The study used new data on domestic and international capital financing and firm performance. The results showed that financial market activity has contracted in the 1990s contrary to the suggestion of aggregate figures. Few firms could obtain capital and just a fraction attracted most of the financing. The findings equally revealed that firms that issue equity or bonds are different and operate differently from other listed public firms. Publicly listed firms were also found to be typically larger and grow faster.

With respect to acquiring firm, Bouzgarrou (2014) investigated the influence of family control on acquisition financing decisions. The sample of the study comprised 265 acquisitions undertaken by French listed firms between 1997 and 2008. The finds indicated that when the family voting rights are high, the possibility to finance the acquisition with debt is high, compared to equity financing. This entails that that the control motives affect financing choices significantly. Control-enhancing mechanisms were also observed to influence financing decision.

Ponikvar, Tajnikar & Pušnik (2015) assessed the effect of firms' growth rate on various financial and non-financial performance ratios. The study estimate the impact of growth on financial and non-financial indicators and equally accounted for unobservable individual effects of each firm by exploring several two-way fixed effect panel models with regression analysis. The results revealed that understanding the impact of growth rates on financial and non-financial ratios avails managers of growing firms additional important information pertinent for making business decisions.

In a study that covered 46 family firms and 46 non-family firms, Hamid, Abdullah & Kamaruzzaman (2015) examined the influence of capital structure on profitability of firms in Malaysia for the period 2009-2011. This study applied varied parameters for capital structure which included short-term debt ratio, long-term-debt ratio and debt ratio to observe the effect on the profitability which is measured by return on equity. The finding revealed that profitable firms rely more on equity as their main financing option. The results confirmed that increase in leverage position is linked to a decrease in firm's profitability.

Barry & Mihov (2015) assessed the roles of lenders and venture capitalists comprising 6000 IPO firms within the period 1980–2012. The authors showed that, generally, venture capitalists and lenders finance different types of firms and while in some instances, they are substitutes. On the other hand, in some occasions, interactions

and complementary roles between lenders and venture capitalists were observed. Firms with high debt appeared to have lower valuation uncertainty as well as initial day returns compared to those funded through venture capital. Moreover, in long-run, firms with high debt position tend to underperform, an outcome more likely for those without venture capital.

3. Data and Methodology

The secondary data will be used in this study. These are data obtained from the annual report of selected publicly listed Nigerian manufacturing companies. The sample size of 15 firms for the period 1999 to 2014 was selected based on data availability and quality. The research design is basically the *ex-post facto* design. This is essentially because we are studying a historical event, which are events that had already taken place.

The panel estimation will be employed to analyze our data. Specifically, the panel Fully Modified Least Squares (FMOLS) will be utilized the estimating our base line model. Panel FMOLS have been found to be reliable contemporary methodology and automatically correct for heteroskendasticity in a model. The panel data method generally brings more advantages by simultaneously integrating the times series and cross sectional methods. The panel data method is a combination of times series and cross sectional properties in the data.

This study will also use the panel (Pedroni) cointegration in assessing the nature of association between the explained variable and the regressors. Only few studies have actually adopted the panel approach to conitegration especially on the Nigerian case. A group panel unit root test will be used in determining the stationarity of the proxy variables. Since our data has time series feature, we it is pertinent that we ensure that our data has no unit root. There have been a number of studies of using panel data analysis in their research, but not many of these studies the development of capital structure of debt to equity ratio in manufacturing firms in Nigeria. The general regression model of panel data is written as follows:

$$DER_t = \beta_0 + \beta_1 TAN_{i,t} + \beta_2 GRT_{i,t} + \beta_3 PRF_{i,t} + \beta_4 SZE_{i,t} + \varepsilon_{i,t} - - - - - - - - - - (1)$$

Where DER = debt to equity ratio, TAN = tangibility, GRT = growth, PRF = profitability, SZE = firm size, β_0 = intercept, β_1- β_4 are parameter estimates, and ε_t = error term.

4. Results and Discussion

Table 1: Descriptive statistics

	DER	TAN	GRT	PRF	SZE
Mean	0.527007	0.803259	0.345341	0.241160	6.826174
Median	0.547735	0.588838	0.282827	0.216605	6.903037
Maximum	4.470337	4.841465	3.768518	0.993300	8.404207
Minimum	-1.077422	0.000000	-0.144245	-0.900000	3.298416
Std. Dev.	0.487623	0.718271	0.347088	0.362142	0.876145
Observations	3968	3968	3968	3968	3968
Cross sections	16	16	16	16	16

Source: Author's, 2016.

