

## **Effects of Capital Structure on Firm's Performance: Empirical Study of Manufacturing Companies in Nigeria**

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### **Abstract**

This research examines the effect of capital structure on firm's performance with a case study of manufacturing companies in Nigeria from 2003 to 2012 with the purpose of providing a critical appraisal of the need and importance of capital structure. Descriptive and regression research technique was employed to consider the impact of some key variables such as Returns on asset (ROA), Returns on equity(ROE), Total debt to total asset(TD), Total debt to equity ratio(DE) on firm performance. Secondary data was employed using data derived from ten (10) manufacturing companies.

From our findings, we observe that capital structure measures (total debt and debt to equity ratio) are negatively related to firm performance. It is hereby recommended that firms should use more of equity than debt in financing their business activities, in as much as the value of a business can be enhanced using debt capital. Hence firms should establish the point at which the weighted average cost of capital is minimal and maintain that gearing ratio so that the company's value will not be eroded, as the firm's capital structure is optimal at this point ceteris paribus.

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## 1 Introduction

Financing is one of the crucial areas in a firm. A financing manager is concerned with the determination of the best financing mix and combination of debts and equity for his firm. Capital structure decision is the mix of debt and equity that a company uses to finance its business (Damodaran, 2001).

One of the importances of capital structure is that it is tightly related to the ability of firms to fulfill the needs of various stakeholders. Capital structure represents the major claims to a corporation's assets which includes the different types of both equities and liabilities (Riahi-Belkaoui, 1999). There are various alternatives of debt-equity ratio, these includes; 100% equity: 0% debt, 0% equity: 100% debt and X% equity: Y% debt (Dare & Sola 2010). From these three alternatives, option one is that of the unlevered firm, that is, the firm that shuns the advantage of leverage (if any). Option two is that of a firm that has no equity capital. This option may not actually be realistic or possible in the real life economic situation, because no provider of funds will invest his money in a firm without equity capital. This partially explains the term "trading on equity", that is, it is the equity element that is present in the firm's capital structure that encourages the debt providers to give their scarce resources to the business. Option three is the most realistic one in that, it combines both a certain percentage of debt and equity in the capital structure and thus, the advantages of leverage (if any) is exploited. This mix of debt and equity has long been the subject of debate concerning its determination, evaluation and accounting.

After the Modigliani-Miller (1958 & 1963) paradigms on firms' capital structure and their market values, there have been considerable debates, both in theoretical and empirical researches on the nature of relationship that exists between a firm's choice of capital structure and its market value. Debates have centered on whether there is an optimal capital structure for an individual firm or whether the proportion of debt usage is relevant to the individual firm's value (Baxter, 1967). Although, there have been substantial research efforts devoted by different scholars in determining what seems to be an optimal capital structure for firms, yet there is no universally accepted theory throughout the literature explaining the debt-equity choice of firms. But in the last decades, several theories have emerged explaining firms' capital structure and the resultant effects on their market values. These theories include the pecking order theory by Donaldson, (1961), the capital structure relevance theory by Modigliani and Miller (1963), the agency costs theory and the trade-off theory (Bokpin & Isshaq, 2008).

Financial constraints have been a major factor affecting corporate firms' performance in developing countries especially Nigeria. The basis for the determination of optimal capital structure of corporate sectors in Nigeria is the widening and deepening of various financial markets. Mainly, the corporate sector is characterized by a large number of firms operating in a largely deregulated and increasingly competitive environment. Since 1987, financial liberalization has changed the operating environment of firms, by giving more flexibility to the Nigerian financial managers in choosing their firms' capital structure. Alfred (2007) suggested that a firm's capital structure implies the proportion of debt and equity in the total capital structure of the firm. Pandey (1999) differentiated between capital structure and financial structure 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 capital. Therefore, a firm's capital structure simply refers to the combination of long-term debt and equity financing.

However, whether or not an optimal capital structure exists in relation to firm value, is one of the most important and complex issues in corporate finance.

The corporate sector in the country is characterized by a large number of firms operating in a largely deregulated and increasingly competitive environment. Since 1987, financial liberalization resulting from the Structural Adjustment Program changed the operating environment of firms. The macroeconomic environment has not been conducive for business while both monetary and fiscal policies of government have not been stable. Following the Structural Adjustment Program, lending rate rose to a high side from 1.5 percent in 1980 to a peak of 29.8 percent in 1992; but it declined to 16.9 percent in 2006. The high interest rate implies that costs of borrowing went up in organized financial market, thus increased the cost of operations. The Structural Adjustment Program (SAP) came with its conditions, policies that liberalized and opened up the Nigerian economy to the outside world even when the nation's domestic produce cannot stand in equal comparison to international commodities, causing unfavorable balance of payment as domestic demand for foreign goods increased also led to the high volatility of the exchange rate system thereby rendering business in Nigeria uncompetitive, especially given high cost of borrowing and massive depreciation of Naira, which culminated to increasing rate of Inflation in Nigeria.

