Optimal Mix of Capital Structure and Performance of Nigerian Quoted Manufacturing Companies

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Abstract

The corporate sector in Nigeria is characterized by a large number of firms operating in a largely deregulated and increasingly competitive environment. Capital structure issue has received substantial attention in developed countries and has remained neglected in the developing countries like Nigeria. The study investigated the effects of optimal capital structure on performance of quoted manufacturing companies in Nigeria. This study adopted descriptive research designed method and offers a one- fold contribution to the empirical debate on adoption of innovation in capital structure. Data of ten years from 2008-2017 were collected from the annual reports of the selected quoted manufacturing companies on the Nigerian Stock Exchange while the panel data were analyzed using multiple regression analytical model and applying standard bi-directional Granger-causality tests to the issue of the relationship between dependent and independent variables. A dichotomous variable of intangible asset (R&D) was introduced to capital structure. This study provides support for the pecking order theory as firms are less indebted when operating profitability increases, but the use of external funding increases with their innovative efforts. Findings revealed a negative and an insignificant relationship between capital structure (asset tangibility, financial leverage, fixed interest before tax, Research & Development costs) and performance (Return on Capital Employed) of Nigerian Quoted Manufacturing Companies. It was concluded that it should come to the knowledge of the policy makers, and economic agents (individual investors and firms) that the performance of firms in Nigeria depend on proper management and composition of their capital structure while management must strive to determine the best mix of debt and equity that would maximize the wealth of shareholders.

Keywords: *Capital structure, Optimal Mix, Profitability, R&D, Fixed interest*

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Background to the Study
The financial liberalization in Nigeria over the years have changed the operating environment of firms by giving more flexibility to the managers in choosing the firm's capital structure (Salawu & Agboola, 2008). Capital structure is the mix of a company's long-term debt, specific short term debt, common and preferred equity and how a firm finances its overall operations and growth by using different sources of data (Ogbulu & Emeni, 2012). Some studies have generated many results that attempted to explain the determinants of capital structure. The pioneering work of Modigliani and Miller (1958) commonly known as the MM theory, on the capital structure led to the development of several other theories that explained the basic determinants of capital structure of the firms.

The debate over the significance of a company's choice of capital structure cannot be over emphasized but in essence, it concerns the effect on the total market value of the company (the combined value of its debts and equity)'in splitting the cash flow stream into a debt and earn equity components. In the review of literature, some scholars traditionally believed that increasing a company's leverage would increase its value up to a point but beyond that point, further increases in financial debts would increase the company's overall cost of capital and decrease its total market value. MM challenged this view and argued that if the company's investment capital is held fixed and certain other assumptions are satisfied, the combined market value of a company's debt and equity is independent of its choice of capital structure. There are only a limited number of studies that have been carried out to examine the factors influencing the capital structure of Nigerian firms.

This study examined the optimal mix of capital structure and the effects on performance. Opoku and Adu (2012), described technology as a critical driving force behind industrial innovation, and success in competition depends upon the sustained growth of Research &Development spending, which allows one to develop and introduce products and technology faster than one's competitors and technological innovation refers to the process through which industry conceives and develops new products or production processes. Adoption of new technology exploitation involves the use of advanced technology or scientific developments to create better products or manufacturing processes. In this case R&D is a technological innovation because research can develop technical solutions to tackle environmental or societal challenges, but such technologies need to be successfully commercialized to have a real environmental impact.

It has been argued that financial constraints should affect R&D investments more severely because of the high degree of uncertainty characterizing innovation output. There is also evidence that such constraints may have different impacts depending on firm-specific characteristics such as size and age, or institutional factors (Aggarwal, 2014). Much of the empirical work on the relationship between a firms' financing and innovation is based on the traditional framework developed in order to analyze capital investment decisions, and thus assumes that the direction of causality runs from finance to innovation. This interpretation might also be reinforced by the generally recognized strategic relevance of forms of seed funding, such as venture capital, in stimulating technological progress (John, 2013). The

various identifiable kinds of innovation and the different dimensions along which it can be studied are radical vs. incremental, continuous vs. discontinuous, closed vs. open innovation paradigms, R&D statistics, patent data, innovation surveys and product announcements. Indeed, the difficulties inherent to such measurement are brought to light, such as the latency between investment and results, the creation of intangible assets and the causal ambiguity of the development of new ideas.

