FIRM CHARACTERISTICS AND CAPITAL STRUCTURE OF LISTED FOOD AND BEVERAGES FIRMS IN NIGERIA

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A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, AHMADU BELLO UNIVERSITY, ZARIA, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE DEGREE IN ACCOUNTING AND FINANCE

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Declaration

I declare that the work in this dissertation entitled "Firm characteristics and Capital Structure of listed Food and Beverages firms in Nigeria" has been performed by me in the Department of Accounting, Ahmadu Bello University, Zaria. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this dissertation was previously presented for another degree or diploma at this or any other Institution.

_____	_____	_____
Musa Bashir MOHAMMED	Signature	Date

Certification

This dissertation entitled FIRM CHARCTERISTICS AND CAPITAL STRUCTURE OF LISTED FOOD AND BEVERAGES FIRMS IN NIGERIA by Musa Bashir MOHAMMED meets the regulation governing the award of the degree of Master of Science (M. Sc.) in Accounting and Finance of the Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

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Dedication

This research work is dedicated to Almighty Allah, the most Beneficent, most Merciful.

Acknowledgments

Surely all praises are for Allah. I praise Him and seek His help. May the peace and blessings of Allah be upon His apostle, Prophet Muhammad (PBUH); his family and his companions and upon those who follow Him in piety until the day of Judgment. I sincerely thank the Almighty Allah for granting me the opportunity to see to the conclusion of this work.

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Abstract

The study examines the effect of firm characteristics on the capital structure of listed food and beverages companies in Nigeria from the perspective of pecking order and trade off theories. The study uses secondary data collected by means of documentation for the period of ten years ranging from 2005-2014. The research design employed was correlational in nature. The hypotheses formulated for the study were tested by means of two multiple regression equations. The findings of the study on one hand show that non-debt tax shields has no significant effect on the companies' leverage, but in the case of growth opportunity, firm size and assets tangibility, positive statistical significant relationships were established. On the other hand, profitability has been established to show significant negative relationship with leverage. The study concludes that firm characteristics have significant effect on financing mix of the companies under investigation. Therefore, the study recommends that companies should be wary of increasing debt finance in their financing mix by only taken into cognizance of these firm specific attributes. Finance managers should carefully consider the costs of taken on more debts and painstakingly strike a balance between the costs of debt and their eventual benefits thereof. Finally, regulatory authorities should come up with flexible rules that will enable companies have easy access to long term debt financing option.

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CHAPTER ONE
INTRODUCTION

1.1 Background to the Study

Corporate financing decision is one of the most critical factors that affect the capital mix of an entity, and is mostly influenced by both endogenous and exogenous features of an entity. As a consequence, capital structure decision is one of the key corporate financial policies that require careful consideration of financial managers because of its implication on cost of capital and overall firm value. In financing firm's operations, corporate financial managers must decide on the use of internal or external means of financing, the use of debts or equity and the use of short term or long term sources or a combination of both.

Capital structure describes the way in which an entity raised capital needed for replacement of its assets, modernization of business processes, diversification and expansion. It is a combination of various types of equity and debt capital an entity maintains resulting from the firm's financing decisions. In setting its financial structure, a firm can choose among many alternatives capital structures. It may decide to issue a huge amount of debt or in the alternative it can issue very little debt. The management of a firm therefore set its capital structure in a way that firm's value is maximized. In other words, firms often choose different financial leverage level in their effort to attain an optimal capital structure. This optimal capital structure is the proportion of debt and equity that minimizes the overall cost of capital and maximizes firm's value.

Based on the prominent role that capital structure decision plays, Kargi (2011) reiterate that decisions concerning the proportion of debt and equity are quite challenging for the management of a firm because a wrong decision may lead to financial distress and eventually, bankruptcy.

Similarly, Harris and Raviv (1991) argue that the evaluation of the capital structure of companies is imperative because not only does it affect a firm market value, it also affects its real decisions about employment, production and investment. Issuing equity enables firms to access finance without being forced to meet interest expense obligation, but dilute ownership. Debt, on the other hand provides access to capital without ceding control. It provides access to an alternative and perhaps, a cheaper source of financing up to a certain risk level. However, taking on more debt increases agency costs (potential agency conflicts) between debt holders and equity holders, increases financial risk and may eventually lead to bankruptcy in case of default to meet debt obligations.

How firms make their capital structure decisions and what drives this important management decision have been one of the most widely researched area in the field of corporate finance. Since the seminal work of Modigliani and Miller (1958) on the irrelevance of capital structure in corporate investment decisions, several theoretical literature as well as empirical studies that model firms' capital structure choice under different circumstances and assumptions have emerged. The Modigliani and Miller's irrelevance proposition was built on the assumption of perfect capital market and they argue that internal and external funds may be regarded as perfect substitutes for each other, hence, the total value of the firm and its cost of capital are independent of capital structure.

The Modigliani and Miller's path-breaking work elicited finance scholars and financial economists to advance a number of theories in which capital structure choice becomes relevant. These theories advanced taxes, bankruptcy costs, information asymmetry, transaction costs,

adverse selection and agency conflicts as the major explanation for the corporate use of debt financing. Although some of these theories suggest that there is an optimal capital structure, they do not specifically provide a methodology that financial managers can use to achieve an optimum debt level. However, these theories provide some help in understanding how the chosen financing mix affects firms' value and what drives firm capital structure choice. A number of financial theories (such as the trade-off and pecking order models) and empirical studies particularly suggest firm specific characteristics as the main determinants and drivers of firm capital structure choice. These firm specific characteristics as summarized in Titman and Wessels (1988) includes assets collateral value, non-debt tax shields, growth, uniqueness, industry classification, size, earnings volatility and profitability.

Firm size has been one of the variables that is widely believed in empirical studies to explain a company's level of debt. Larger firms are likely to have easier access to debt markets and be able to borrow at lower cost. The larger a firm is, the more information is expected to be available about it, which reduces the level of information asymmetries in the market, making it possible to obtain cheap financial resources from lenders. Antonious *et al.* (2008) posit that the cost of financial distress increases with expected growth forcing financial managers to reduce the debt in their capital structure. And in the presence of information asymmetries, firms issue equity instead of debt when overvaluation leads to higher expected growth. However, internal resource of growing firms may not be sufficient to finance their positive net present value investment opportunities and, hence, they have to raise external capital. If firms require external finance, they issue debt before equity.

According to Guven *et al.* (2006), profitable companies will employ more debt since they are more likely to have a high tax burden and low bankruptcy risk. Drobetz and Fix (2003), on the contrary suggest that due to the costs associated with new equity issues in the presence of information asymmetries, firms prefer raising capital first from retain earnings, second from debt and finally from issuing new equity. Debt typically grows when investment exceeds retain earnings and falls when investment is less than retain earnings. Jensen and Meckling (1976) argue that due to the conflict of interest between debt providers and shareholders, lenders face the risk of adverse selection and moral hazard. Consequently, lenders may demand security, and collateral value may be a major determinant of the level of debt finance available to firms (Harris and Raviv, 1990). This is based on the notion that tangible assets constitute sound collateral for loans. Therefore, the greater the proportion of tangible assets on the balance sheet, the more willing lenders would be to supply loans and leverage would be higher (Rajan and Zingales, 1995).

Further, in testing empirically the relationship between firm characteristics and capital structure (leverage), what constitute leverage and a clear-cut definition of leverage remain vague in the academic literature of corporate finance. Whilst some scholars advocate book leverage, some empirical studies however favours market leverage. According to Myers (1997), managers focus on book leverage because debt is better supported by assets in place than it is by growth opportunities. Book leverage is preferred because financial markets fluctuates a great deal and managers are said to believe that market leverage numbers are unreliable as a guide to corporate financial policy (Frank and Goyal, 2009). Advocates of market leverage however argue that the book value of equity is primarily a “plug number” used to balance the left hand side and the right

hand side of the balance sheet rather than a managerially relevant number. Also, while some studies (see Anifowose, 2010 and Shehu, 2012) see leverage as long term debt or total debt, some other empirical studies however viewed it to include accounts payable or all liabilities (And each of these alternative views often results into different empirical outcome).

In view of the solid growth currently being experienced by the Nigerian food and beverages industry, together with a great deal for expansion in the long run, the need for proper financing mix and careful capital selection in the sector remains highly imperative. It therefore presupposes that careful mix of debt and equity in the financial structure of this important industry will impact on the success and future prosperity of the firms operating in the sector. For the purpose of this study, five firm characteristics of listed food and beverages entities in Nigeria will be considered as the independent variables, namely; growth, firm size, profitability, tangibility and non-debt tax shields. While the dependent variable will be capital structure (leverage) of listed food and beverages firms in Nigeria. These variables of firm characteristics are expected to yield an effective statistical result due to their role in explaining the corporate level of debt as suggested in the literature.

1.2 Statement of the Problem

Corporations fund their operations by raising capital from a variety of distinct sources. The mix between the various sources, generally referred to as the firm's capital structure has attracted considerable attention from both academics and practitioners. As a result of the importance of capital structure, (as an important management decision), there have been efforts by finance scholars in search of factors that influence firms to include more or less debt in their financing mix, and this has long been a subject of debate in corporate finance which dates back to the early

work of Modigliani and Miller's irrelevance proposition of 1958. Previous empirical evidences and finance theories such as the tradeoff and pecking order models particularly identified firms' specific characteristics as important factors that influence firm's debt/equity choice. Some studies (see Antonios, Yilmaz, and Krishna, 2008) however argued that though the company specific factors strongly influences the capital structure decisions of firms, the financing behaviour of firms is also strongly affected by the market and economic conditions in which the entities operate.

The relationship between firm characteristics and leverage has been strongly debated over the years especially in the context of advanced economies of Western Europe and United States. Despite these numerous studies, there is still disagreement among these studies about the direction of the relationship between firm characteristics and leverage. Some of the prior studies include Titman and Wessels, (1988), Harris and Raviv, (1991), Rajan and Zingales, (1995), Frank and Goyal, (2009), Bevan and Danbolt, (2002) among others. However, in Nigeria, even though there are limited empirical studies in the area, yet, a lot of gap in methodology and literature have been identified in these prior studies. In addition, the effect of growth opportunity, firm size, profitability, asset tangibility and non-debt tax shields on leverage have not been specifically and extensively studied in the listed food and beverages entities in Nigeria.

Furthermore, some of the empirical studies conducted in Nigeria on firm characteristics and leverage made use of panel data methodology, and as their method of estimation, these previous studies employed the use of pooled ordinary least square (OLS) as their method of estimation. However, OLS is widely believed in the literature of econometrics to be a restrictive model in

terms of panel data estimation. This is for disregarding the space and time dimension of pooled data. The OLS's naïve and restrictive assumption of constant coefficients across time and individual firms in a pooled data may distort the true picture of the relationship between the dependent and independent variables in a regression model. Therefore, this may affect the validity of the inferences made by these studies. These prior studies include that of Salawu (2007), Anifowose (2009), Shehu (2012), among others. Similarly, most of these previous studies consider only one measure of leverage, which is mostly long term debt. However, studies conducted by Salawu (2007) and Olokoyo (2012) note that Nigerian listed manufacturing companies do not make use of much long term debt in their total borrowings. Therefore, analysis of leverage solely based long term debt may not result into valid conclusion. In essence, this study made an attempt to fill some of the identified gaps and tries to provide answers to the following research questions raised.

How does growth opportunity affect leverage of listed food and beverages firms in Nigeria? What is the impact of firm size on leverage of listed food and beverages companies in Nigeria? How does profitability affect leverage of listed food and beverage entities in Nigeria? How does asset tangibility affect leverage of listed food and beverages firms in Nigeria? How does non debt tax shields affect leverage of listed food and beverages companies in Nigeria?

1.3 Objectives of the Study

The main objective of this study is to examine the impact of firm characteristics on capital structure of listed food and beverages firms in Nigeria. The specific objectives the study set to achieve are as follows:

i. to assess the effect of growth opportunity on leverage of listed food and beverages firms in Nigeria.

ii. to examine the effect of firm size on leverage of listed food and beverages firms in Nigeria.

iii. to investigate the effect of asset tangibility on leverage of listed food and beverages firms in Nigeria.

iv. to assess the effect of profitability on leverage of listed food and beverages firms in Nigeria.

v. to examine the effect of non-debt tax shields on leverage of listed food and beverages firms in Nigeria.

1.4 Research Hypotheses

To achieve the set objectives, the following hypotheses are formulated and stated in a null form:

H_{01}: Growth opportunity has no significant effect on leverage of listed food and beverages firms in Nigeria.

H_{02}: Firm size has no significant effect on leverage of listed food and beverages firms in Nigeria.

H_{03}: Asset tangibility has no significant effect on leverage of listed food and beverages firms in Nigeria.