The main objective of the study is to critically examine the effect of capital structure on the performance of firms in Nigeria. The specific objectives are to:

1. Evaluate linkage between the value of the total debt and returns on assets and investment
2. Determine the association between financial leverage and returns on assets
3. Evaluate the capital structure and firms' performance in Nigeria

The above objectives are guided by the following questions:

1. Does the debt-equity ratio affect firms' performance in Nigeria?
2. Is there any significant relationship between the long term debt to capital employed ratio and firms' performance in Nigeria?
3. In what way does the total debt ratio of a firm affect its performance?
4. How does the age of a firm affect the firms' performance in Nigeria?

## **2 Literature Review**

### **2.1 Conceptual Review**

The term capital structure according to Kennon (2010) refers to the percentage of capital (money) at work in a business by type. There are two forms of capital: equity capital and debt capital. Alfred (2007) stated that a firm's capital structure implies the proportion of debt and equity in the total capital structure of the firm. Pandey (1999) 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. The capital structure of a firm as discussed by Inanga and Ajayi (1999) 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 of both equity and debt capital in financing its assets. However, whether or not an optimal capital structure exists is one of the most important and complex issues in corporate finance.

Capital structure, preferred stock and common equity are mostly used by firms to raise needed funds, capital structure policy seeks a trade-off between risk and expected return. The firm must consider its business risk, tax positions, financial flexibility and managerial conservatism or aggressiveness, while these factors are crucial in determining the target capital structure, operating conditions may cause the actual capital structure to differ from the optimal capital structure.

A critical decision for any business organization is a decision for an appropriate capital structure, the decision is not only because of the need to maximize returns to various organizational constituencies, but on an organization's ability to deal with its competitive environment. The prevailing argument, originally developed by Modigliani and Miller (1958), is that an optimal capital structure exists which balances the risk of bankruptcy with the tax savings of debt. Once established, this capital structure should provide greater returns to stock holders than they would receive from an all-equity firm.

In theory, modern financial techniques would allow top managers to calculate accurately optimal trade-off between equity and debt for each firm. However, in practice; many studies found that most firms do not have an optimal capital structure. This is due to the fact that the managers do not have an incentive to maximize firm's performance because their compensation is not generally linked to it. Moreover, since managers do not share firm's profits with shareholders, they are very likely to increase company's expenditures by purchasing everything they like and surrounding themselves of luxury and amenities. Hence, the main concern of shareholders is ensuring that managers do not waste firm's resources and run the firm in order to maximize its value, which entails finding a way to solve the principal-agent problem.

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. A firm's capital structure is then the composition of its liabilities. The various components of a firm's capital structure according to Inanga and Ajayi (1999) 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 stock; 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 term bonds used by the firm in financing its investment decisions while coming up with its principal and also paying back interest.

## **2.2 Theoretical Review**

### **2.2.1 Irrelevant and Relevant Theory**

Modigliani and Miller (MM), 1958 illustrates that under certain key assumptions, firm's value is unaffected by its capital structure. Capital market is assumed to be perfect in Modigliani and Miller's world, where insiders and outsiders have free access to information; no transaction cost, bankruptcy cost and no taxation exist; equity and debt choice become irrelevant and internal and external funds can be perfectly substituted. The M-M theory (1958) argues that the value of a firm should not depend on its capital structure. The theory argued further that a firm should have the same market value and the

same Weighted Average Cost of Capital (WACC) at all capital structure levels because the value of a company should depend on the return and risks of its operation and not on the way it finances those operations. Miller brought forward the next version of irrelevance theory of capital structure. He appealed that, capital structure decisions of firms with both corporate and personal taxes circumstances are irrelevant (Miller 1977). If these key assumptions are relaxed, capital structure may become relevant to the firm's value. So, research efforts have been contributed to relaxing the ideal assumptions and describing the consequences. This theory was criticized on the ground that perfect market does not exist in real life situation. Attempts to relax these assumptions particularly the no bankruptcy cost and no taxation led to the static trade off theory

### **2.2.2 Agency Cost Theory**

This is a theory concerning the relationship between the principal (shareholders) and the agent of the principal (company's managers). This suggests that the firm can be viewed as a nexus of contracts (loosely defined) between resource holders. An agency relationship arises whenever one or more individual, called principals, hire one or more other individuals, called agents, to perform some service and then delegate decision-making authority to the agents.

The agency theory concept was initially developed by Berle and Means (1932), who argued that due to a continuous dilution of equity ownership of large corporations, ownership and control become more separated. This situation gives professional managers an opportunity to pursue their interest instead of that of shareholders.

Jensen and Meckling (1976) suggested that, for an optimal debt level in capital structure by minimizing the agency costs arising from the divergent interest of managers with shareholders and debt holders. They suggest that either ownership of the managers in the firm should be increased in order to align the interest of managers with that of the owners or use of debt should be motivated to control managers' tendency for excessive extra consumptions. Jensen (1986) presents agency problem associated with free-cash flow. He suggested that free cash flow problem can be somehow controlled by increasing the stake of managers in the business or by increasing debt in the capital structure, thereby reducing the amount of "free" cash available to managers.