Capital structure of a firm describes the management decision as regards the form of capital mix of such organizations. It is the making of a decision as to how the capital of the firm should be financed. Is it through internal funding or external? Internal funding includes financing through the retained earnings, tangible and liquid assets while external funding is through external debts and equity. Some firms introduce intangible assets such as R&D into their capital structure while some introduce low or no R&D. The introduction of R&D into a firm's capital structure may affect the shareholder's wealth and the value of the company. Research itself is innovative, systematic, scientific and technological (John, 2013). Among the various theories of capital structure is Modigliani and Miller (1964), that considered a perfect market as no transaction or bankruptcy costs, perfect information where firms and individuals can borrow at the same interest rate, no taxes and investment returns are not affected by financial uncertainty while the trade-off theory of capital allows bankruptcy cost to exist as an offset to the benefit of using debt as tax shield. In another development of packing wider theory which tries to capture the costs of asymmetric information. It states that companies prioritize their sources of financing (from internal financing to equity) according to the law of least resistance preferring to raise equity as a financing means of last resort. Hence, internal financing is used first, when that is depicted, debt is issued, and when it is no longer sensible to issue anymore debt, equity is issued. The capital structure substitution theory is based on the hypothesis that company management may manipulate capital structure such that earnings per share (EPS) are maximized.

Capital structure is normally made of equity capital, preference capital and long-term loan (debt) capital. Debt capital such as long-term bonds is used by the firm to finance its investment decision by paying back the principal and interest in return. The combinations of different capital types (optimal capital mix) will have differing impacts on firm performance. This is because each capital type has its own cost and incentives for the firms, thus defining or influencing the way the firms operate.

Puri and Zarutskie, (2012), opined that capital structure is normally made of equity capital, preference capital and long-term loan (debt) capital. Debt capital such as long-term bonds is used by the firm to finance its investment decision by paying back the principal and interest in return. The combinations of different capital types will have differing impacts on firm performance. This is because each capital type has its own cost and incentives for the firms, thus defining or influencing the way the firms operate. The result of a firm performance is the output where the stakeholders hope for a positive outcome. One of the debatable issues in finance is regarding the idea or concept of performance.

Study related to firms' performance originates from organization theory and strategic management. Performance measure can be divided into two categories which are financial performance or organizational performance. Profit maximization, maximizing profit on assets and maximizing shareholders' value are examples of measurement for financial performance. On the other hand, operational performance such as growth in revenue and market share referring to a wide definition of performance since they focus on determinants that contribute to financial performance (Chemmanur & Fulghier, 2014).

The sources and modes of financing a firm is very important not just to the managers but also to the fund providers because if a wrong mix of finance is employed, the performance and survival of the business enterprise may be seriously affected. Firms financing decisions involve wide range of policy issues which may be outside the direct control of the management. At the macro level, they have implications for capital market development, interest rate and security price determination and regulation while at the micro level, such decisions affect capital structure and company's development. It is therefore pertinent to say that the management of a company determines an appropriate capital structure which would ensure that their businesses continue as a going concern (Ogbulu & Ememni, 2012).

The capital structure of a firm or more specifically the firm's debt-to-equity ratio provides insight into how risky a company is. Usually, a company that is more heavily financed by debt poses greater risk, as this is relatively highly geared. Thus, the concept and an understanding of the capital structure of a firm are extremely important because it can influence not only the return a firm earns for its shareholders, but whether or not a firm survives in the period of recession or depression. Capital structure decisions are very difficult to make in uncertain economies. In developing economies, the existence of macro environment factors such as high and soaring interest rates, volatility in economic and political situations are important factors that determines the capital structure of firms. The presence of the factors above causes financing decisions to experience a significant rise. In addition, the dwindling economic activities also raise uncertainty. A firm's leverage is defined as the percentage ratio of total debt to total assets (Olokoyo, 2013). Following the relevant empirical literature, this can be considered a measure of the extent to which a firm uses borrowing instead of equity in order to finance its activity. It is worth recalling that our leverage index does not allow us to distinguish between different categories of debt according to the maturity structure (Bartoloni, 2008).