H_{04}: Profitability has no significant effect on leverage of listed food and beverages firms in Nigeria.

H_{05}: Non debt tax shields has no significant effect on leverage of listed food and beverages firms in Nigeria.

1.5 Scope of the Study

The study covers only a sub sector in the manufacturing sector in Nigeria, which is the listed food and beverages companies. The study covers the period 2005-2014. The study will also concentrate on five important firm characteristics as determinants of leverage. These are; firm size, growth potential, asset tangibility, profitability and non-debt tax shields. The study restricts itself to analyzing quantitative data in determining the effect of firm Characteristics on leverage. Thus, secondary data obtained from respective companies' financial statements and other companies' profiles were used.

1.6 Significance of the Study

The research findings may be of benefit to corporate financial managers particularly those of listed food and beverages firms in Nigeria who have to make an appropriate mix of debt and equity in order to minimize cost of capital and maximize overall firm value. The findings will therefore assist them to understand and give more weight and consideration on those peculiar characteristics of their firms which are of significance in the determination of their capital structure.

Most existing studies on corporate capital structure choice used data from companies in advanced economies, thus reflecting the financing behaviour of firms in industrialized economies. This study will therefore consider how emerging market's firm characteristics relate to capital structure choice.

The study will go a long way in providing evidence as to whether or not the capital structure choice of Nigerian listed food and beverages firms are in accordance with the predictions of various financial theories. The theories of capital structure particularly trade-off and pecking order models predict variously as to how firm characteristics relate to firms debt/equity choice. This study will provide evidence empirically whether the predictions of these theories are portable to companies operating in Nigerian food and beverages industry.

The outcome of the study will also be of benefit to existing and potential investors. To existing shareholders, it will serve as a reference for them to know how their corporations rely on debt financing, and what factors are responsible for the capital structure choice of their entity.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

In this section, relevant and related literatures on firm characteristics, capital structure as well as theoretical framework are reviewed. The section starts with presentation of conceptual issues.

2.2 Concept of capital structure

Capital structure, variously called financial leverage or gearing is the proportion of a company's long term debt (and preference shares if any) to ordinary share capital. An entity may for instance, have 30% debt and 70% equity or 40% debt and 60% equity making up its capital structure. According to Myers (2001), capital structure attempts to explain the mix of securities and financing sources used by corporations to finance real investments. Pandey (1999) sees capital structure as the proportionate relationship between long-term debt and equity. It describes the mix of debenture, long term debt, preference shares and equity share capital. Capital

structure, to Olokoyo (2012), represents the major claim to a corporation's assets. This includes the different types of both equity and debt liabilities a firm employs in its business operations. Bos and Fetherson (1993) define capital structure as total debt to total assets at book value which influences both the profitability and riskiness of the firm.

In their effort, Buckley, Ross, Westerfield, and Jaffe (1998) describe capital structure as the proportion of the long-term sources of funds to total assets used by a firm and it comprises of debt, preferred stock and common equity. According to them, a firm can choose any capital structure as it wants and could increase or decrease its debt-equity ratio by issuing debt to buy back stocks or issuing stock to pay debt. Van Horne and Wachowicz (1995), refer to capital structure as the composition of a firm liabilities and owner's equity, with decisions relating to it being one of the three financing decisions (investment, financing and dividend decisions) which finance managers have to make. Bhaduri (2002) define capital structure as the different options used by a firm in financing its assets. In another effort, Kennedy (2013) defines capital structure of a firm as consisting of various sources of finance which are presented in the equity and liability side of the balance sheet or statement of financial position.

Despite the numerous attempts by finance scholars to give an acceptable definition of capital structure, the literature of corporate financial leverage does not provide a general and most acceptable definition of leverage. It is in view of this, Drobetz and Fix (2003) argue that there is no clear-cut definition of leverage in the academic literature of corporate finance. In the same vein, Rajan and Zingales (1995) posit that the extent of leverage and the most relevant measure depends on the objective of the analysis. For the fact that this study intends to sees leverage in a

wider perspective, the study adopts two definitions of leverage put forward by Rajan and Zingales (1995). The first and broadest definition of leverage is the ratio of total (non-equity) liabilities to total assets. This is a proxy of what is left to shareholders in case of liquidation. The second definition of leverage is the ratio of debt (both short-term and long-term) to total assets.

Another issue in empirical corporate leverage studies is whether leverage could be measured at book or market values. Fama and French (2000) argue that most of the theoretical predictions apply to book leverage. In a similar vein, Thies and Klock (1992) suggest that book ratios better reflect management's target debt ratios. The market value of equity depends on a number of factors which are out of direct control for the firm. Therefore, using market values may not reflect the underlying alterations within the firm. Drobetz and Fix (2003) also posit that corporate treasurers often explicitly claim to use book ratios to avoid distortions in their financial planning caused by the volatility of market prices.

2.3 Firm Characteristics and Capital structure

The extant literature of corporate finance and empirical studies in the area have advanced series of arguments as to how firm characteristics explain the use of debt in capital structure. And this study will be incomplete without taking a look at some previous empirical studies as regards to the purpose of the studies, the methodology that was adopted as well as the findings of these studies that are relevant to this study. This is to enable this study to see the gaps that might have been left or to get an insight in some of the recommendations for further studies that were reported in these previous works.

2.3.1 Growth and Leverage

The literature of corporate capital structure have revealed two extreme positions as regards the effect of leverage on firm growth opportunity. The agency costs for growing firms are expected to be higher as these firms have more flexibility with regards to future investments (Anifowose, 2009). The reason being that bond holders fear that such firms may go for risky projects in future as they have more choice of selection between risky and safe investment opportunity. Considering their investment at risk in future, bond holders will impose higher costs at lending to growing firms. Growing firms therefore, facing higher costs of debt will employ less debt and more equity in their capital structure.

According to Titman and Wessels (1988), equity controlled firms have tendency to invest sub-optimally to expropriate wealth from the firm's bondholders. The cost associated with this agency relationship is likely to be higher for firms in growing industries, which have more flexibility in their choice of future investments. Expected future growth should thus be negatively related to long term debt levels. To Titman and Wessels (1988) also, growth opportunities are capital assets that add value to a firm but cannot be collateralized and do not generate current taxable income.

In contrast, Drobetz and Fix 2003 suggest that a firm will first use internally generated funds which may not be sufficient for a growing firm, and so next option for the growing firm is to use debt financing, which implies that a growing firm will have a high leverage. Myers (1984) also predicts that firms with more investments- holding profitability fixed should accumulate more debt over time. Thus, according to Myers (1984) growth opportunities and leverage are expected

to be positively related. Previous empirical evidences have been reporting different direction of relationship between growth and leverage.

Rajan and Zingales (1995) investigate the determinants of capital structure by analyzing the financial decisions of public companies in the major industrialized economies to establish whether their leverage is similar across the G-7 countries. The study computed leverage ratio for each country under study after making the necessary accounting adjustments. The study employs data obtained from Global vantage data base on international corporations from the period 1987 through 1991. The sampled used covered between 30% and 70% of the companies listed in each country which accounts for more than 50% of the market capitalization in each country. The study found that at an aggregate level, firm leverage is fairly similar across the G-7 countries. They found tangibility of asset to be positively related with the leverage in all the G-7 countries, the market to book ratio enter with negative coefficient in all the countries; firm size is positively related with leverage in all the countries except Germany where it is negatively related.

Nikolaos (2007) examines the firm characteristics that affect the capital structure choice of Greek companies that are listed on the Athens stock exchange. The study adopts four firm level characteristics as firm size, growth opportunities, liquidity and interest coverage ratio to explain the variation in debt ratio of the sampled firms. The study employs panel dada procedure and utilized data obtained from Athens stock exchange database for the five year period 1997- 2001. The study finds among other things that growth opportunity, liquidity and interest coverage ratio to be negatively related to leverage, while firm size appears to have a positive relationship with leverage. The results are consistent with the predictions of various financial theories and do

provide some help in understanding how the chosen financing mix of the sampled firms affects firms value.

Anifowose (2010) investigates the determinants of capital structures in Nigerian cement industry for the period 2000 through 2009. The study employs data obtained from the annual report and accounts of the sampled firms listed on the Nigerian stock exchange. Eight firm specific characteristics were used by the author to measure their effect on leverage. Ordinary least square regression method was utilized as technique of data analysis. The empirical result reveals potential for growth, age of the firm, tangibility of assets are positively and significantly related to leverage.

Previous empirical studies have used different proxies as measures of growth. These include; market to book ratio (Rajan & Zingales 1995), research and development expenses to sales (Graham 2000), annual growth rate in total assets (Titman & Wessels 1988; Anifowose, 2009).

2.3.2 Size and leverage

The relationship between firm size and leverage is also mixed and inconclusive in the literature of corporate finance. According to Anifowose 2009, large firms do not consider the direct bankruptcy costs as an active variable in deciding the level of leverage as these costs are fixed by the constitution and constitute a smaller proportion of the total firm's value. And large firms being more diversified have less tendencies of bankruptcy (Titman and Wessels 1988). This therefore suggests a positive relationship between size and leverage. Frank and Goyal (2007)

also note that large firms will have more debt since larger firms are more diversified and have lower default risk. Larger firms are also typically more mature firms. These firms have a reputation in debt markets and consequently face lower agency costs of debt.

Similarly, Wiwattanakantang (1999) opined that, lager firms have an advantage over smaller firms in accessing credit markets and can borrow under better conditions. The larger a firm is, the more information is expected to be available about it which reduces the level of information asymmetries in the market, making it possible to obtain financial resources from lenders (Guven *et al.* 2005). Further, Nikolaos (2007) argues that Banks are more willing to lend their funds to larger firms partly because they are more diversified and also because they usually request larger amounts of debt capital than smaller firms. As a consequence, larger firms are usually able to reduce transaction costs associated with long term debt issuance and can arrange a lower interest rate. On the contrary, Frank and Goyal (2007) argue that large firms have been around longer and are better known. Thus, large firms face lower adverse selection and can more easily issue equity compared with small firms where adverse selection problems are severe. Large firms also have more assets and thus the adverse selection may be more important it impinges on a larger base.

Rajan and Zingles (1995) maintain that there is less asymmetrical information about the larger firms. This reduces the chances of undervaluation of the new equity issue and thus encourages the large firms to use equity financing. In the same vein, Drobetz and Fix (2003) opined that size can be regarded as a proxy for information asymmetry between firm insiders and the capital markets. Large firms are more closely observed by analysts and should therefore be more capable of issuing informationally sensitive equity and have lower debt. Thus, predicting a

relationship between firm size and leverage to be negative, with larger firms exhibiting increasing preference for equity relative to debt. Previous researches as far the relationship between firm size and leverage have been reporting mixed findings.

Titman and Wessels (1988) examine empirically the theoretical determinants of corporate capital structure. The theoretical attributes as asset structure, growth opportunities, uniqueness, industry classification, non-debt tax shields, profitability, earnings volatility and firm size were tested to see how they drive the firm's debt-equity choice. The independent variables of the study were regressed using data sourced from annual compustat industrial files for the period 1974 through 1982. Six measures of leverage as long-term, short-term, and convertible debt scaled by market and by book values of equity were used in the study. The study finds that firm size, uniqueness and profitability are negatively related to leverage. Their findings could not provide support for an effect on debt ratio arising from non-debt tax shields, volatility, collateral value or future growth. The authors however concluded that it remains an open question whether their measurement model does indeed capture the relevant aspects of the attributes suggested by capital structure theories.

Bevan and Danbolt (2002) examine the capital structure and its determinants for all non-financial companies in the United Kingdom. The study adopts a decompositional analysis of all measures of corporate debt into its short term, long term and total debt constituents. Four independent variables of market-to-book ratio, logsales, profitability as well as asset tangibility are used in the study as the explanatory variables. Data for all the 822 sample firms was derived from DataStream international limited. The authors make use of Tobit analysis at various degrees of

left and/or right censoring as well as ordinary least square as techniques of dada analysis. The study finds among other things that the level of gearing of UK companies vary substantially with the definition of gearing applied. Based on a large sample however, they find logsales and tangibility to be positively correlated with gearing. They further suggest that analyses of gearing based solely upon long term debt provides only part of the story, and a fuller understanding of capital structure and its determinants requires a detailed analysis of all forms of corporate debt.

Bauer (2004) investigates the determinants of capital structure in transition economy of Czech Republic to examine if differences exist from the predictions of existing theories on capital structure choices. The study utilized data obtained from annual books and accounts of companies listed in Czech for the period 2000 and 2001. The data are analyzed using ordinary least square regression method. The independent variables of the study are firm size, return on asset, tax rate, tangibility, growth opportunity, non-debt tax shields and volatility. Four measures of leverage as book total liabilities ratio, book total debt ratio, market total liabilities ratio and market total debt ratio were used together with a comparative analysis. The result shows that listed firms in Czech Republic exhibit lower leverage than their counterpart firms in G-7 centuries. Leverage in Czech listed firms was found to be positively correlated with firm size and tax and negative relationship was reported between leverage with tangibility, profitability and growth opportunities.