Table 4 presents the descriptive statistics of the panel data series, revealing individual characteristics of our proxy variables. From a residual normality point, we can observe that the mean and the median of each of the variable are approximately equal with the exception of tangibility which is still significantly equal to unity. This very indication shows that our variables are normally distributed.

The stationarity status of our data series was determined. There are standard five criteria for determining stationarity and they include Levin, Lin & Chu t*, Im, Pesaran and Shin W-stat, ADF - Fisher Chi-square and PP - Fisher Chi-square. Three out of the four criteria have p values significant at 5% critical value. This outcome indicates that our variables are indeed stationary, and have no unit root. We may run the panel cointegration in other to determine if there is a long run association between the regress and the regressors.

Table 3: Panel (Pedroni) Cointegration test

Pedroni Residual Cointegration Test
Series: DER TAN GRT PRF SZE
Sample: 1999 2014
Null Hypothesis: No cointegration
Alternative hypothesis: common AR coefs. (within-dimension)

			Weighted	
	Statistic	**Prob.**	**Statistic**	**Prob.**
Panel v-Statistic	6.178506	0.0000	6.178506	0.0000
Panel rho-Statistic	-2.558268	0.0053	-2.558268	0.0053
Panel PP-Statistic	-53.35551	0.0000	-53.35551	0.0000
Panel ADF-Statistic	-32.03317	0.0000	-32.03317	0.0000

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	**Prob.**
Group rho-Statistic	-1.166022	0.1218
Group PP-Statistic	-58.96186	0.0000
Group ADF-Statistic	-34.96087	0.0000

Source: Author's, 2016.

The panel (Pedroni) cointegration test is presented in table 3. This cointegration parameter has 11 parameters for determining cointegration. In the table, we can observe that 10 of 11 cointegration criteria confirm that there is cointegration equation between the independent variable and the other determinants. This overwhelming econometric assertion leads us to affirm that there exis a long-run relationship between debt to equity ratio and the regressors. In other words, the variables in both sides of the equation move along in the long-run.

Table 4: Panel Fully Modified Least Squares (FMOLS)

Dependent Variable: D(DER)
Method: Panel Fully Modified Least Squares (FMOLS)
Sample (adjusted): 2000 2014
Total panel (unbalanced) observations: 230

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TAN)	0.038519	0.030926	1.245519	0.2143
D(GRT)	-0.218286	0.089988	-2.425732	0.0161
D(PRF)	-0.083943	0.047347	-1.772947	0.0777
D(SZE)	0.113684	0.024146	4.708261	0.0000
R-squared	0.814397	Mean dependent var		0.551984
Adjusted R-squared	0.783318	S.D. dependent var		0.484782
S.E. of regression	0.448700	Sum squared resid		42.27962
F-statistic	6.840731	DW		1.643297
Prob(F-statistic)	0.000016			

Source: Author's Estimation

Panel FMOLS estimate in table 4 above explains the actual effect of the explanatory variables on corporate leverage. In line with the theoretical expectation in trade-off and the pecking order postulations, tangibility exerted positive effect on debt to equity ratio. Growth and profitability both have negative impact on debt to equity ratio, and while the former supports the trade-off and the information asymmetry theory, the later confirms the *a priori* expectation of the pecking order theory. Firm size was found to have significant positive effect on debt to equity ratio discrediting ther pecking order assumption but confirm the trade-off theory. The overall effect of the regressors on the dependent variable is quite significant as only 19% of such effects were not captured in the model.

5. Conclusion

The arguments on the responsiveness of capital structure leverage to sets of its major determinants have dominated the corporate finance literature. There is however no consensus regarding the direction of effects of these determinants on debt to equity ratio. In contribution to existing literature, this study explored development of debt to equity ratio in capital structure in the Nigerian context, with aim of filling gaps in

methodology which have been argued to undermine the credibility of previous findings. We ascertained that our data set are stable and normally distributed as precursor to determining if the variables are cointegrated. A more sophisticated method of panel estimation other than the traditional method was adopted which among other advantages purges the defects posed by heteroskendasticity prevalent in the conversional estimation method. We established that there is a long-run relationship between debt to equity ratio and tangibility, profitability, firm growth and firm size. The panel regression estimate confirmed the trade-off theory and the pecking order hypothesis in Nigeria as tangibility was found to have positive effect on corporate leverage. However, the finding with regards to growth and firm size supports the trade-off theory while discrediting the pecking order assumption. Profitability on the order hand has confirms the pecking order theory for Nigeria and shows that profitability has negative effect on debt to equity ratio. The robustness and reliability of the findings was embedded on the controls for residual weaknesses and disturbances.

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