Aghim, Klemn, Bond and Marinescou (2004) found a nonlinear relationship with the debt/assets ratio: firms that report positive but low R&D use more debt finance than firms that report no R&D, but the use of debt finance falls with R&D intensity among those firms that report R&D. They found a simpler relationship with the probability of issuing new equity: Firms that report R&D are more likely to raise funds by issuing shares than firms that report no R&D, and this probability increases with R&D intensity. The shares of bank debt and secured debt in total debt are both lower for firms that report R&D compared to those that do not, and tend to fall as R&D intensity rises.

The knowledge about capital structure has mostly been derived from data in developed economies that have many institutional similarities (Belleflammea, Lambert & Schwienbacher, 2014). Since different countries have different institutional arrangements, mainly with respect to tax and bankruptcy codes, existing market for corporate control and the roles banks and security markets played. It might prove inadequate to infer that what occurs in the developed economies or what determines their capital structure can be used to explain what is obtainable in the developing countries. However, the capital structure issue has received substantial attention in developed countries but it remained neglected in the developing countries like Nigeria.

Benvenuti, Casolaro and Gennari (2013) noted that until recently, development economics have placed little importance to the role of firms in economic development. Moreover, until the eighties, the corporate sectors in most developed countries faced several challenges on their choices of sources of company's finance because, access to equity markets was either regulated or limited due to the under developed stock markets (Chemmanur & Fulghier, 2014). The empirical literature on capital structure has received substantial attention in developed countries but it remained neglected in the developing countries like Nigeria. Optimal capital structure often includes information on R&D activities as control variables but the big challenge is whether R&D should be part of capital structure or not and the effects of its inclusion has on the firm's value? What should be the best mix of capital structure that would reduce WACC and improve shareholder's wealth? There is need to address these questions in order to find out the association between the adoption of technological innovation in optimal capital structure and profitability of Nigerian quoted manufacturing firms.

Literature Review
The capital structure of a firm comprises of both the long term sources of finance which include debt and equity financing and the short term sources of finance like liquid assets. Myers (1984) in his study that developed the pecking order theory identified that the capital structure of firms ranges from internal to external financing. He identified internal financing to include retained earnings while the external financing includes debt financing and equity financing while Gonzalez-Uribe (2013) in line with Myers (1984)'s model argued that the capital structure of a company ranges from share capital, retained earnings and debt financing.

Kerr, Lerner and Schoar (2014) examined whether capital structure affects profitability of manufacturing firms. The methodology used was descriptive and sampling techniques was used to sample the listed industries and the effect on their performances, which were Cadbury Nigeria, Dangote Cement, Nestle Nigeria Plc, Nigeria Breweries, Coca-cola Bottling Company. It was concluded that capital structure is insignificant to performance. Myers (1993) did a study that investigated the effect of capital structure on the firm's which shows negative relationship between debt ratio and profitability of company. Onaolapo and Kajola (2010) investigated the effect of capital structure on performance and witnessed that the financial annual report had a negative effect on a firm profitability. The study sort to find

determinants of capital structure from the period of 2001 – 2011. The study identified a strong positive relationship between leverages and returns. On equity, Liquidity, return on investment, defining indicated that all measure of capital structure (total debt ratio, long and short term ratio) were negatively related to the return of asset in the regression.

Modigliani and Miller (1963) suggested that capital structure of companies should be formed completely of debt because interest payment results to lower tax. This assertion may be valid in theory form and completely of debt because interest payment may only be accomplished if tax benefits are equal to bankruptcy costs. In this scenario, the duty of managers is to recognise the achievement of optimal capital structure and then maintain it. It is the only appropriate point where cost of financing and weighted average cost of capital are reduced resulting to enhanced performance and cooperate value. By exercising theoretical models, management teams are quite capable of developing optical capital structure (Puri & Zarutskie, 2012). They argued that the financial performance of a company was not interrelated to the salary of a manager. Hence, managers prefer huge benefits instead of sharing company profits (dividends) with shareholders. Thus, shareholders are faced with the task of ensuring that mangers are working with the target of maximizing firm value. Shareholders are required to look for ways of settling principal agent problems.