In the literature of corporate capital structure, several indicators have been used to measure firm size. These includes; logarithm of total sales (Titman and Wassels 1988), average value of total assets (Chung 1993), the market value of the firm (Graham, 2000) etc.

2.3.3 Profitability and leverage

Profitability is one of the firm specific characteristics that is widely believed in the literature of corporate finance to have effect on firms' debt/equity choice. However, there is no consensus view as regards the direction of the relationship. Modigliani and Miller (1963) argue that, due to the tax deductibility of interest payments, companies may prefer debt to equity. This therefore would suggest that highly profitable firms would choose to have high levels of debt in order to obtain attractive tax shields that characterize debt financing.

Frank and Goyal (2007) suggest that profitable firms would have more debt in their financial structure. This is because expected bankruptcy costs are lower, and interest tax shields are more valuable for profitable firms. They also posits that agency costs, taxes, and bankruptcy costs push more profitable firms toward higher book leverage. Expected bankruptcy costs declines when profitability increases. The deductibility of corporate interest payments induces more profitable firms to finance with debt. This could result in a positive relationship between profitability and leverage. Profitable companies will employ more debt since they are more likely to have a high tax burden and low bankruptcy risk (Guven *et al*, 2006).

Furthermore, Baral (2004) maintains that more profitable firms have more capacity to borrow and providers of debt will be more willing to provide funds because the probability of default is lower than for less profitable firms. With profitable firms also subject to higher tax payments, there is greater incentive to employ more debt to exploit debt interest tax shield.

In a contrary position, Myers and Majluf (1984) argue that firms prefer internal finance over external funds. They opine that firms prefer raising capital first from retained earnings, second

from debt, and third from issuing new equity. This behavior is due to the costs associated with new equity issues in the presence of information asymmetries. Thus, according to them, with investments and dividends fixed, more profitable firms should become less levered over time. Debt grows when investment exceeds retained earnings and falls when investment is less than earnings (Drobetz and Wanzenried 2006). Therefore, according to these positions, leverage and profitability are expected to be negatively related. Empirical researches previously conducted have been reporting different direction of relationship between profitability and leverage.

Mazur (2007) investigates the determinants of capital structure choice of companies listed on Warsaw stock exchange for a five year period covering 2000-2004. The study included a total of 238 non-financial sample firms and data was obtained from the annual reports and accounts of the firms listed on Warsaw stock exchange. Ten firm specific characteristics were adopted as independent variables of the study to examine their influence on the capital structure of the selected firms. The author employs ordinary least square regression method as a technique of data analysis. The empirical result indicates that profitability, liquidity, tangibility of assets, and firm size are statistically and negatively related with leverage. Uniqueness of assets on the other hand reveals a statistical positive relationship. The negative relationship between leverage and profitability is consistent with the prediction of pecking order model.

Salawu (2007) examines empirically the capital structure choice of selected non-financial listed companies in Nigeria. The study investigates the determinants of the capital structure choice of 50 sampled non-financial firms for the period 1990 through 2004. The study employs data obtained from annual report and accounts of the sampled firms quoted on the Nigerian stock

exchange. Pooled ordinary least square regression model, fixed effect model and random effect model were employed by the author as techniques of data analysis. The findings of the study reveal that debt financing for the sample firms during the period under study is mainly short-term in nature. Leverage is find to be negatively related with profitability. In consistent with the pecking order predictions on negative relationship between leverage and profitability, non-financial firms in the sample exhibit such behavior.

Shehu (2012) carries out an investigation to determine the capital structure choice of Nigerian listed Insurance firms. He obtained data from the annual report and accounts of the 15 firms listed on the Nigerian Stock Exchange for the period 2001-2010. Five specific firm characteristics were used in the study as potential determinant of capital structure. Ordinary least square regression method was utilized as a technique of data analysis. The empirical result indicates that profitability, growth opportunity and assets tangibility are statistically and positively related to leverage. The positive relationship between profitability and leverage revealed by the findings of this study is in opposite with the prediction of pecking order hypothesis. In most studies on the determinant of capital structure however, financial firms are excluded in that their capital structure are largely determine by exogenous factors such as laws and regulatory requirements. It is therefore a first study of its kind this study could lay its hands on. Therefore, a similar study needs to be carry out to confirm the validity of these findings.

Various proxies such as operating income over total assets (Titman and Wassels 1988), cash flow from operation normalized by book value of total assets (Rajan and Zingales 1995), net income after taxes over total sales (Anifowose, 2009), and earnings after tax over capital

employed (Shehu 2012) were used in empirical capital structure studies as measure of profitability.

2.3.4 Asset tangibility and Leverage

The extant literature of capital structure argue that the type of assets owned by an entity affects its capital structure choice. The direction of the relationship between the two variables is however contradictory. While some studies argued for a positive relationship, some studies present contrary viewpoint. An entity with large amount of tangible assets can borrow at a cheaper rate of interest by providing the security of these tangible assets to lenders. According to Frank and Goyal (2009), assets tangibility has an important effect on the costs of financial distress. They argue that, tangible assets are easier to collateralize, and they suffer a smaller loss of value when firms go into distress, thereby, suggesting that firms with more tangible assets will employ more debt in their capital structure. Similarly, Rajan and Zingales (1995) note that if a large fraction of a firm's assets are tangible, then assets should serve as collateral, diminishing the risk of the lender suffering the agency costs of debt like risk shifting. Assets should also retain more value in liquidation. Therefore, the greater the proportion of tangible assets on the balance sheet, the more willing should lenders be to supply loans, and consequently leverage should be higher.

Additionally, Guven *et al*. (2006) note that firms with higher proportion of tangible assets would more likely belong to an industry with lower risk where they can afford higher financial leverage and higher proportion of tangible assets. These tangible assets will eventually have an impact on

the borrowing decisions of these firms, and in the case of a bankruptcy, tangible assets create more value than firms with greater dependence on intangibles.

Harris and Raviv (1991), on the other hand argue that the low information asymmetry associated with tangible assets makes equity issuance less costly, thereby resulting in a negative relation between leverage and tangibility. Firms with more tangible assets will make more use of equity in their financial structure because there is less information asymmetry between the firm managers and new investors. Firm managers will issue equity without fear that such equity issuance will be undervalued by new investors. This therefore suggests a negative relationship between debt and tangibility. Previous empirical evidences documented different direction of association between leverage and tangibility.

Drobetz and Fix (2003) examine the determinants of capital structure based on the predictions of the trade-off and pecking order models using Swiss data. The study focused exclusively on non-financial firms listed on the Swiss stock exchange. The authors employ data sourced from world scope database for the 124 sample firms for the period under study. The authors apply four alternative definitions of leverage as total liabilities to total assets, debt to total assets, total debt to net assets, and total debt to capital. The empirical analysis adopts six firm characteristics that include; tangibility of assets, firm size, market-to-book ratio, profitability, volatility, uniqueness and non-debt tax shields as independent variables of the study. Ordinary least square regression method and Censored Tobit regressions method were employed as techniques of data analysis. The empirical result suggests that the relationship between leverage and firm characteristics based on the various predictions of both pecking order and trade off models depend largely on

the exact definition of leverage. At an aggregate level however, they concluded that leverage of Swiss firms is comparatively low and more profitable firms use less leverage. The result also reveals that tangibility of assets and volatility of earnings are positively related to leverage.

Mazur (2007) investigates the determinants of capital structure choice of companies listed on Warsaw stock exchange for a five year period covering 2000-2004. The study included a total of 238 non-financial sample firms and data was obtained from the annual reports and accounts of the firms listed on Warsaw stock exchange. Ten firm specific characteristics were adopted as independent variables of the study to examine their influence on the capital structure of the selected firms. The author employs ordinary least square regression method as a technique of data analysis. The empirical result indicates that liquidity, profitability, tangibility of assets, and firm size are statistically and negatively related with leverage.

Wellalage and Locke (2012) investigate the capital structure of New Zealand's large listed companies on the New Zealand Stock Exchange. The study explored empirically the relationship between firm characteristics, corporate governance and capital structure in New Zealand's large listed firms. The study utilized data collected from Thomson One Banker database for the top 50 publicly listed companies on the New Zealand stock exchange under the NZX50 category for the period 2003-2010. Quantile regression analysis was employed by the authors as technique of data analysis. The result indicates a significant positive relationship between firm size and leverage while a significant negative relationship between growth opportunities, non-debt tax shield, firm risk, tangibility of assets and leverage was revealed by the findings. The negative relationship between tangibility and leverage is opposed to the prediction of the trade-off theory.

The study generally finds firm specific characteristics (i.e. tangibility, liquidity, risk, growth, tax shield and firm size) to have played a significant role in determining firm leverage levels rather than corporate governance variables.

Previous empirical studies in this area used two major indicators as proxy for assets tangibility. These includes; the ratio of tangible assets plus inventories to total assets (Titman and Wessels 1988) and fixed assets to net total assets (Anifowose 2009).

2.3.5 Non-Debt tax shields and leverage

There are two conflicting points of view about the relationship of non-debt tax shields to leverage. Firms generally make use of debt financing in order to exploit the tax deductibility of interest to reduce their tax bill. Interest tax shields resulting from the use of debt in corporate financing are not the only way of reducing corporate tax liabilities. The existence of non-debt tax shields provides an alternative (and perhaps less costly) means of reducing income taxes and may serve to mitigate the benefit of debt tax shields (Cloyd, Limberg, and Robinson, 1997). Therefore, firms with high non-debt tax shields will have less debt in their capital structure.

Similarly, De-Angelo and Masulis (1980) posit that tax deductions for depreciation and investment tax credits are substitutes for the tax benefits of debt financing. As a result, firms with large non-debt tax shields relative to their expected cash flow include less debt in their capital structures. In the same vein, Schulman, Deborah, Sellers and Kennedy (1996) argue that if a firm uses sufficient tax shields from depreciation to reduce taxable income to zero, debt may yield no additional tax benefit and capital structure decisions will be based on non-tax considerations.

Green, Murinde and Prasad (2001) argue that one interesting thing to note about the corporate tax is the fact that the firms will take advantage of interest payments allowable for tax purposes to bring down their tax bill. Therefore, entities that make use of other tax shields such as depreciation and investment tax credits will have less need to utilize the interest tax shields. De-Angelo and Masulis (1980) further argue that the extra savings derived from an additional unit of debt declines as non-debt tax shields rises. They attribute this to the increased possibility of bankruptcy that could happen at higher debt levels.

In contrast, Scott (1997) maintains that firms with substantial non-debt tax shields should have considerable collateral assets which can be used to secure debt. If the amount of depreciation is the primary component of non-debt tax shields, the firm possesses relatively more tangible assets that generate proportionally high level of depreciation. Such assets have collateral value for the attainment of secured debt, which in turn increases the debt capacity of firms allowing them to borrow more and save more on tax.

Guven, Hakan and Guray (2004) carry out an empirical testing using dynamic panel data methodology to analyze the impact of firm specific characteristics on the corporate capital structure decisions of 123 Turkish manufacturing firms listed on the Istanbul stock exchange. The study utilized data obtained from annual reports and accounts of 123 sample firms for the period 1993 through 2002. The data are analyzed using the fixed effects method. The variables examined are size, profitability, growth opportunities in properties, plant and equipment, growth opportunities in total assets, non-debt tax shields and tangibility of assets. The empirical result

reveals a negative relationship between leverage and non-debt tax shields, profitability as well as assets tangibility.

Huang and Song (2006) examine the determinants of capital structure in Chinese listed companies in order to investigate whether firms in the largest developing and transition economy of the world entertain any unique characteristics in their capital structure choice. The study employs a new database containing both market and accounting data of 1216 Chinese listed firms from 1994 through 2003. The study adopts six measures of leverage as book long term debt ratio, book total debt ratio, book total liabilities ratio, market long term debt ratio, market total debt ratio, and market total liabilities ratio. Firm specific characteristics as determinants of capital structure used in the study are return on assets, size, tangibility, non-debt tax shields, growth opportunity, ownership structure and volatility of earnings. Ordinary least square method and the Tobit model are used as techniques of data analysis. The findings reveal that, as in other countries, leverage in Chinese quoted firms increases with firm size and fixed assets and decreases with non-debt tax shields, growth opportunities and profitability. The study also reveals that Chinese firms tend to have much longer long term debt as compared to those in developed countries. The findings of this study may not stand in the present China as the country experienced a massive industrialization in recent years.