Therefore, firms which are mostly financed by debt given managers less decision power of those financed mostly by equity, and thus debt can be used as a control mechanism, in which lenders and shareholders becomes the principal parties in the corporate governance structure.

### **2.2.3 Pecking Order Theory**

The pecking order theory of capital structure as introduced by Donaldson (1961) is among the most influential theories of corporate leverage. It goes contrary to the idea of firms having a unique combination of debt and equity finance, which minimize their cost of capital. The theory suggests that when a firm is looking for ways to finance its long-term investments, it has a well-defined order of preference with respect to the sources of finance it uses. It states that a firm's first preference should be the utilization of internal funds (i.e. retain earnings), followed by debt and then external equity. He argues that the more profitable the firms become, the lesser they borrow because they would have sufficient internal finance to undertake their investment projects. He further argues that it is when the internal finance is inadequate that a firm should source for external finance

and most preferably bank borrowings or corporate bonds. And after exhausting both internal and bank borrowing and corporate bonds, the final and least preferred source of finance is to issue new equity capital.

Pecking Order theory tries to capture the costs of asymmetric information which states that companies prioritise their sources of financing (from internal financing to equity) according to the principle of least effort, or of least resistance, preferring to raise equity as a financing means of last resort. Hence, internal funds is used first, and when that is exhausted, debt is issued, and when it is not sensible to issue any more debt, equity is issued. On the other hand, Pecking Order Theory (Myers & Majluf, 1984), captures the effect of asymmetric information upon the mispricing of new securities, which says that there is no well defined target debt ratio. They opined that investors generally perceive that managers are better informed of the price sensitive information of the firms. Investors' perception is such that managers issue risky securities when they are overpriced. This perception of investors leads to the under pricing of new equity issue. Sometimes this under-pricing becomes so severe that it causes substantial loss to the existing shareholders. To avoid the problem arising from information asymmetry firms usually fulfill their financing needs by preferring retained earnings as their main source of financing, followed by debt and finally external equity financing as the last resort.

### **2.3 Review of Empirical Studies**

With the view of helping both growing and grown firms in structuring their finance efficiently, many studies have been undertaken home and abroad, that is; locally and internationally, on this area of study. Some of these studies will be discussed in this section and to make this section easier, it will be grouped internationally and locally.

The following studies were undertaken locally, here in Nigeria;

Chandrasekharan (2012) conducted a study using 87 firms out of the population of 216 firms listed on the Nigeria stock exchange for a period of five years (2007-2011) from static trade-off, agency and pecking order theory point of view. He employed the panel multiple regression analysis and the study reveals that for the Nigerian listed firms; firms' size, growth and age are significant with the debt ratio of the firm, whereas, profitability and tangibility are not.

Babalola (2014), using 31 manufacturing firms with audited financial statements for a period of fourteen years (1999-2012) from static trade-off point of view. He employed the triangulation analysis and the study revealed that capital structure is a trade-off between the costs and benefits of debt, and it has been refuted that large firms are more inclined to retain higher performance than middle firms under the same level debt ratio. In another study, using a sample of 10 firms for a period of 10 years ('2000-2009) from agency and static trade-off point of view. He used the regression analysis and concluded that the manufacturing industry's capital structure in Nigeria is consistent with trade-off theory and the hypothesis tested that the corporate performance is a nonlinear function of the capital structure.

Akinyomi (2013), using three manufacturing companies selected randomly from the food and beverage categories and a period of five years (2007-2011) using the static trade-off and the pecking order theory point of view. He adopted the use of correlation analysis method and revealed that each of debt to capital, debt to common equity, short term debt to total debt and the age of the firms' is significantly and positively related to return on asset and return on equity but long term debt to capital is significantly and relatively

related to return on asset and return on return on equity. His hypothesis also tested that there is significant relationship between capital structure and financial performance using both return on asset and return on equity.

Taiwo (2012), using ten firms listed on the Nigerian Stock Exchange for a period of five years (2006-2010) from the static trade-off, pecking order and agency theory point of view. In his findings, He employed the Im, Pesaran and shine unit root test and Panel Least Square test and revealed that the sampled firms were not able to utilize the fixed asset composition of their total assets judiciously to impact positively on their firms' performance.

Bassey, Aniekan, Ikpe and Udo (2013), using a sample of 60 unquoted agro-based firms in Nigeria within a period of six years (2005-2010) from the agency cost theory point of view. They employed the Ordinary Least Square regression and descriptive statistics and revealed that only growth and educational level of firms owners were significant determinants of both long and short term debt ratios, assets structure, age of the firms, gender of owners and export status impacted significantly on long term debt ratios, while business risk, size and profitability of firms were major determinants of short term debt ratio for the firms under investigation.