John (2013), examined the optimum level of capital structure which a firm can increase its financial performance in Nigeria using annual data of ten firm's spanning a five year period. The results showed that asset turnover, size, firm's age and firm's asset significantly affect performance. In another development, Akeem, Edwin, Kiyanjul and Kayode (2014) stated that a firm's capital structure implies the proportion of the debt and equity in the total capital structure of the firm while Pandey (1999) as cited in Akeem et al. (2014) differentiated between capital structure and financial structure of a firm by affirming that the various means used to raise funds represent the firm's financial structure, while the capital structure represents the proportionate relationship between long-term debt and equity. According to Inanga and Ajayi (1999) as cited in Akeem et al. (2014) the capital structure of a firm does not include short-term credit, but means the composite of a firm's long term funds obtained from various sources. Therefore, a firm's capital structure is described as the capital mix both equity and debt capital in financing its assets.

According to Javiddin, Jamil and Roni (2017) capital structure is the combination of the debt and equity structure of a company. It can also be referred to as the way a corporation finances its assets through some combination of equity, debt or hybrid securities; that is the combination of both equity and debt. However, not all business firms use a standardized capital structure hence they differ in their financial decisions under various terms and conditions. It is therefore a difficult situation for these firms to determine the capital structure in which risk and costs are minimum and that can raise the value of shareholder wealth and or minimize profits (Olokoyo, 2013). The various component of a firm's capital structure according to Inanga and Ajayi (1999) as cited in Akeem et al. (2014) may be classified into equity capital preference capital and long-term loan (debt) capital. Equity capital refers to the contributed capital; Money originally invested in the business in exchange for shares of shock;

and retained profits; profits from past years that have been kept by the company to strengthen the balance sheet, growth, acquisition and expansion of the business. Preference capital refers to a hybrid that combines the features of debentures and equity shares except the benefits while debt capital refers to the long terms bonds used by the firm in financing its investment its decisions while coming up with its principal and also paying back interest.

According to John (2013) the capital structure of a firm comprises of both the long-term sources of finance which include debt and equity financing, and the short-term sources of finance, for example, cash, reserves, etc. Myers (1984) as cited Opoku and Adu (2012) observed that the capital structure of firms range from internal financing to external financing. He included retained earnings while the external financing includes debt financing and equity financing. Zoppa and McMahon (2002) as cited in David and Olorunfemi (2012) observed that a company's capital structure should include the following; (a) Reinvested profits (R.Es); (b) Short-term debt financing like trade credit; (c) Long-term debt financing like debentures and long-term debts etc. (d) New equity capital injections form existing owners and owner managers; (e) New equity capital from uninvolved parties like outside investors, venture capitalists etc.

Methodology
This study investigated the effect of capital structure on the performance of quoted manufacturing companies in Nigeria The study adopted descriptive research designed method. Data of ten years from 2008-2017 were collected from the annual reports of Guiness Plc and Cadbury Nig. Plc quoted on the Nigerian Stock Exchange. The study offers a one- fold contribution to the empirical debate on adoption of innovation in capital structure. It provides a comprehensive descriptions of possible simultaneous patterns which may affect a firm's performance with the introduction of a dichotomous variable of innovation (R&D to capital structure. The study identified possible simultaneity patterns whereby we used the firms Tangible Assets, debt ratio (Leverage), given by the percentage ratio of total debt to total assets, as a proxy for its financial leverage, Fixed Interest as measure of capital structure and the ROCE as a proxy for its operating profitability; these variables are derived from financial information of the selected firms. We also used a dichotomous variable (INN) as a proxy for the firm's successful innovation; this variable was based on the innovation survey and assumed value of where the firms have introduced technological innovation (product and/or process innovation) and zero otherwise. The panel data were analyzed using multiple regression analytical model and applying standard bi-directional Granger-causality tests to the issue of the relationship between tangible and profitability; debt ratio and profitability, fixed interest and profitability and innovation and profitability. We used a Vector Autoregressive Representation and introduced (R) regression using a lagged dependent variable as explanatory variable. .