Wellalage and Locke (2012) investigate the capital structure of New Zealand's large listed companies on the New Zealand Stock Exchange. The study explored empirically the relationship between firm characteristics, corporate governance and capital structure in New Zealand's large listed firms. The study utilized data collected from Thomson One Banker database for the top 50

publicly listed companies on the New Zealand stock exchange under the NZX50 category for the period 2003-2010. Quantile regression analysis was employed by the authors as technique of data analysis. The result indicates a significant positive relationship between firm size and leverage while a significant negative relationship between non-debt tax shield, firm risk, tangibility of assets and leverage were revealed by the findings.

The ratio of annual depreciation expenses to total assets is mostly use in capital structure studies to measure non-debt tax shields. Considering the nature of the industry of this study, deprecation is the most significant element among non-debt tax shields.

2.4 Theoretical framework

This research is a form of capital market research that is founded on positive capital structure theories which investigate the imperatives of firm specific characteristics as important determinants of corporate leverage. According to Jensen and Smith (1984), prior to the 1950's, corporate financial theories were riddled with logical inconsistencies and were almost totally prescriptive, that is, normatively oriented. The concerns of the field were optimal investment, financing and dividend policies, but little consideration was given to the effect on these policies on individual incentives, or to the nature of equilibrium in financial markets.

In the 1950's however, fundamental changes in finance began to occur (Jensen and Smith 1984). The analytical methods and techniques traditional to economics began to be applied to problems in finance, and the resulting transformation been significant. This evolution was accompanied by a change in the focus of the literature from normative questions such as "what should investment,

financing, or dividend policies be?" to positive theories addressing questions such as "what are the effects of alternative investment, financing, or dividend policies on the value of the firm?" This shift in research emphasis was necessary to provide the scientific basis for the formation and analysis of corporate policy decisions.

The paradigm shift from prescriptive to positive oriented research in corporate finance was largely dominated by corporate capital structure research in the last few decades. Theoretical discourse on corporate capital structure originates from the irrelevance propositions of Modigliani and Miller (1958), arguing that the capital structure of the firm was independent of its cost of capital and therefore firm value. Their argument was based on strict perfect capital market assumptions. The Modigliani and Miller's irrelevance proposition provided a foundation upon which finance theories such as the trade-off and pecking order models are built. This research work is underpinned by both the trade-off and pecking order theories of corporate leverage. The theories make different arguments and predictions about the relationship between corporate leverage and firm characteristics.

Trade-off theory

The trade-off theory was built on the premise that a firm can pick an optimal mix of debt and equity by focusing on the trade-offs between the tax benefits of debt and the potential costs of financial distress. It was argued that more debt exploits the tax deductibility of interest and keeps more money in private hands, thereby increasing firm value. Eventually, however debt tax benefit begin to evade because the firm runs out of income to be shielded from taxes (perhaps due to other non-debt tax shields such as depreciation), or the increased prospects and the

potential costs of financial distress offset the incremental tax benefits of more debts. In essence, this trade-off sees firms increasing their use of debt until either they run out of income to shelter, or they run up against the threat of financial distress. The theory postulates that the tax–deductibility of interest payment induces a company to borrow up to the margin where the present value of interest tax shield is just offset by the value loss due to agency cost from issuing risky debt as well as the cost of possible liquidation or re-organization.

According to the model, the optimal capital structure does exist. A firm is regarded as setting a target debt level and gradually moving towards it. The firm's optimal capital structure will involve the trade-off among the effect of corporate and personal taxes, bankruptcy costs and agency costs. Classic arguments therefore, for the trade-off between the costs and benefits of debt are based on bankruptcy costs, tax benefits and agency costs related to asset substitution, underinvestment and overinvestment (Oztekin, 2009).

The trade-off theory predicts variously as to how firm characteristics affect the firms' debt/equity choice. The model predicts a negative relation between firm growth and leverage. According to the model, growth increases costs of financial distress, reduces free cash flow problems and exacerbates debt related agency problems. The theory further predicts that firms with more investment opportunities have less leverage because they have stronger incentives to avoid underinvestment and asset substitution that can arise from stock holder-bond holder agency conflicts. On firm size, the theory predicts larger, more mature firms to have relatively more debt. According to the model, large, more diversified firms face lower default risk. Large firms

may also be able to reduce transaction costs associated with long term debt issuance, thus, predicting a positive relation between firm size and leverage.

The theory also suggests that agency costs, taxes and bankruptcy costs push more profitable firms towards higher book leverage. The model maintains that expected bankruptcy costs decline when profitability increases and the deductibility of corporate interest payments induces more profitable firms to finance with debt. It further states that tangible assets are easier for outsiders to value than intangibles, which lowers expected distress costs. Therefore, according to the theory firms with more tangible assets employ more debt in their capital structure.

Pecking order theory

The pecking order theory takes the information cost argument in a somewhat different direction, suggesting that the dilution associated with issuing securities is so large that it dominates all other considerations (Barclays and Smith, 2005). According to the pecking order model, companies maximize value by systematically choosing to finance new investments with the "cheapest available" source of funds. The theory considers the possibility of asymmetric information whereby firm managers are assumed to know more about the characteristics of the firms return stream or investment opportunities (Harris & Raviv, 1991). The choice of capital structure by management therefore signals to outside investors some insider information. This asymmetry of information influences the choice between internal and external financing and between new issues of debt and equity securities (Olokoyo, 2012).

The pecking order theory of capital structure was first presented by Myers (1984) and Myers and Majluf (1984), and relies heavily on information cost to explain corporate financing behavior.

They argue that if investors are less well-informed than current firm insiders about the value of the firm's assets, then equity may be mispriced by the market. If firms are required to finance new projects by issuing equity, underpricing may be so severe that the new investors capture more than the NPV of the new project, resulting in a net loss to existing shareholders. Myers (1984) argues that firm's capital structure reflects the accumulation of past financial requirements. He maintains that there is a pecking order of corporate financing, firms prefer internal to external finance; if internal finance is not sufficient and firms require external finance, they issue the cheapest security first. In this case, they start with debt, then possibly hybrid securities such as convertible bonds and issue equity only as a last resort.

Unlike the trade-off theory, there is no well-defined target leverage in the pecking order model. There are two kinds of equity; internal and external, one at the top of the pecking order and one at the bottom. A firm's leverage ratio therefore reflects its past cumulative requirement for external finance. According to this theory, the optimal capital structure does not exist. Myers (1984) challenges the notion of an optimal capital structure based purely on the tradeoff of debt-related benefits and costs in a world of information asymmetry between corporate managers and investors. He further argues that corporate financing practice does not confirm to a simple trade-off model and he suggests the existence of a pecking order among the financing sources used by firms.

The theory, like the trade-off model explained the financing decisions of firms. According to the model, firms with more investments (i.e growth opportunity) should accumulate more debt over time. The theory also suggests that a firm will use first internally generated funds which may not be sufficient for growing firm and the next alternative is to embark on debt financing. Thus, a

positive relation is predicted between growth and leverage. The theory is usually interpreted as predicting an inverse relation between firm size and leverage. Large firms are more closely observed by analysts and should be more capable of issuing informationally more sensitive equity and lower debt.

Additionally, the theory posits that higher earnings or profitability result in less book leverage. Firms prefer raising capital first from retained earnings, second from debt and third from issuing new equity. This behavior, according to the model, is due to the costs associated with new equity issues in the presence of information asymmetries. The model also asserts that firms with more tangible asset will make less use of debt in their financial structure. This, according to the theory is because low information asymmetry associated with tangible assets

makes equity issuance less costly. Thus, leverage ratios should be lower for firms with higher tangibility. Firms with more tangible assets will make more use of equity in their financial structure because there is less information asymmetry between the firm managers and new investors. Firm managers will issue equity without fear that such equity issuance will be undervalued by new investors. This therefore suggests a negative relationship between debt and assets tangibility.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter covers the methods and techniques the study applied to achieve the research objectives. The chapter presents and discusses the research design, population and sample of the study, sources and method of data collection for the study and the technique of data analysis. It also presents the definition and measurements of the variables and models of the study as well as the justification of the methods and techniques adopted.

3.2 Research Design

Consistent with the objective of this study, correlational research design is employed. The design is the measurement of two or more factors to determine or estimate the extent to which the values for the factors are related or change in an identifiable manner. In order to use the correlational research design, the variables of the study must be related; each variable of the study must be expressed in numerical form, that is, it must be quantifiable; and the research must follow a quantitative approach (Water, 2014). This study involves the measurements of five independent variables and one dependent variable as well as assessment of the relationship between the explained and the explanatory variables. Correlational design is therefore appropriate for this study because it allows for testing of expected relationships between and among variables as well as making predictions regarding those relationships.

3.3 Population and Sample of the Study

The population of the study consist of all the twenty one (21) food and beverages firms quoted on the floor of Nigerian Stock Exchange (NSE) as at 2014. The food and beverages sector covers the following sub-sectors; seven (7) Beverages Brewers/Distillers Firms, one (1) Beverages Non-Alcoholic Firm, eleven (11) Food Products Firms, and two (2) Food Products Diversified Firms. Food and beverages firms are preferred because of absence of empirical studies on similar topic that is particular to the industry.

Based on the following criteria, a total of twelve firms are filtered out, leaving a balance of nine firms as the sample of the study.

i. A firm must have been quoted on the floor of Nigerian Stock Exchange at least 1 year before 2005.

ii. A firm must be on the NSE listing and its shares constantly traded on the floor of the Exchange for most of the period covered by the study.

iii. A firm must have its annual report and accounts accessible for most of the period under study.

On the basis of first criterion, five firms were eliminated for not being quoted on the Nigerian Stock Exchange prior to 2005. These firms include; Big Treat Plc, Dangote Flour Mills Plc, Dangote Sugar Refinery Plc, Honey Well Flour Mills Plc and Multi-Trex Integrated Foods Plc. Seven firms were further dropped for their shares are not constantly traded on the floor of the Exchange which make their data inadequate. These firms include; Champion Breweries Plc, Golden Guinea Breweries Plc, International Breweries Plc, Jos International Breweries plc, Premier Breweries Plc, P S Mandrides Plc and Union Dicon Salt Plc.

Table 3.1 presents the population and date of listing on NSE

Table 3.1: Population and Date of listing on NSE

S/N	Population	Date of listing on NSE
	Beverages Brewers/Distillers	
1	Champion Breweries Plc	1st September, 1983
2	Golden Guinea Breweries Plc	1979
3	Guinness Nigeria Plc	November, 1965
4	International Breweries Plc	6th April, 1995
5	Jos International Breweries Plc	30th March, 1992
6	Nigerian Breweries Plc	5th September, 1973
7	Premier Breweries Plc	1988
	Beverages Non-Alcoholic	

8	7-Up Bottling Company Plc	1986
	Food Products	
9	Big TreatPlc	6th December, 2007
10	Dangote Flour Mills Plc	4th February, 2008
11	Dangote Sugar Refinery Plc	8th March, 2007
12	Flour Mills of Nigeria Plc	14th August, 1979
13	Honeywell Flour Mills Plc	June, 1995
14	Multi-Trex Integrated Foods Plc	30th October, 1990
15	Northern Nigerian Four Mills Plc	1978
16	P S Mandrides Plc	February, 1979
17	UTC Nigeria Plc	31st January, 1972
18	National Salt Company of Nigeria Plc	20th October, 1992
19	Union Dicon Salt Plc	23rd September, 1993
	Food Products Diversified	
20	Cadbury Nigeria Plc	1976
21	Nestle Nigeria Plc	20 April, 1979

Source: NSE FactBook 2013

Table 3.2 Presents sample of the study

Table 3.2: Sample of the study and date of listing on NSE

S/N	Sample	Date of listing on NSE
1	Cadbury Nigeria Plc	1976
2	Nestle Nigeria Plc	20 April, 1979
3	Guinness Nigeria Plc	November, 1965
4	Nigerian Breweries Plc	5th September, 1973
5	Flour Mills of Nigeria Plc	14th August, 1979
6	7-Up Bottling Company Plc	1986
7	Northern Nigerian Flour Mills Plc	1978
8	National Salt Company Plc	20th October, 1992
9	UTC Nigeria Plc	31st January, 1972

Source: NSE FactBook 2013

3.4 Sources and Method of Data Collection

The study utilized data from secondary sources. This is because the estimation of the models of the study requires the use of accounting variables which is largely found in corporate financial statements. Therefore, the study used documentary firm-level data that were obtained from the annual report and accounts of the sample firms and NSE fact book. Data for the estimation of the models of the study were obtained from the sampled firms' annual reports and accounts while dates of listing on the NSE were obtained from NSE fact book. The data was collected for the period 2005 through 2014.