Simon-Oke and Afolabi (2011), using a study of five quoted firms within a period of nine years (1999-2007) from the static trade-off and agency cost theory point of view. They employed the panel data regression model and revealed in their study a positive relationship between firms' performance and equity financing as well as between firms' performance and debt-equity ratio. There is also a negative relationship that exists between firms performance and debt financing due to high cost of borrowing in the country.

Semiu and Collins (2011), using a sample size of 150 respondents and 90 firms were selected for both primary data and secondary data respectively for a period of five years (2005-2009) from the relevance, pecking order, the free cash flow, the agency cost and the trade-off theory point of view. They employed the descriptive statistics and Chi-square analysis and suggested that a positively significant relationship exists between a firm's choice of capital structure and its market value in Nigeria.

The following were undertaken internationally; outside Nigeria:

Ong and Teh (2011) investigated on the capital structure and firms performance of construction companies for a period of four years (2005-2008) in Malaysia. Long term debt to capital, debt to asset, debt to equity market value, debt to common equity, long term debt to common equity were used as proxies as the independent variables (capital structure) while returns on capital, return on equity, earnings per share, operating margin, net margin were used to proxy the corporate performance. The result shows that there is relationship between capital structure and corporate performance.

In Jordan, Zeitun and Tian (2007) conducted a study on capital structure and corporate performance on 167 Jordanian firms between 1989-2003. They found a significantly negative relationship between capital structure and corporate performance. Many variables such as return on assets, return on equity, profitability, Tobin's Q were used to measure performance while leverage, growth, size and tangibility were proxies for capital structure.

In Sri Lanka, Puwanenthiren, P. (2011) carried out an investigation on capital structure and financial performance of some selected companies in Colombo Stock Exchange between 2005-2009. Capital structure was surrogated by debt while performance was proxy by gross profit, net profit, return on investment / capital employed and returns on

assets. The results shown the relationship between the capital structure and financial performance is negative.

Khalaf (2013) using a sample of 45 manufacturing companies listed on the Amman Stock Exchange were used for this study which covers a period of five (5) years from 2005-2009. Multiple regression analysis was applied on performance indicators such as Return on Asset (ROA) and Profit Margin (PM) as well as Short-term debt to Total assets (STDTA), Long term debt to Total assets (LTDTA) and Total debt to Equity (TDE) as capital structure variables. The results show that there is a negative and insignificant relationship between STDTA and LTDTA, and ROA and PM; while TDE is positively related with ROA and negatively related with PM. STDTA is significant using ROA while LTDTA is significant using PM. The study concludes that statistically, capital structure is not a major determinant of firm performance. It recommends that managers of manufacturing companies should exercise caution while choosing the amount of debt to use in their capital structure as it affects their performance negatively.

In Pakistan, Abdul (2010) using 36 engineering sector firms in Pakistani market listed on the Karachi Stock Exchange (KSE) during the period 2003-2009 applied Pooled Ordinary Least Square regression and revealed the results show that financial leverage measured by short term debt to total assets (STDTA) and total debt to total assets (TDTA) has a significantly negative relationship with the firm performance measured by Return on Assets (ROA), Gross Profit Margin (GM) and Tobin's Q. The relationship between financial leverage and firm performance measured by the return on equity (ROE) is negative but insignificant. Asset size has an insignificant relationship with the firm performance measured by ROA and GM but negative and significant relationship exists with Tobin's Q. Firms in the engineering sector of Pakistan are largely dependent on short term debt but debts are attached with strong covenants which affect the performance of the firm.

However, what we discovered with the majority of this studies is that they are sectorial focusing; like the studies of Babalola (2014), Akinyomi (2013) and Khalaf (2013) focused on manufacturing industries of Nigeria and Amman, Shehu (2011) concentrated on insurance companies in Nigeria, Basseu, Aniekan, Ikpe and Udo (2013) focused on agro-based companies in Nigeria, Ong and Teh (2011) concentrated on construction companies in Malaysia, Berger and Wharton (2002) focused on the U. S. banking industry and Abdul (2010) focusing on the engineering sector in Pakistan. Nonetheless, most of the studies fall under the same range of period of 2000-2011 as their year of assessment, the exception of Zeitun and Tian (2007) reviewed between 1989-2003 with a period of fifteen (15) years. Most of the studies did not study on the leverage position of the firms except Ogebe P., Ogebe J. and Alewi K. (2011). In conclusion, the findings of the foreign studies are very vital only that the differences in their political and economic situation among the nations may hinder their finding from being applicable to Nigeria.

### **3 Methodology**

#### **3.1 Introduction**

This section describes the procedures for data collection and method of data analysis that was used for this research. The section therefore, explores the most suitable research methodology required for the collection, presentation and analysis of data for the study



with a view of reaching objective outcome. The methodology of this study will include research design, nature and sources of data and also the techniques used in the analysis were also outlined. This chapter tries to carry out the effect of capital structure on firm's performance using model specification with some specific variables.