Specification of Empirical Model
Model Specification
Lag ROCE = $\beta_0 + \beta_1$ lagTangible $+\beta_2$lagFinLev$+\beta_3$lagFixed interest $+\beta_4$lagR&D $++$
ROCE = Return on Capital Employed

Note: Tangible/Total Assets, Financial Leverage(Debt/Equity) and Fixed Interest Coverage ratio and R&D/Total Assets are measures of capital structure.

β_o, β_1, $\beta_2\beta_3$ and β_4 are parameters, β_o=intercept, = Unobserved or heterogeneity effect; and u = residual error of firm i in year t

Results and Discussion
Results
Table 1: Model summary[1]

Model	R	R square	Adjusted R Square	Std. Error of the estimated
1	.669[a]	.447	.171	.16624

    a. Predictors: (Constant), Fixed Interest Rate, Tangible Asset Ratio, Financial Leverage, Innovation (R&D)

    b. Dependent variable: Return On Capital Employed

Table 1: ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig
1	Regression	134	3	.045	1.620	.281[b]
	Residual	166	6	.028		
	Total	300	9			

    a. Dependent variable: Return On Capital Employed

    b. Predictors: (Constant), Fixed Interest Rate, Tangible Asset Ratio, Financial Leverage, Innovation (R&D)

Table 3: Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficient	T	Sig P-Value
	B	Std. Error	Beta		
(Constant)	.033	.206		.160	.878
TANGIBLE ASSET RATIO	-.549	.624	-.508	-.879	.413
FINANCIAL LEVERAGE	1.145	.724	.917	1.581	.165
FIXED INTEREST RATE	.012	.014	272	.869	.418
INNOVATION (R&D)	.002	.007	.018	.167	.138

Table 4: Model Summary [2] Values for Guinness Plc and Cadbury Plc

	Guinness Plc	Cadbury Plc
Tools	Values	Values
R	0.460	0.424
R^2	0.212	0.179
Adjusted R^2	0.182	-0.231
Standard error	**0.**34618	**0.**53081

Discussion

The Result in table 1 above was extracted from the model summary table of return on capital employed (ROCE) which provides overview of the result. Since R=0.669, it indicates that there exist strong positive relationship between ROCE, Tang, Finlev and Fixed interest as measures of capital structure i.e. as ROCE increases, all other variables also increase. The primary interests are the R square and adjusted R- squared which were 0.447 and 0.171 respectively. It shows that the weighted combination of the predictor variables (Tang, Finlev and Fixed interest) explained approximately 44.7% of the variance of Return on capital employed (ROCE) for the ten years' period (2008-2017). The adjusted R^2 of 0.171 indicates that about 17.1% of the predictor variables can be explained for when other variable is added to the model. The R^2 reveals the validity of the coefficient of multiple determination (R^2). From table 2 above, the F-ratio of 1.620 in the ANOVA table test the significance of all the predictor variables. Since the P-value is 0.281 is greater than the $\beta = 0.05$ level of significance, it indicates that Tang, Finlev and fixed Interest have explained an insignificant amount of variation in the value of ROCE i.e. the model does not have power of predictive.

From table 3 above the model specification indicates that a unit decrease in the Tangible cause -0.549 decreases in figures of ROCE while a unit increase in Finlev causes 1.145 increase in ROCE, unit increase in fixed interest causes 0.012 increase in ROCE. Also, when Tangible, Finlev interest and INN could not be accounted for, ROCE will remain 0.33 for the year. The table shows that constant and parameter of the measure capital structure is statistically insignificant at $\beta = 0.05$ since the P-value of 0.878, 0.413, 0.165, 0.418 and 0.138 were greater than β value = 0.05 level of significance based on the generated P- Value results and the t-statistic.