3.5 Technique of Data Analysis

Multiple regression was used to analyze the relationship between firm characteristics and capital structure. Since the data of the study is panel, that is, a combination of cross sectional and time series, the regression was therefore run in a panel manner, hence, various options of panel data regression were run. These include OLS regression, random effect regression and fixed effect regression. Hausman specification test was run to determine the choice between fixed and

random effect regression for each of the models of the study. In addition, Lagrangian multiplier test for random effects was also conducted to determine the appropriate alternative between pooled OLS regression and random effect model (as suggested by the Hausman specification test). Therefore, the result for all the models of the study is reported using pooled OLS regression suggested by the Breusch and pagan lagrangian multiplier test for random effects. The analysis is conducted using S/Data Analysis Software (STATA 10.0).

3.6 Models Specification and Variable Measurement

3.6.1 Models Specification

To test for the hypotheses of this study, the functional model is specified as follows;

LEV = f (GROWTH, SIZE, PROF, TANG, NDTS)

Following Rajan and Zingales (1995), leverage as the dependent variable is represented by two alternative measures. This is therefore express in two different regression models, which are mathematically expressed as follows;

$LEV1_{it} = \alpha o + \beta_1 GROWTH_{it} + \beta_2 SIZE_{it} + \beta_3 PROF_{it} + \beta_4 TANG_{it} + \beta_5 NDTS_{it} + \mu_{it}$ ……i

$LEV2_{it} = \alpha o + \beta_1 GROWTH_{it} + \beta_2 SIZE_{it} + \beta_3 PROF_{it} + \beta_4 TANG_{it} + \beta_5 NDTS_{it} + \mu_{it}$ ..……..ii

Where;

$LEV1_{it}$ = Ratio of non-equity liabilities to total assets of firm i in year t

$LEV2_{it}$ = Ratio of Interest bearing debts to total assets of firm i in year t

$GROWTH_{it}$ = Growth of firm i in year t

$SIZE_{it}$ = Size of firm i in year t

$PROF_{it}$ = Profitability of firm i in year t

$TANG_{it}$ = Assets tangibility of firm i in year t

$NDTS_{it}$ = Non-debt tax shields of firm i in year t

μ_{it} = Error term;

α = Constant or intercept

$\beta_1 - \beta_5$ = The slopes or parameter estimates

3.6.2 Variables Measurement

The explanatory variables of the study are firm characteristics (firm growth, firm size, profitability, non-debt tax shield, and assets tangibility) and the capital structure is used as the dependent variable. The measurements of the variables and their components are presented in Table 3.3

Table 3.3 Variables Definition and Measurement

Variables	Definition/Measurements
Growth Opportunity	Measured as annual percentage increase in total assets
Profitability	Measured as earnings before interest and tax divided by total assets
Firm Size	Measured as natural log of total revenue/sales
Assets Tangibility	Measured as the ratio of tangible fixed assets plus inventories to total assets. (see Guven *et al.* 2006)
Non-DebtTax Shields	Measured as annual depreciation divided by total assets.
LEV1	Is the ratio of total liabilities to total asset; measured as total debt plus trade credits and equivalents divided by total assets.(see Rajan & Zingales 1995, Bevan & Danbolt 2002 and Drobetz & Fix 2003)
LEV2	Is the ratio of total debt to total asset; measured as long term debt plus short term debt divided by total assets.

3.7 Diagnostic Tests

The study conducted multicollinearity test using variance inflation factor (VIF) and its reciprocal (1/VIF) in order to assess the presence of multicollinearity or otherwise. Multicollinearity is a statistical phenomenon in which two or more predictor variables in a multiple regression model are highly correlated. Breuch-Pagan/Cook-weisberg test for heteroskedasticity is also conducted.

The test is conducted in order to ascertain the presence of heteroskedasticity (non-constant variance of error terms) in the data . In addition, Hausman Specification test was also run in order to determine a choice between fixed and random effects regression. The study also run for Breausch and Pagan Lagrangian multiplier test for random effects. The test was run in order to determine the appropriate choice between the random effect regression suggested by the hausman specification test and pooled OLS.

CHAPTER FOUR
DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter presents and discusses the results of the tests conducted on the data collected for the study. The results are presented using tables. The chapter begins with descriptive statistics and then correlation matrix. This is where the analysis of the results to tests the hypothesis of the study is conducted.

4.2 Descriptive statistics

Table 4.1 presents descriptive statistics of the variables of the study. The mean, standard deviation, minimum and maximum have been used to describe the data.

Table 4.1: Descriptive Statistics

Variables	Obs	Mean	St Dev	Minimum	Maximum	Skewness	Kurtosis
LEV1	90	0.5498	0.1535	0.2065	0.8598	-0.1521	2.5279
LEV2	90	0.2020	0.1831	0.0000	0.6549	0.6267	2.4879
GROWTH	90	0.3256	0.4563	-0.8723	1.9752	1.0886	5.1014
SIZE	90	16.5561	1.4546	13.3254	19.2344	-0.0715	2.0440
PROF	90	0.1561	0.1465	-0.2925	0.4552	-0.3033	3.1623
TANG	90	0.6462	0.1639	0.2709	0.9155	-0.3269	1.9952
NDTS	90	0.0428	0.0181	0.0083	0.0838	0.4285	2.5908

Source: Extracted from STATA output 10.0

The first measure of leverage which is ratio of total liabilities to total assets is measured as the proportion of total liabilities to total assets. From table 4.1, it can be seen that LEV1 has a mean of 0.5498, a minimum of 0.2065 and a maximum of 0.8598. This implies that the total liabilities of the Nigerian food and beverages firms sampled on average amounts to about 55% of total assets value for the period under view. It also appears that 21% to 86% of the sampled firms' assets is held in liabilities.

Examining the second measure of leverage LEV2, which is total debt to total assets, the statistics from Table 4.1, shows a mean value of 0.2020, a minimum of 0.0000, standard deviation of 0.1831 and a maximum of 0.6549. This suggests that on average, about 20% of the firms' assets are financed by interest bearing liabilities during the period of the study. It also reveals that the large difference between the average values for total liabilities and total debt indicates that trade credit and equivalent accounts for a significant proportion of financing for listed food and beverages firms in Nigeria.

The Growth opportunity, which is measured as annual percentage change in total assets has a mean of 0.3256, a minimum of -0.8723 and a maximum of 1.9752. This shows that the growth between the companies varies greatly as some firms experienced negative growth of --80.23% while some companies reported positive growth to as high as 197.52%. The standard deviation of 0.4563 indicates that there is wide deviation from the mean of growth of the firms during the investigation period. Firm size is proxied by natural logarithms of sales/revenue. It has a mean of 16.5561 with a standard deviation of 1.4546 and the range is from a minimum of 13.3254 to a maximum of 19.2344.

Profitability is measured as the proportion of earnings before interest and tax to total assets. From Table 4.1, PROF has a mean of 0.1561 with a standard deviation of 0.1465, a minimum of -0.2925 and a maximum of 0.4552. This shows that the profitability between the firms varies greatly as some companies reported negative profit of 12.25% while some companies reported positive profit to as high as 45.52 %. This suggests that some companies in the sample will prefer less debt in their capital structure because they do not have enough earnings to shield the interest expense peculiar to debt financing.

As regards assets tangibility, it can be seen from Table 4.1 that the proportion of tangible assets to total asset ranges from a minimum of 27.1% to a maximum of 91.6%, with a mean of 0.6462. This indicates that on average, about 65% of the total assets value of the sampled firms is held in tangible assets. It further shows that only 35% of the total assets value of the sampled firms that is held in current assets during the period under review. This therefore suggests that some firms in the sample had potentials for more debt in their financing because they would have collateral in tangible assets to place in debt application or debt negotiation. From the table, NDTS has a mean of 0.0428, a minimum of 0.0083, maximum of 0.0838 with a standard deviation of 0.0181.

Considering the standard deviation, which measures the degree of dispersion of the variables from their mean values, it reveals that the most volatile of the variables are growth opportunity, profitability and LEV2 with standard deviations of 46%, 15% and 18% respectively. The least volatile of the variables are firm size, tangibility, LEV1 and non-debt tax shields with standard deviation of 1.45, 16%, 15% and 2% respectively.

4.3 Correlation Matrix

The correlation matrix as presented in Table 4.2 shows the associated link between explanatory variables and the explained variables. It is also used to identify whether there is relationship among the explanatory variables themselves, to be able to detect if multicollinearly problem exists.

Table 4.2: **Correlation Matrix of Dependent and Independent Variables**

Variables	LEV1	LEV2	GROWTH	SIZE	PROF	TANG	NDTS
LEV1	1.0000						
LEV2	0.6220	1.0000					
GROWTH	-0.0774	0.1820	1.0000				
SIZE	0.3090	0.2609	0.0741	1.0000			
PROF	-0.1743	-0.3087	.02138	0.2070	1.0000		
TANG	0.2955	0.3538	-0.0510	-0.065	0.0652	1.0000	
NDTS	0.3117	0.1180	-0.1231	0.1037	0.1681	0.4284	1.0000

Source: Extracted from STATA output 10.0

From Table 4.2, there is positive correlation between LEV1 and three of the five explanatory variables, that is, firm size, asset tangibility and non-debt tax shields. The correlation coefficient between the variables ranges from 0.2955 to 0.3117. LEV1 is however, negatively correlated with growth opportunity at -0.0774 and profitability at -0.1743. The second measure of leverage, that is LEV2, has a positive association with all the independent variables except profitability which shows a negative association with a correlation coefficient of -0.3087. The results show almost the same correlation trend between the two measures of leverage and the explanatory variables.

The result implies that irrespective of the measure of leverage applied, leverage has a positive relationship on growth opportunity, firm size, asset tangibility and non-debt tax shields. However, when leverage is measured as the ratio of total liabilities to total assets (LEV1), it has a negative association with growth opportunity. Further, from the Table, profitability has negative relationship with both measures of capital structure that is, LEV1 and LEV2.

As shown from Table 4.2, growth opportunities has a positive correlation with LEV2 at 0.1820. The association is however negative with LEV1 at 0.0774. Firm size has positive correlation with all the two debt elements and the degrees of association are 0.3290 and 0.2609 for LEV1 and LEV2 respectively. Profitability reports a negative relationship with all the two measures of leverage. The degrees of association are -0.1743 and -0.3087. A positive association is observed between assets tangibility, non-debt tax shields and all the two proxies of capital structure

4.4 Robustness tests

In order to ascertain the validity of the findings and to avoid making wrong inferences, some robustness tests were carried out.

4.4.1 Multicollinearity test

Table 4.3: Multicollinearity test

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. vif
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Variable	VIF	1/VIF
NDTS	1.30	0.766892
TANG	1.24	0.804687
PROF	1.13	0.886619
GROWTH	1.08	0.926201
SIZE	1.07	0.936751
Mean VIF	1.16	

Multicollinearity is a statistical phenomenon in which two or more predictor variables in a multiple regression model are highly correlated. In this situation, the coefficient estimates may change erratically in response to small changes in the model or the data. The study conducted multicollinearity test using variance inflation factor (VIF) and its reciprocal (1/VIF) or (TOLERANCE) in order to assess the presence of multicollinearity or otherwise. The benchmark for VIF is that at 5%, collinearity is suspected, at over 10% collinearity is assumed to be present. On the other hand, the closer TOLERANCE is to 1, the greater the evidence that the regressors are not collinear. The results of multicollinearity test from Table 4.3 indicate absence of multicollinearity. This is confirmed from the statistical result that shows all the VIF are not closer to 10 and TOLERANCE are respectively closer to 1. The mean value of VIF is 1.16. All these suggests absence of multicollinearity among the independent variables.

4.4.2 Heteroskedesticity test

The traditional OLS assumes that the variance of the error terms has to be constant and the same for all observations (homoscedastic) and if this assumption is violated, that is, the variance is

non-constant (Heteroskedastic), the usual standard error terms of the estimated parameters are biased and inconsistent (Adren, 2007). Under this situation, Gujurati (2004) maintained that OLS method does not make use of the information contained in the unequal variability of the dependent variable. Therefore, estimation with OLS when heteroskedasticity problem is been addressed is capable of producing estimators that are BLUE (Best linear unbiased estimators). For the purpose of this study, Breuch-Pagan/Cook-weisberg test for heteroskedasticity is conducted.

The Breusch-pagan/Cook-weisberg test for heteroskedasticity in respect of model 1 (see appendix III) reveals a chi-sqaure value of 0.53 with p-value of 0.4662, which is insignificant at all levels of significance. This therefore signifies absence of heteroskedasticity in the data.

In respect of model 2, the test reveals a chi-square value of 0.52 and p-value of 0.4713, (see appendix III) which is also insignificant at all levels of significance. This also indicates absence of heteroskedasticity problem in the data.