### **3.2 Sources of Data**

The sample for this study is taken from 10 firms listed on the Nigerian Stock Exchange (NSE) during the period of this study. These firms cover 10 sectors such as oil and gas, manufacturing and telecommunication. These sectors are the major forces driving the Nigerian economy

The sample period is eleven years ranging between 2002 and 2012 and it is ensured that each of the firms has data for at least five years during this period under study. Hence our study is a cross-sectional time series analysis as it enabled us to study the behaviours of these firms across each other over a long period of time. Data of firms listed on the NSE are relied upon because these firms are mandated to make their information public and this is a solution to the problem of paucity of data in a country like Nigeria.

Most of our data were collected from an independent data source known as Financial and Governance (FINGOV) Database, a data resource firm based in Nigeria. This database contains the most comprehensive data across all sectors of the Nigerian economy and is particularly rich in data spanning over Corporate Governance issues, CSR practices of firms, Board structure, Shareholders information and Financial and capital market data.

This independent data source has been able to integrate, update and validate relevant data from the annual reports of companies. It should also be noted that information from companies' annual reports can be relied upon as they are audited by external auditors, majority of who are of international repute.

### **3.3 Method of Data Collection**

In carrying out this research, the technique used in collecting the secondary data was the review of the capital structure from the annual report and account of 10 selected firms from different sectors of the industry listed in the Nigeria stock exchange market using random sampling techniques. The target population for the study consists of the total companies listed on the Nigeria stock exchange which totals up to 173 companies of 24 sectors. Agriculture sector has 5 companies, Airlines sector 1; Automobiles sector 6; Banking sector 21; Breweries sector 7; Building materials sector 8; Chemical and Paints sector 7; Commercial sector 3; Computer and office equipment sector 6; Conglomerates sector 8; Construction sector 8; Engineering technology sector 1; Food, Beverage and Tobacco sector 14; Footwear sector 2; Healthcare sector 10; Industrial or domestics product sector 12; Insurance sector 17; Machinery marketing sector 3; Managed funds sector 4; Packaging sector 8; Petroleum marketing sector 9; Printing and Publishing sector 4; Real estate and Property sector 1; and Textiles sector 6. From all this sectors, ten (10) companies were selected from five (5) sectors (i.e. two (2) companies each) using random sampling technique. The companies includes; 7-Up Bottling Company Plc, Pz Cussons Nigeria Plc (Pz Industries), Julius Berger (Nig). Plc, Vitafoam (Nig).Plc, Pharma-DekoPlc, Nigerian Ropes Plc, Berger Paints Plc, The Tourist Company Of Nigeria Plc, Thomas Wyatt (Nig). Plc and Guinness Nigeria Plc.

### 3.4 Method of Data Analysis

The method of data analysis used in this research work is the descriptive, correlation and regression technique. In order to test the hypotheses concerning the relationship between the dependent and independent variables, STATA 12 software was used.

### 3.5 Model Specification

#### 3.5.1 Analytical Framework and Empirical Model Specification

This analysis is carried out within a panel data estimation framework. The preference of this estimation method is not only because it enables a cross-sectional time series analysis which usually makes provision for broader set of data points, but also because of its ability to control for heterogeneity and endogeneity issues. Hence panel data estimation allows for the control of individual-specific effects usually unobservable which may be correlated with other explanatory variables included in the specification of the relationship between dependent and explanatory variables (Hausman and Taylor, 1981). The basic framework for panel data regression takes the form:

$$Y_{it} = \beta X'_{it} + \alpha Z'_i + \varepsilon_{it} \quad (1)$$

In equation 6 above, the heterogeneity or individual effect is  $Z'_i$  which may represent a constant term and a set of observable and unobservable variables. When the individual effect  $Z'_i$  contains only a constant term, OLS estimation provides a consistent and efficient estimates of the underlying parameters (Kyereboah-Coleman, 2007); but if  $Z'_i$  is un-observable and correlated with  $X_{it}$ , then emerges the need to use other estimation method because OLS will give rise to biased and inconsistent estimates.

Similarly for endogeneity issues, it is generally assumed that the explanatory variables located on the right hand side of the regression equation are statistically independent of the disturbance  $\varepsilon_{it}$  such that the disturbance term  $\varepsilon_{it}$  is assumed to be uncorrelated with columns of the parameters  $X_{it}$  and  $Z_{it}$  as stated in equation (1), and has zero mean and constant variance  $\sigma^2\eta$  (Hausman and Taylor, 1981; Nakamura and Nakamura, 1981). If this assumption is violated, then OLS estimation will yield biased estimates of the underlying parameters of  $\beta$  (Mayston, 2002).

Hence, endogeneity problems arise when the explanatory variables are correlated with the disturbance term  $\varepsilon_{it}$  (Mayston, 2002; Nakamura and Nakamura, 1981; Hausman and Taylor, 1981). In order to circumvent these problems, panel estimation techniques of fixed and random effects will be adopted in this study, in addition to the traditional pooled regression estimation. Decisions will be made between the fixed and random effect models using the Hausman specification test.