Since all the P value of optimal capital structure parameters (0.413, 0.165, 0.418 and 0.138) are greater that β value (0.05) therefore we accept the null hypothesis and concluded that there is no significant relationship between optimal capital structure and performance of the selected Nigerian quoted manufacturing companies when adopting R&D in their optimal capital structures. Since R= 0.460, it indicates that there exists moderate positive relationship between ATR, Tang, Finlev and Fixed Interest and INN as measures of capital structure i.e. as ATR increases all other variables also increase. The primary interests are the R Square and adjusted R-squared which were 0.212 and 0.182 respectively. It shows that the weighted combination of the predictor variables (Tang, Finlev and Fixed Interest) explained approximately 21.2% of the variance of acid test ratio (ATR) for the ten years' period (2008-2017).

Conclusion

The effect of a firm's capital structure on companies' performance has been examined by using a qualitative indicator, an output measure derived from the firms' annual reports of ten years. The adoption of R&D costs in optimal capital structure is not a necessary factor to determine a firm performance. Whether a company adopts R&D or not, the optimal level or best level of debt to equity would still be achieved except in other circumstances. This result, which holds regardless of a firm's size, indicates that when internal resources are not sufficient to cover large innovative projects, debt financing is required. Unfortunately, given the characteristics of our data set, we cannot testfor other important implications of the pecking order theory regarding different sources of finance according to thematurity structure of debt and the possibility of issuing equity finance.

In addition, financial institutional factors may play a crucial role in shaping the innovation path, due to the strong relationship between Nigerian industry and the banking system. While there is evidence that the development of local banks may affect a firm's innovative process and can reduce financial constraints faced by small firms investing in fixed capital (Benfratello, Lambert, & Schwienbacher, 2008). It should be borne in mind that the use of inventory and venture capital markets by Nigerian Manufacturing Companies is still relatively limited compared to other industrialized countries. Therefore, it should come to the knowledge of the policy makers, and economic agents (individual investors and firms) that the profitability and performance of firms in Nigeria depend on proper management and composition of their capital structure. From the analysis it is crystal clear that the selected capital structure indicator variables have no significant influence over financial ratios of the selected manufacturing companies.

Conclusively, the result indicates that there is no significant relationship between capital structure and performance of the Nigerian manufacturing companies. Indeed, R&D investment presents several peculiarities that distinguish them from other industrial investments. The fact that the mid-term expected result of R&D investments is an intangible activity, represented by new knowledge, and that these investments are subordinated to higher uncertainty due to their long-term, high risk-high reward nature, makes them inherently less appealing to external investors with low risk tolerance. Furthermore, the appropriate ability of the new knowledge produced, the asymmetric information arising between investors and entrepreneurs, and moral hazard issues, all contribute in creating an investment not appealing to traditional financial intermediaries. As a consequence, we could see how innovative firms have adopted a financing cycle approach to overcome financial constraints, where specific financial resources are ideal at each respective life-stage of firms.

Recommendations

The findings of this study are equal to documents in theoretical frameworks and literature to fill any gap in knowledge. For example, Hurdle (1973) concluded in their study that financial leverage has a negative impact on profitability. According to the result and hypotheses tested, it is recommended that management must strive to determine the best mix of debt and equity that will maximize the returns of the company because it is only at that point that the wealth of

shareholders will be maximized. It is clear that capital structure is an important management decision as it greatly influences the owners' equity return, the owner's risks as well as market value of the shares. It is therefore necessary for the management of a company to develop an appropriate structure. In this doing, all the factors that are relevant to the company's capital decision should be properly analyzed and balanced. The implication of this is that the sampled firms were not able to utilize the fixed asset composition of their total assets judiciously to impact positively on their companies' performance. Hence, this study recommends that assets tangibility should be driven factor to capital structure because firms with more tangible assets are less likely to be financially constrained.

Furthermore, the researcher recommends that scholars in the field of operations management should seek to create a model that should guide practitioners on the proper mix of the measures of capital structure and measure of performance. This would ensure effectiveness in the measurement of capital structure and therefore enhance the levels of the profitability in the manufacturing companies.

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