4.4.3 Hausman Specification Tests

The study ran hausman specification tests in order to determine a choice between fixed and random effects regression (see appendix III for fixed and random effect regressions). The hausman tests basically show whether the unique errors are correlated with the regressors. Random effect is the null hypothesis which states that the entity's error terms are not correlated

with repressors; while fixed effect is the alternative hypothesis which states that the entities error terms are correlated with the regressors. The hausman specification test considered random effect regression as the appropriate estimator of parameters on the basis that the entities error terms are uncorrelated with the regressors as the hausman test (see appendix III) is statically insignificant for both model 1 (P. value = 0.2135) and model 2 (P. value = 0.8745). Therefore, hausman test indicated that the random effect regression is the preferred model that should be used.

4.4.4 Lagrangian Multiplier Test for Random Effect

The study further run for Breausch and Pagan Lagrangian multiplier test for random effects. The test was run in order to determine the appropriate choice between the random effect regression suggested by the hausman specification test and pooled OLS. The null hypothesis in the lagrangian multiplier test is that variance across entities is zero, that is, there is no significant difference across units, (i. e. no panel effect). The lagrangian multiplier test for random effect considered pooled OLS regression as the more appropriate estimator of parameters on the basis that there is no significant differences across units of the study as the test is statistically insignificant for both models (see appendix III). Hence, results will be interpreted using pooled OLS regression as suggested by the series of robustness tests conducted

4.5 Regression results

This subsection deals with the inferential results of the study. The result is in relation to the impact of firm characteristics on leverage of listed food and beverages firms in Nigeria. It

contains the individual and combined impact of firm characteristics on capital structure. The independent variables are the same for all the models.

Table 4.4 presents the regression result of both models

Table 4.4 Regression Results

Model 1			Model 2	
Variables	Coefficient	t-statistics	Coefficient	t-statistics
Constant	-0.3011	-1.75 (0.084)	-0.8038	-4.31 (0.000)
GROWTH	-0.0003	-0.01 (0.992)	0.1122	3.30 (0.001)
SIZE	0.0407	4.15 (0.000)	0.0456	4.29 (0.000)
PROF	-0.3211	-3.21 (0.000)	-0.5917	-5.46 (0.000)
TANG	0.2306	2.46 (0.016)	0.4628	4.55 (0.000)
NDTS	1.8390	2.12 (0.037)	0.1730	0.18 (0.855)
R-Square	0.3209		0.4401	
Adj-R-square	0.2805		0.4068	
F-Statistic	7.94 (0.000)		13.19 (0.000)	

Source: Extracted from STATA output 10.0

The regression result from Table 4.4 in respect of firm growth opportunity and leverage shows that firm growth is significant at 1% in explaining the leverage of listed food and beverages firms in Nigeria based on model 2. This can be confirmed from the t-value of 3.30 with p-value of 0.001; and therefore serve as a base for the rejection of null hypothesis which states that growth opportunity has no significant effect on the leverage of listed food and beverages firms in Nigeria. The regression result based on model 1 however reveals that growth opportunity does not have significant effect on the leverage

of listed of food and beverages firms in Nigeria. This is based on the t-value of -0.01 with p-value of 0.992 which is not significant at 1 to 10% levels of significance. The regression result further reveals that firm size has significant effect at 1% level of significance on leverage of Nigerian listed food and beverages companies with positive coefficients for all the two models. This finding serve as a base for the rejection of null hypothesis earlier formulated which states that firm size has no significant effect on the leverage of listed food and beverages firms in Nigeria.

Again, the regression result in respect of association between profitability and leverage shows that profitability is inversely related with leverage but significant at 1% level of significance for all the models. The result provides justification for the rejection of the null hypothesis, which states that profitability has no significant effect on the leverage of listed food and beverages firms in Nigeria. Further, the regression result reveals that asset tangibility as measured by the proportion of tangible assets to total assets is positively related and statistically significant at 1% level of significance with leverage for all the two models employed by the study. The finding also provides justification for the rejection of null hypothesis which states that asset tangibility has no significant effect on the leverage of listed food and beverages firms in Nigeria.

The regression result in respect of the association between non debt tax shields and leverage reveals mixed findings for the two models of the study. The result reveals that non debt tax shields is positively related and statistically significant at 5% level of

significance with leverage based on model 1. This also provides a base for the rejection of the null hypothesis which states that non debt tax shields has no significant effect on the leverage of listed food and beverages entities in Nigeria. The result based on model 2 however reveals contrary finding. The result based on model 2 shows that non debt tax shields has no significant effect on the leverage of listed food and beverages firms in Nigeria. This can be confirmed by the t-value of 0.18 which is insignificant at 1 to 10% levels of significance.

The result from Table 4.4 shows that F-statistics are respectively 7.94 and 13.19 for models 1 and 2 which are all significant at 1% level of significance. The statistic also suggests the fitness of the models. The adjusted R-squares of 0.2805 and 0.4068 show that the firm attributes account for 28% of the variation in the capital structure of the firms based on model 1. Model 2 however explain 41% variation in the dependent variable during the same period under investigation. By and large, the adjusted R-squares for the two models may appear to be low particularly model 1. However, the objective in regression analysis is not to obtain a high adjusted R-square, but dependable estimates of the true population regression coefficients and draw a statistical inference about them. Therefore, the study is more concerned about the logical or theoretical relevance of the explanatory variables to the dependent variable and their statistical significance.

4.6 Discussion of findings

Emanating from the data, as well as results presented and analyzed, the following findings have been made; the study finds that growth opportunity has positive and significant effect on the ratio of interest bearing debt to total assets, that is, leverage based on model 2. A possible explanation for this may be that the firms are experiencing growth, and the internally generated funds in form of retained earnings may not be sufficient for them to finance these growths, so as a next option, the firms resort to debt financing. The positive effect can also be explain from the point of view of Myers (1984), who predicts that firms with more investments, holding profitability fixed, would accumulate debt over time. This finding is in agreement with the position of pecking order theory which predicts that internally generated funds are not sufficient for growing firms and the next alternative is to embark on debt financing. This finding is consistent with prior studies by Guven *et al* (2006), Mazur (2007), Rafiq *et al.* (2008), Anifowose (2010) and Shehu (2012), but contradicts those of Rajan and Zingales (1995), Bevan and Danbolt (2002), Drobetez and Fix (2003), Huang and Song (2006), Wellage and Locke (2012) who find negative relationship between leverage and growth opportunities. The findings for Model 1 which measures leverage as the ratio of total liabilities total assets is however strange because of the insignificant statistical association between LEV1 and growth opportunity.

The study finds that firm size has positive and significant effect on the leverage of listed of food and beverage firm in Nigeria. This is true for both the measures of leverage employed by the study. This implies that large Nigerian listed food and beverages companies employ more debt in their financing mix than small ones. This may be as a result of the fact that large and more diversified firms face lower default risk when they employ debt in their financial structure. In addition, another reason that may have informed the positive association is that large firms have

better reputation in debt market; hence, they face lower debt related agency costs; and thus can also borrow under better condition. This finding confirms the argument put forward by Titman and Wessels (1988) that direct bankruptcy costs associated with debt finance is not considered as an active variable in financing decision of large firms. The finding agrees with those of Rajan and Zingales (1995), Wiwattanakantang (1999), Baral (2004), Shah and Hijazi (2004), Salawu (2007), Nikolaos (2007) and Wellage and Locke (2012). The result is however contrary to those of Titman and Wessls (1988), Mazur (2007), Anifowose (2010), and Shehu (2012) who find a significant negative effect of firm size on leverage.

The study also finds that both the two measures of leverage adopted have a significant negative effect on the profitability of listed food and beverages firms in Nigeria. The explanation for this negative association could be that financial managers of these firms may have preferred to make use of retained earnings in financing investment which is a cheaper source of finance than external financing in the form of debt or equity. Also, bankruptcy costs associated with debt financing may have induced financial managers of these firms to prefer the use of retained earnings in financing their investment than to go for debt finance. The finding confirms the prediction of pecking order hypothesis which posits that higher earnings or profitability results in less book leverage (firms prefer raising capital first from retain earnings when financing new investment or projects). This result also corroborates the argument by Bevan and Danbolt (2002) who noted that leverage-profitability negative relationship is the most pervasive regularity in capital structure research. This finding is consistent with Wiwattanakantang (1999), Bevan and Danbolt (2002), Drobetz and Fix (2003), Guven *et al.* (2006), Huang and Song (2006), Rafiq *et*

al. (2008) and Saheel and Muhammed (2010). However, the result contradicts that of Shehu (2012) who finds a significant positive relationship between leverage and profitability.

Further, the study finds that assets tangibility has positive and strong effect on all the measures of leverage employed by the study. Thus, listed food and beverages firms with high proportion of tangible assets employ more debt in their financial structure. One of the explanation for this positive relationship is that entities with large amount of tangible assets can borrow at a cheaper rate of interest in the debt market by providing security of these tangible assets to lenders. Therefore, financial managers of the sampled firms may have taken the opportunity of low interest rate in the presence of high tangible assets to employ more debt in their financing mix. This finding confirms the argument by Frank and Goyal (2009), who maintained that tangible assets are easier to collateralize and they suffer a smaller loss of value when firms go into distress, thereby, suggesting that firms with more tangible assets will employ more debt in their capital structure. The finding is in line with the prediction of trade-off theory which posits that firms with more tangible assets will employ more debt in their capital structure because the assets are easier for outsiders to value than intangibles, hence, lowers expected distress costs. The finding is in tandem with those of Drobetz and Fix (2003), Huang and Song (2006), Antifowose (2010) and contradicts the findings of Bauer (2004), Nickolaos (2007) and Wellage and Locke (2012).

It is also found in the study that non debt tax shields has positive effect on total liabilities to total assets, that is, leverage based on model 1. The explanation for this may be that the presence of substantial non debt tax shields in form of depreciation should be as a result of considerable

collateral assets possessed by the firms which would have been used to secure debt at a low interest rate. This suggests that the presence of non-debt tax shields did not serve as a substitute for the tax benefits of debt financing for the sampled firms during the period under study. The study however finds a contrary position when leverage is measured as ratios of total debt to total assets (model 2). The implication of these findings is that significant statistical association between non-debt tax shields and leverage depends on the definition or measure of leverage applied. That is, it is definitional dependent.

It is equally found from the analysis of descriptive statistics that there is large difference between the average values of total liabilities and total debt. This therefore suggests that trade credit and its equivalent account for significant proportion of financing for the sampled firms during the period under study. The use of trade credit and equivalent in the financing of these sampled firms may be due to poor participation of some entities in the bond market.

CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The main objective of this study is to assess the impact of firm characteristics on capital structure of listed food and beverages firms in Nigeria. The study therefore specifically investigated the impact of growth opportunity, firm size, profitability, assets tangibility and non-debt tax shields on the capital structure of the companies from 2005 to 2014. The study considered two alternative measures of leverage to represent the dependent variable.

The sample size of the population is nine firms. Correctional research design was employed, because the study tried to find the impact of firm characteristics on leverage using data collected from the annual report and accounts of the firms. Multiple regression technique was employed for data analysis. The regression was run using panel data; as such, various options of panel data regression were run and series of robustness tests (such as multicollinearity and heteroekedasticity tests) were conducted to enhance the validity of the findings. The tests suggested pooled OLS as the most robust of all other methods of panel data estimation.

The study found that firm characteristics have significant impact on the capital structure of listed food and beverage companies in Nigeria. Individual results show that growth opportunity has significant impact on the leverage of listed food and beverage firms in Nigeria based on model 2

but the result was found to be insignificant in respect of model 1. The impact of firm size on the leverage of listed food and beverages firms was found to be positive and statistically significant for all the two models. Profitability was also found to have significant negative impact on the capital structure of the firms. Assets tangibility was found to be positive and statistically significant in explaining the leverage of listed food and beverages firms in Nigeria. Non debt tax shields was also found to have significant positive impact on the capital structure of listed food and beverages firms for model 1. Model 2 however shows that non debt tax shields has no significant impact in explaining the leverage of listed food and beverages companies in Nigeria.

5.2 Conclusion

Following careful review of extant literature, and based on the data collected and analyzed; as well as the hypotheses tested, the study concludes that firm characteristics strongly drive the capital structure of listed food and beverages companies in Nigeria. It is generally concluded that firm size and assets tangibility have significant positive effect on all the two measures of leverage of listed food and beverages companies in Nigeria during the period under review. This is in accordance with the position of trade off theory which predicts a positive relation between leverage on one hand as well as firm size and assets tangibility on the other hand. The study however concluded that profitability has a significant negative effect on the two leverage measures of the firms during the same period under study. The negative relationship revealed by the study agrees with pecking order theory which predicts a negative relation between leverage and profitability. Growth opportunity is concluded to have a significant positive effect on leverage and is in accordance with pecking order position.

The study also concludes that alternative definitions of leverage or gearing results in different correlations and level of significance with the determining factors. This is unlike other previous empirical studies that adopted only one definition or measure of leverage in the form of long term debt, which resulted to similar outcomes.