The panel model for the study is specified thus:

$$Y_{it} = \beta X'_{it} + \alpha Z'_i + \varepsilon_{it}$$

Where:

Y = dependent variable

D = independent variable

- $\beta_0$  = intercept
- $\beta_1$  = coefficient of the explanatory variable
- e = error term
- I = cross-sectional variable
- T = time series variable

**3.5.2 Model Specification**

Deriving from the theoretical model, we specify the Pooled, Fixed and Random impact of capital structure on firm performance in ten selected firms listed on Nigeria Stock Exchange.

To test the four hypotheses we specify the following models;

*Performance=f (debt-equity ratio, long term debt to capital employed ratio, total debt ratio, age)*

**FIRM PERFORMANCE MEASURED BY ROI**

**Pooled Regression Specification**

$$ROI_i = \alpha_0 + \alpha_1 DE_i + \alpha_2 LDCE_i + \alpha_3 TD_i + \alpha_4 AGE_i + \varepsilon_{1i} \tag{2}$$

**Fixed Effect Model Specification**

$$ROI_{it} = \alpha_0 + \alpha_1 DE_{it} + \alpha_2 LDCE_{it} + \alpha_3 TD_{it} + \alpha_4 AGE_{it} + \sum_{i=1}^9 \alpha_i idum + \varepsilon_{1it} \tag{3}$$

**Random Effect Model Specification**

$$ROI_{it} = \alpha_0 + \alpha_1 DE_{it} + \alpha_2 LDCE_{it} + \alpha_3 TD_{it} + \alpha_4 AGE_{it} + \mu_i + \varepsilon_{1it} \tag{4}$$

**FIRM PERFORMANCE MEASURED BY ROA**

**Pooled Regression Specification**

$$ROA_i = \alpha_0 + \alpha_1 DE_i + \alpha_2 LDCE_i + \alpha_3 TD_i + \alpha_4 AGE_i + \varepsilon_{1i} \tag{5}$$

**Fixed Effect Model Specification**

$$ROA_{it} = \alpha_0 + \alpha_1 DE_{it} + \alpha_2 LDCE_{it} + \alpha_3 TD_{it} + \alpha_4 AGE_{it} + \sum_{i=1}^9 \alpha_i idum + \varepsilon_{1it} \tag{6}$$

**Random Effect Model Specification**

$$ROA_{it} = \alpha_0 + \alpha_1 DE_{it} + \alpha_2 LDCE_{it} + \alpha_3 TD_{it} + \alpha_4 AGE_{it} + \mu_i + \varepsilon_{1it} \tag{7}$$

Where;

ROI = return on investment (firm's performance variable) which can be measured as net profit after tax divided by shareholders fund.  $ROI = \frac{Netprofitaftertax}{Shareholdersfund}$

ROA = return on assets (firm's performance variable) which can be measured as net profit after tax divided by total asset.  $ROA = \frac{Netprofitaftertax}{Totalasset}$

DE = debt-equity ratio which is a capital structure variable. It is measured as total debt divided by net worth.  $DE = \frac{Totaldebt}{Networth}$

Where net worth = equity share capital + preference share capital + reserve and surplus

LDCE = long term debt to capital employed ratio (a capital structure variable), it is measured as book value of long term debt divided by capital employed.

$$LDCE = \frac{\text{Book value of long term debt}}{\text{Capital employed}}$$

TD = total debt (a capital structure variable), it is measured as total debt of a firm divided by its total asset.  $TD = \frac{\text{Total debt}}{\text{Total asset}}$  AGE = number of years of the firm from the date of its incorporation

## 4 Data Presentation, Analysis and Interpretation

### 4.1 Introduction

This study focuses on the presentation and discussion of results. It is divided into two major parts. The first part comprises the descriptive analysis; the second is the inferential analysis. The regression model otherwise known as ordinary least square (OLS) estimation technique will be employed using STATA 12 computer software for statistical analysis of data. It made use of secondary data sourced from an independent data source known as Financial and Governance (FINGOV) Database, a data resource firm based in Nigeria. The data were on the key variables: ROI, ROA, debt-equity ratio, long term debt to capital employed ratio, total debt ratio and age. An exercise was carried out in this respect using debt-equity ratio, long term debt to capital employed ratio, total debt and age as Independent variable while using ROI and ROA as Dependent variables. The period covered was from 2002 to 2012.

### 4.2 Interpretation and Analysis of Data

#### 4.2.1 Descriptive Statistics

This section presents the descriptive analysis of the project. The descriptive statistics of variables cover minimum, maximum, mean and standard deviation.