Additionally, it is concluded that firms' capital structure choices in Nigerian listed food and beverages companies are affected by the same variables as they are in developed countries. The pecking order and the tradeoff hypotheses that were tested using data from advanced economies explained to a very large extent the corporate capital structure choice of listed food and beverages companies in Nigeria.

5.3 Recommendations

Based on the findings and conclusions of this study, the following are recommended:

i. It is observed in the study that leverage in the Nigerian listed food and beverages companies increases with growth opportunities, firm size and asset tangibility. Thus, corporate financial managers of these firms should be wary of increasing debt finance in their financial structure by only taken into cognizance of these firm specific attributes. Finance managers should carefully consider the costs of taking on more debt and painstakingly strike a balance between these costs that are associated with debt financing and the eventual benefits thereof.

ii. Since profitability is a sign of prosperity, the study recommends that financial managers should accumulate these profits in the form of retained earnings to finance future growth and carefully employ more debt (even in the presence of profitability) to finance immediate projects/investments. However, all these should be done with proper consideration of costs associated with debt finance.

iii. The study from the analysis of descriptive statistics established that the Nigerian listed food and beverages firms largely make use of trade credit and equivalent in their total financing. This may be due to poor participation of the companies in the bond market in order to access long term debt finance which is cheaper. It therefore recommended that the Securities and Exchange Commission should strive to remove any policy that could serve as the bottleneck for effective participation of these companies in the Nigerian bond market, particularly Nigerian listed food and beverages firms.

5.4 Limitations of the study

Like most other studies, this research work encountered some constraints. These include:

i- One of the constraints encountered by this study is the issue of time frame related to the period of the study; as only food and beverages companies listed on the floor of the NSE between 2004 and 2014 were included. Hence firms with short histories (not listed prior to 2004) were excluded. The study should have used all the twenty one listed firms, but the inadequacy of data did not allow their inclusion.

ii- In the literature of corporate finance, leverage has been measured in two ways; it is either measured in terms of book value or in terms of market value. This study measured leverage in terms of book value in that most of the theoretical predictions apply to book leverage and most previous empirical studies in the area used book value of leverage. The study could have consider the use of market leverage rather than book leverage.

iii- The study limits itself to only the listed food and beverages companies is Nigeria. Therefore, the findings, conclusions and recommendations are only applicable to listed food and beverages firms in Nigeria.

5.5 Area for further research

i. The study investigated the effect of growth opportunity, firm size, profitability, asset tangibility and non-debt tax shields on the leverage of listed food and beverages entities in Nigeria for the period 2005 through 2014. The period of the study can be extended and there are other firm characteristics that were not captured in this study. Other firm characteristics not captured in this study may further be considered to see their explanatory power on leverage.

ii. Further research could consider using market value approach as a measure of leverage. This should be conducted either in the same domain or any other sector to see if there is any significant difference between the two results.

iii. The same firm characteristics variables used by this study can be examined in another domain/sector to see whether the findings will be similar to that of listed food and beverages companies in Nigeria.

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Appendix 1: Listed companies under food, beverages, tobacco and breweries firms as at 2014

Beverages- Brewers/distillers:

1) Champion Breweries Plc.
2) Golden Guinea Breweries Plc.
3) Guiness Nigeria Plc.
4) International Breweries Plc.
5) Jos International Breweries Plc.
6) Nigerian Breweries Plc.
7) Premier Breweries Plc.

Beverages- Non-alcoholic

8) 7-up Bottling Company Plc.

Food Products

9) Big Treat Plc.
10) Dangote Flour Mills Plc.
11) Dangote Sugar Refinary Plc.
12) Flour Mills of Nigeria Plc.
13) Honey Well Flour Mills Plc.
14) Multi-Trex Integrated Foods Plc.
15) Northern Nigerian Flour Mills Plc.
16) National Salt Company of Nig. Plc.
17) P. S. Mandrides Plc.
18) UTC Nigeria Plc.
19) Union Dicon Salt

Food Products Diversified

20) Cadbury Nigeria Plc.
21) Nestle Nigeria Plc.

Sources: NSE factbook, 2013

SAMPLED COMPANIES

1) Cadbury Nigeria Plc.
2) Nestle Nigeria Plc.
3) Guiness Nigeria Plc.
4) Nigerian Breweries Plc.
5) Flour Mills of Nigeria Plc.
6) 7-Up Bottling Company Plc.
7) Northern Nigerian Flour Mills Plc.
8) National Salt Company of Nigeria Plc.
9) UTC Nigeria Plc.

Appendix II: Data for the Study

Year	LEV1	LEV2	GROWTH	SIZE	PROF	TANG	NDTS
2005	0.764095	0.646332	-0.00662	17.67642	0.217358	0.737155	0.041395
2006	0.50569	0.171143	-0.00706	17.66631	0.223511	0.86385	0.047381
2007	0.571137	0.142021	-0.00331	17.79803	0.217008	0.709517	0.044729
2008	0.559405	0.118369	0.19982	17.94692	0.228719	0.596659	0.038484
2009	0.496353	0.050622	0.001924	15.05212	0.239505	0.677687	0.042491
2010	0.573234	0.093372	-0.00926	15.30581	0.284532	0.714046	0.048266
2011	0.585761	0.021796	-0.00118	15.51022	0.254851	0.65889	0.049096
2012	0.563218	0.021731	0.117116	16.3542	0.289954	0.688865	0.048783
2013	0.635774	0.157669	0.149433	16.61656	0.212024	0.844146	0.071027
2014	0.619702	0.1743	0.141977	15.62332	0.171943	0.83027	0.082562
2005	0.666024	0.351212	0.004176	18.11408	0.176413	0.879204	0.054018
2006	0.609917	0.138258	0.098548	18.20048	0.210807	0.881151	0.065967
2007	0.222743	0.318695	1.735773	15.2736	0.224193	0.82411	0.008396
2008	0.523138	0.122785	0.873475	16.27922	0.302415	0.732774	0.060733
2009	0.291329	0.021395	0.153116	18.79542	0.354782	0.807365	0.060642
2010	0.564716	0.004694	-0.00247	16.61321	0.39386	0.851198	0.063507
2011	0.561392	0.000833	-0.00692	19.04052	0.394705	0.821323	0.059014
2012	0.631718	0.198583	0.721633	17.08237	0.297388	0.494062	0.03829
2013	0.331563	0.177421	0.287895	14.76105	0.180663	0.658328	0.066398
2014	0.55547	0.035607	0.003446	14.77621	0.181732	0.688438	0.083829
2005	0.384504	0	1.547425	14.16405	0.455249	0.582671	0.014972
2006	0.645613	0	0.443798	14.3517	0.452835	0.641019	0.037438
2007	0.663612	0	0.420481	14.46416	0.433563	0.689693	0.051948
2008	0.206549	0	0.223973	14.60033	0.341753	0.736945	0.05782
2009	0.229028	0.205094	0.737207	17.76179	0.409116	0.693855	0.043373
2010	0.565224	0.356007	0.862046	18.03967	0.334988	0.764038	0.033126
2011	0.53669	0.426305	0.727714	18.23148	0.314808	0.807592	0.037162
2012	0.701396	0.430765	0.528802	18.40008	0.277094	0.835219	0.03851
2013	0.615734	0.303654	0.714454	18.57518	0.302357	0.797461	0.044239
2014	0.624843	0.253394	0.421632	18.70649	0.21762	0.699881	0.042938
	0.507071	0.279626	0.926737	16.10372	-0.07868	0.406615	0.0593

2005							
2006	0.590943	0.528863	0.842193	15.65239	-0.11521	0.740318	0.012435
2007	0.36396	0.178382	1.459788	16.41356	-0.06383	0.270952	0.03356
2008	0.38459	0.007195	1.975208	15.6485	0.288881	0.310423	0.012529
2009	0.371962	0.312875	0.539347	15.88089	0.254571	0.356213	0.014113
2010	0.302314	0.005775	0.937379	15.98655	0.333125	0.464884	0.022084
2011	0.340177	0.005833	-0.35566	16.00089	0.275556	0.462139	0.046428
2012	0.436191	0.00436	0.337846	16.14833	0.314102	0.413336	0.039237
2013	0.384671	0.004098	0.06396	16.41182	0.327063	0.42592	0.051277
2014	0.397032	0.003832	0.069379	16.1985	0.309944	0.574267	0.044064
2005	0.464275	0.333397	0.105988	17.50482	0.103737	0.622198	0.034299
2006	0.648465	0.088533	0.338579	17.74706	0.09104	0.660972	0.031526
2007	0.642884	0.219366	0.259958	17.98781	0.125976	0.619153	0.034501
2008	0.680817	0.266756	0.544098	18.32719	0.142065	0.501592	0.027415
2009	0.716687	0.300153	0.419043	18.4604	0.108371	0.392163	0.025407
2010	0.783632	0.371814	0.249581	18.80858	0.126499	0.405604	0.019398
2011	0.649508	0.34465	-0.04479	18.87236	0.267212	0.45801	0.05659
2012	0.623735	0.065471	0.156233	18.90185	0.135672	0.4718	0.026051
2013	0.53611	0.168488	0.478104	19.02719	0.076413	0.42586	0.023235
2014	0.582279	0.230448	0.297613	19.23441	0.059664	0.482488	0.029317
2005	0.546775	0.097376	0.416922	16.91347	0.217103	0.56178	0.01544
2006	0.392059	0.349376	0.443791	17.12767	0.130657	0.383573	0.011131
2007	0.852518	0.604179	-0.00935	16.60655	-0.15726	0.711561	0.029146
2008	0.809599	0.62923	-0.02999	16.70688	-0.08872	0.63779	0.044114
2009	0.819243	0.654995	0.005957	16.89417	-0.04543	0.629685	0.046001
2010	0.482699	0.01028	-0.12697	16.96141	0.018156	0.498394	0.052495
2011	0.525774	0	0.000129	17.1113	0.078841	0.461035	0.040091
2012	0.526578	0	-0.00153	17.2501	0.185152	0.468794	0.044941
2013	0.455004	0	0.003825	17.25695	0.162155	0.372706	0.036011
2014	0.44421	0	0.008905	17.39236	0.173508	0.435695	0.031458
2005	0.859814	0.521103	-0.25267	14.4984	0.115581	0.733735	0.081427
2006	0.306463	0.020874	0.068788	13.32542	-0.29253	0.603745	0.027506
2007	0.499799	0.163079	-0.31756	13.76585	0.056334	0.709823	0.025508
2008	0.500618	0.288396	0.834825	14.1974	0.027005	0.809592	0.032718
2009	0.495281	0.276317	0.064139	14.5828	0.031913	0.812587	0.032425
2010	0.487793	0.26391	0.038508	14.76323	0.056389	0.775836	0.025967
2011	0.484399	0.282464	-0.06831	14.85349	0.04976	0.846864	0.032884
2012	0.467289	0.23936	0.109603	14.84513	0.143762	0.858391	0.031421
2013	0.651584	0.308264	-0.0769	14.30807	-0.17914	0.91556	0.034221
2014	0.555752	0.272434	0.041653	14.61223	-0.02246	0.885833	0.032765
	0.623537	0.248043	0.814866	16.51938	0.193159	0.727053	0.077604

2005							
2006	0.684751	0.339516	0.732717	16.66891	0.131512	0.741739	0.071409
2007	0.70388	0.386216	0.622269	16.90981	0.121591	0.686044	0.073336
2008	0.709879	0.431284	0.926589	17.12273	0.123577	0.713791	0.064008
2009	0.698817	0.420588	0.810786	17.2356	0.136909	0.764419	0.070672
2010	0.749569	0.508981	0.632931	17.36697	0.129799	0.739956	0.065139
2011	0.73222	0.426586	1.051189	17.53077	0.154709	0.826367	0.078225
2012	0.846694	0.529733	0.513328	17.74926	0.1206	0.864687	0.081661
2013	0.787409	0.406882	0.376183	17.90759	0.099132	0.861118	0.042922
2014	0.75515	0.385845	0.59492	17.97578	0.108088	0.860055	0.053897
2005	0.560716	0.125669	0.278367	15.14706	0.131083	0.570312	0.027715
2006	0.597464	0.117661	0.203869	15.50465	0.110201	0.575524	0.029635
2007	0.586377	0.013638	-0.00429	15.4014	0.043704	0.618243	0.023121
2008	0.68307	0.011241	0.007734	15.38083	-0.0484	0.58767	0.039552
2009	0.417592	0.015527	0.219535	15.52035	0.029912	0.403723	0.029197
2010	0.402038	0.013596	-0.09001	15.45302	-0.01074	0.486599	0.033862
2011	0.410182	0.014607	0.049455	15.48725	0.010543	0.443209	0.03142
2012	0.306208	0.014114	-0.87236	15.47029	0.000317	0.46438	0.032156
2013	0.398368	0.133495	0.53201	16.35511	0.027345	0.774009	0.054668
2014	0.25685	0	0.075481	16.27525	0.098627	0.669963	0.050128