Table 4.1: Descriptive Analysis

	ROI	ROA	TD	AGE	DE	LDCE
N	105	105	105	105	105	105
Minimum	-.86	-.44	.02	32.00	-.88	-7.34
Maximum	.71	.19	.69	64.00	6.37	1.71
Mean	.1682	.0292	.1843	48.1619	.7019	.1658
Median	.1858	.0550	.1417	47.0000	.3828	.2829
Std. Deviation	.26636	.11879	.14471	8.40115	1.03234	1.11936

Source: Author's computation, 2014

**Interpretation of Descriptive Tables**

The descriptive statistics presented in the table below covers all the sampled company from 2002 to 2012.

From table 4.1, return on investment (ROI) ranges from -0.86 to 0.71 with a mean of 0.16 and a standard deviation of 0.27, return on asset (ROA) has a minimum value of -0.44 and a maximum of 0.19, with an average value of 0.03 and a standard deviation of 0.12, Total debt (TD) ranges from 0.02 to 0.69 with a mean value of 0.1843 and a standard deviation of 0.14. Firm's age (Age) ranges from 32years to 64years with an average value of 48years and a standard deviation of 8years, debt to equity ratio (DE) ranges from -0.88 to 6.37 with an average value of 0.70 and a standard deviation of 1.03 while debt ratio (DR) ranges from -7.34 to 1.71 with an average value of 0.17 and a standard deviation of 1.12.

**4.2.2 Correlation Analysis**

Table 4.2: Correlation table

Variable	ROI	ROA	TD	AGE	DE	LDCE
ROI	1					
ROA	.328**	1				
TD	-.339**	-.227*	1			
AGE	-.062	.107	.127	1		
DE	-.335**	-.020	.681**	-.117	1	
LDCE	-.118	.194*	-.117	.043	.267**	1

\*\* . Correlation is significant at the 0.01 level (2-tailed) and \* . Correlation is significant at the 0.05 level (2-tailed)

Source: Author's computation, 2014

**Interpretation of Correlation Table**

The table above summarizes the results of correlation analyses among the variables. This exercise serves two important purposes. First is to determine whether there are bivariate relationship between each pair of the dependent and independent variables. The second is to ensure that the correlations among the explanatory variables are not so high to the extent of posing multi-collinearity problems.

From table 4.2, all the independent variables (TD, AGE, DE and LDCE) are negatively related to firm performance (ROI); however, only ROA, TD and DE are significantly associated with firm performance. On the other hand, TD and DE are negatively related to firm performance.

**4.3 Test of Hypotheses**

**Hypothesis 1**

*H<sub>0</sub>: There is no significant relationship between debt-equity ratio and firm performance*

**Hypothesis 2**

*H<sub>0</sub>: there is no significant relationship between long term debt to capital employed ratio and firm performance*

**Hypothesis 3**

*H<sub>0</sub>: there is no significant relationship between total debt ratio and firm performance*

**Hypothesis 4**

*H<sub>0</sub>: there is no significant relationship between age of a firm and firm performance*

### 4.3.1 Regression Analysis

In this section we employed panel data estimation method to examine the impact of capital structure on firm performance (ROI and ROA) from 2002 to 2012. The study considered the pooled regression assuming that the intercept is equal across the production areas and years. We also assume different intercept for each company and perform both Fixed and Random Effect regressions.

### 4.3.2 Capital Structure and Firms' Performance Measured with Returns on Investment (ROI)

Table 4.3 below presents the relationship between capital structure and firm in Nigeria. The F-statistics value of 4.33 ( $P < 0.05$ ), 2.76 ( $P < 0.05$ ) and 12.58 ( $P < 0.05$ ) show that the independent variables are jointly statistically significant in the Pooled, Fixed and Random estimates in explaining variations in pipeline production loss. The R-square statistics value of 0.147, 0.108, and 0.203 shows that the independent variables jointly account for about 14.7%, 10.8% and 20.3% variation on firm performance in the Pooled, Fixed and Random effect models respectively. Going by the Hausman test statistics of (0.77) we accept the null hypothesis that differences in coefficient of the fixed and random estimates are not systematic, thus we accept and interpret the random effect model.

From the results presented below, a negative relationship exist between total debt, debt ratio and age of firms, while a positive relationship exist between debt to equity ratio and firm performance. However, only total debt is significantly related to firm performance. This relationship is statistically significant at 5% level. The result shows that firm performance will increase by 60.5% given a percentage increase in total debt. Therefore statistically, we reject the H1 and accept the Ho of the independent variable such as long term debt to capital employed ratio, age and debt to equity ratio while we accept the H1 and reject Ho of the other independent variable (total debt).

Table 4.3: The Impact of Capital Structure on Firm Performance (ROI)

Variable	Pooled	Fixed Effect	Random Effect
TD	-0.462*	-0.63**	-0.606**
DE	-0.036	0.016	0.003
LDCE	-0.026	-0.029	-0.027
AGE	-0.001	-0.005	-0.002
Cons	0.348**	0.501	0.379
No. of obs	105	105	105
R-square	0.1477	0.1081	0.1063
F-statistics(p-value)	4.33 (0.003)	2.76 (0.032)	12.58 (0.014)
Hausman		0.77 (0.9424)	

Note: \*, \*\*, \*\*\* indicate significance at the 10%, 5% and 1% levels of significance respectively

Source: Author's Computation, 2014

**4.3.3 Capital Structure and Firms' Performance Measured by Return on Asset (ROA)**

In this section, we interpret the effects of capital structure on firm performance measured by return on asset (ROA). The results are symmetric with the one explained under the ROI measure of firm performance and based on aforementioned reason, we choose to interpret random effect estimated model.

From table 4.4 below, going by the R-Square value of 0.138, it is evident that the independent variables account for about 13.8% variation on firm performance. The F-statistic value of 8.68 (P<0.05) shows that the independent variables are jointly statistically significant in explaining changes in the dependent variable.

Specifically, the results from the table show that all variables except TD are negatively related to firm performance. However, only total debt and debt to equity ratio is statistically significantly related to firm performance. Thus, firm performance will increase by 30.0% and 4.1% given a 100% increase in total debt and debt to equity ratio respectively. Therefore statistically, we reject the H<sub>1</sub> and accept the H<sub>0</sub> of the two independent variables such as; long term debt to capital employed ratio and age while we accept the H<sub>1</sub> and reject H<sub>0</sub> of the other independent variable (total debt, debt to equity ratio).

Table 4.4: The Impact of Capital Structure on Firm Performance (ROA)

Variable	Pooled	Fixed	Random
TD	-0.361***	-0.282**	-0.3**
DE	0.033*	0.046**	0.042**
LDCE	0.006	0.0002	0.001
AGE	0.003*	0.00004	0.002
Cons	-0.06	0.047	-0.031
No. of obs	105	105	105
R-square	0.1260	0.0792	0.0752
F-statistics(p-value)	3.60 (0.009)	1.96 (0.108)	8.68 (0.070)
Hausma		1.93 (0.7490)	

Note: \*, \*\*, \*\*\* indicate significance at the 10%, 5% and 1% levels of significance respectively

Source: Author's Computation, 2014.

## 5 Conclusion and Recommendations

### 5.1 Conclusion

This study revealed the impact of the total debt (TD), Age of the firm (AGE), debt-equity ratio (DE) and the long term debt to capital employed ratio (LDCE) on the returns on investment and returns on assets (ROI and ROA) of the firms selected. The firms selected were ten from five different sectors and employed panel data spanning from 2002 to 2012. The relationship between the independent variables and firm's performance is being analyzed through the regression model measured with respect to returns on investment (ROI). The result reveals that there is a negative relationship between total debt, long term debt to capital employed ratio and age of firms while a positive relationship exist between debt to equity ratio and firm performance. However, only total debt is significantly related to firm performance. This relationship is statistically significant at 5% level. The result shows that firm performance will increase by 60.5% given a percentage increase in total debt. Therefore statistically, we reject the  $H_1$  and accept the  $H_0$  of the independent variable such as long term debt to capital employed ratio, age and debt to equity ratio while we accept the  $H_1$  and reject  $H_0$  of the other independent variable (total debt).

In addition, the relationship between the independent variables and firm's performance is also analyzed through the regression model measured with respect to returns on asset (ROA). This regression analysis also reveals that all variables except TD are negatively related to firm performance. However, only total debt and debt to equity ratio is statistically significantly related to firm performance. Thus, firm performance will increase by 30.0% and 4.1% given a 100% increase in total debt and debt to equity ratio respectively. Therefore statistically, we reject the  $H_1$  and accept the  $H_0$  of the two independent variables such as long term debt to capital employed ratio and age while we accept the  $H_1$  and reject  $H_0$  of the other independent variable (total debt, debt to equity ratio).

In conclusion, going by the correlation analysis, the result reveals that all the independent variables (TD, AGE, DE and LDCE) are negatively related to firm performance (ROI); however, only ROA, TD and DE are significantly associated with firm performance. On the other hand, TD and DE are negatively related to firm performance.

### 5.2 Recommendations

Based on the findings of the result, the following actions are recommended;

Long term debt finance is mostly used by highly tangible firms, hence, policies that would encourage growing firms accumulate huge tangible assets should be pursued. Hence, tax rebates and exemptions can be granted.

To maximize the market values, the major focus of quoted firms in Nigeria when deciding their choice of capital structure is to establish a positive significant relationship between their capital structure choice majorly total debt and debt-equity mix and their performance as revealed in the findings of this study.

A most optimal capital structure is the debt-equity mix that best maximize firms' value, therefore, firms' should strive to optimize their capital structure by an appropriate mix of debt-equity capital. The firms' should therefore strike a balance between their choice of capital structure and the effect on its performance as it affect the shareholders risks, returns and the cost of capital.



Also, professional and qualified personnel should be charged with the financing decision of firms in Nigeria since an optimal capital structure is a must for firms in Nigeria if they must compete effectively and survive in times of financial and economic distresses, and attaining an optimal capital structure requires an effective and strategic planning.

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