Appendix III: Correlation, Descriptive, Robustness tests & Regression results

```
xtset id year, yearly
       panel variable:  id (strongly balanced)
        time variable:  year, 2005 to 2014
                delta:  1 year
```

```
. su lev1 lev2 growth size prof tang ndts, detail
```

LEV1

Percentiles		Smallest		
1%	.206549	.206549		
5%	.291329	.2227431		
10%	.33587	.229028	Obs	90
25%	.4442096	.25685	Sum of Wgt.	90
50%	.561054		Mean	.5498544
		Largest	Std. Dev.	.1535229
75%	.6495084	.8192431		
90%	.7523593	.846694	Variance	.0235693
95%	.8095987	.8525176	Skewness	-.1521286
99%	.8598142	.8598142	Kurtosis	2.527941

LEV2

Percentiles		Smallest		
1%	0	0		
5%	0	0		
10%	.0004166	0	Obs	90
25%	.014607	0	Sum of Wgt.	90
50%	.1727212		Mean	.2020758
		Largest	Std. Dev.	.1831696
75%	.3333968	.6041788		
90%	.4310243	.6292295	Variance	.0335511
95%	.5297334	.6463315	Skewness	.6267439
99%	.6549954	.6549954	Kurtosis	2.487934

GROWTH

Percentiles		Smallest		
1%	-.8723562	-.8723562		
5%	-.1269726	-.3556596		
10%	-.0373923	-.3175602	Obs	90
25%	.0034459	-.2526731	Sum of Wgt.	90
50%	.2018442		Mean	.3256552
		Largest	Std. Dev.	.4563907
75%	.5440981	1.459788		
90%	.8677605	1.547425	Variance	.2082924
95%	1.051189	1.735773	Skewness	1.088665
99%	1.975208	1.975208	Kurtosis	5.101474

SIZE

Percentiles		Smallest		
1%	13.32542	13.32542		
5%	14.30807	13.76585		
10%	14.59157	14.16405	Obs	90
25%	15.45302	14.1974	Sum of Wgt.	90
50%	16.60988		Mean	16.55614
		Largest	Std. Dev.	1.454676
75%	17.74926	18.90185		
90%	18.51779	19.02719	Variance	2.116082
95%	18.87236	19.04052	Skewness	-.0715185
99%	19.23441	19.23441	Kurtosis	2.044014

PROF

	Percentiles	Smallest		
1%	-.2925296	-.2925296		
5%	-.0887158	-.1791367		
10%	-.033946	-.1572602	Obs	90
25%	.0596643	-.1152142	Sum of Wgt.	90
50%	.1429133		Mean	.1561152
		Largest	Std. Dev.	.1465423
75%	.2672119	.4091164		
90%	.3340568	.4335627	Variance	.0214747
95%	.394705	.4528354	Skewness	-.3033426
99%	.4552493	.4552493	Kurtosis	3.162361

TANG

	Percentiles	Smallest		
1%	.2709518	.2709518		
5%	.3835734	.3104225		
10%	.4099756	.3562128	Obs	90
25%	.4865993	.3727055	Sum of Wgt.	90
50%	.6818658		Mean	.6462684
		Largest	Std. Dev.	.1639451
75%	.7758356	.8792039		
90%	.8547945	.8811508	Variance	.026878
95%	.8646868	.8858326	Skewness	-.3269371
99%	.9155598	.9155598	Kurtosis	1.995213

NDTS

	Percentiles	Smallest		
1%	.0083962	.0083962		
5%	.0141129	.0111306		
10%	.0226025	.0124349	Obs	90
25%	.0314198	.0125293	Sum of Wgt.	90
50%	.0398211		Mean	.0428588
		Largest	Std. Dev.	.0181722
75%	.0540175	.0814269		
90%	.0708493	.0816613	Variance	.0003302
95%	.0782248	.0825624	Skewness	.4285335
99%	.0838287	.0838287	Kurtosis	2.590878

```
. pwcorr lev1 lev2 growth size prof tang ndts, star (0.05) sig
```

	lev1	lev2	growth	size	prof	tang	ndts
lev1	1.0000						
lev2	0.6220*	1.0000					
	0.0000						
growth	-0.0774	0.1820	1.0000				
	0.4686	0.0860					
size	0.3290*	0.2609*	0.0741	1.0000			
	0.0015	0.0130	0.4873				
prof	-0.1743	-0.3087*	0.2138*	0.2070	1.0000		
	0.1004	0.0031	0.0430	0.0502			
tang	0.2955*	0.3538*	-0.0510	-0.0625	0.0652	1.0000	
	0.0047	0.0006	0.6330	0.5587	0.5417		
ndts	0.3117*	0.1180	-0.1237	0.1037	0.1681	0.4284*	1.0000
	0.0028	0.2681	0.2456	0.3309	0.1132	0.0000	

```
. reg lev1 growth size prof tang ndts
```

Source	SS	df	MS		
Model	.673152833	5	.134630567	Number of obs	= 90
Residual	1.42451197	84	.016958476	F(5, 84)	= 7.94
				Prob > F	= 0.0000
				R-squared	= 0.3209
				Adj R-squared	= 0.2805
Total	2.0976648	89	.023569267	Root MSE	= .13022

lev1	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
growth	-.0003059	.0314274	-0.01	0.992	-.0628028	.062191
size	.0406699	.0098044	4.15	0.000	.0211728	.0601669
prof	-.3211346	.1000384	-3.21	0.002	-.5200719	-.1221973
tang	.2306074	.0938613	2.46	0.016	.0439539	.4172609
ndts	1.838978	.8674073	2.12	0.037	.1140434	3.563912
_cons	-.3010986	.1723	-1.75	0.084	-.643736	.0415387

```
. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of lev1

         chi2(1)      =     0.53
         Prob > chi2  =   0.4662
```

```
. vif
```

Variable	VIF	1/VIF
ndts	1.30	0.766892
tang	1.24	0.804687
prof	1.13	0.886619
growth	1.08	0.926201
size	1.07	0.936751
Mean VIF	1.16	

```
. xtreg lev1 growth size prof tang ndts, fe

Fixed-effects (within) regression               Number of obs      =        90
Group variable: id                              Number of groups   =         9

R-sq:  within  = 0.1503                         Obs per group: min =        10
       between = 0.4562                                        avg =      10.0
       overall = 0.2493                                        max =        10

                                                F(5,76)            =      2.69
corr(u_i, Xb)  = 0.1822                         Prob > F           =    0.0272
```

lev1	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
growth	-.0244416	.0411773	-0.59	0.555	-.1064533	.0575701
size	.0135077	.0140492	0.96	0.339	-.0144737	.0414892
prof	-.2512681	.1380677	-1.82	0.073	-.5262538	.0237176
tang	.2485885	.1410027	1.76	0.082	-.0322428	.5294197
ndts	1.081909	1.08142	1.00	0.320	-1.071925	3.235744
_cons	.1663804	.2432815	0.68	0.496	-.3181568	.6509175
sigma_u	.07375088					
sigma_e	.12322104					
rho	.26374889	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(8, 76) =     2.23                 Prob > F = 0.0343

. est store fixed
```

```
. xtreg lev1 growth size prof tang ndts, re

Random-effects GLS regression                   Number of obs      =        90
Group variable: id                              Number of groups   =         9

R-sq:  within  = 0.1389                         Obs per group: min =        10
       between = 0.7665                                        avg =      10.0
       overall = 0.3172                                        max =        10

Random effects u_i ~ Gaussian                   Wald chi2(5)       =     25.00
corr(u_i, X)       = 0 (assumed)                Prob > chi2        =    0.0001

------------------------------------------------------------------------------
        lev1 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      growth |  -.0057187   .0338893    -0.17   0.866    -.0721406    .0607032
        size |   .0310705   .0110565     2.81   0.005     .0094001     .052741
        prof |  -.2778547   .1111523    -2.50   0.012    -.4957091   -.0600003
        tang |   .2225848   .1062758     2.09   0.036      .014288    .4308815
        ndts |   1.643868   .9215428     1.78   0.074    -.1623224    3.450059
       _cons |  -.1336177    .192697    -0.69   0.488    -.5112968    .2440614
-------------+----------------------------------------------------------------
     sigma_u |  .04408561
     sigma_e |  .12322104
         rho |   .1134784   (fraction of variance due to u_i)
------------------------------------------------------------------------------

. est store random

. hausman fixed random

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |    fixed        random       Difference          S.E.
-------------+----------------------------------------------------------------
      growth |  -.0244416    -.0057187       -.0187229        .0233898
        size |   .0135077     .0310705       -.0175628         .008668
        prof |  -.2512681    -.2778547        .0265866        .0819016
        tang |   .2485885     .2225848        .0260037        .0926673
        ndts |   1.081909     1.643868       -.5619591         .565887
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =          7.10
                Prob>chi2 =        0.2135

. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        lev1[id,t] = Xb + u[id] + e[id,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                 --------+------------------------------
                    lev1 |    .0235693       .1535229
                       e |    .0151834        .123221
                       u |    .0019435       .0440856

        Test:   Var(u) = 0
                                chi2(1) =       0.90
                              Prob > chi2 =       0.3428

.
```

Model II

```
. reg lev2 growth size prof tang ndts
```

Source	SS	df	MS	Number of obs =	90
Model	1.31418254	5	.262836509	F(5, 84) =	13.21
Residual	1.67186522	84	.019903157	Prob > F =	0.0000
				R-squared =	0.4401
Total	2.98604776	89	.033551098	Adj R-squared =	0.4068
				Root MSE =	.14108

lev2	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
growth	.1122135	.0340468	3.30	0.001	.0445076	.1799193
size	.0456171	.0106215	4.29	0.000	.024495	.0667392
prof	-.5916668	.1083763	-5.46	0.000	-.8071849	-.3761486
tang	.4627734	.1016844	4.55	0.000	.2605629	.6649839
ndts	.1730112	.939703	0.18	0.854	-1.695691	2.041714
_cons	-.803833	.1866606	-4.31	0.000	-1.175028	-.4326379

```
. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of lev2

         chi2(1)      =     0.52
         Prob > chi2  =   0.4713

. xtreg lev2 growth size prof tang ndts, fe

Fixed-effects (within) regression               Number of obs      =        90
Group variable: id                              Number of groups   =         9

R-sq:  within  = 0.3527                         Obs per group: min =        10
       between = 0.5643                                        avg =      10.0
       overall = 0.4093                                        max =        10

                                                F(5,76)            =      8.28
corr(u_i, Xb)  = 0.1009                         Prob > F           =    0.0000
```

lev2	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
growth	.0572678	.0451849	1.27	0.209	-.0327258	.1472613
size	.0353097	.0154166	2.29	0.025	.0046049	.0660145
prof	-.606114	.1515053	-4.00	0.000	-.9078629	-.304365
tang	.4520017	.1547259	2.92	0.005	.1438383	.7601651
ndts	-.48595	1.18667	-0.41	0.683	-2.849409	1.877509
_cons	-.5778301	.2669591	-2.16	0.034	-1.109525	-.0461349
sigma_u	.06877192					
sigma_e	.13521365					
rho	.20552381	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(8, 76) =     1.93                 Prob > F = 0.0674

. est store fixed
```

```
. xtreg lev2 growth size prof tang ndts, re

Random-effects GLS regression                   Number of obs      =        90
Group variable: id                              Number of groups   =         9

R-sq:  within  = 0.3486                         Obs per group: min =        10
       between = 0.6856                                        avg =      10.0
       overall = 0.4358                                        max =        10

Random effects u_i ~ Gaussian                   Wald chi2(5)       =     51.75
corr(u_i, X)       = 0 (assumed)                Prob > chi2        =    0.0000

------------------------------------------------------------------------------
        lev2 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      growth |    .0859737   .0378531     2.27   0.023     .0117829    .1601644
        size |    .0414189   .0125213     3.31   0.001     .0168776    .0659602
        prof |   -.5782331   .1250742    -4.62   0.000    -.8233739   -.3330922
        tang |    .4585456   .1209978     3.79   0.000     .2213942     .695697
        ndts |   -.0314637   1.023042    -0.03   0.975    -2.036589    1.973662
       _cons |    -.716383   .2179509    -3.29   0.001    -1.143559   -.2892071
-------------+----------------------------------------------------------------
     sigma_u |    .0640718
     sigma_e |   .13521365
         rho |    .1833665   (fraction of variance due to u_i)
------------------------------------------------------------------------------

. est store random

. hausman fixed random

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |    fixed        random       Difference          S.E.
-------------+----------------------------------------------------------------
      growth |   .0572678     .0859737      -.0287059        .0246743
        size |   .0353097     .0414189      -.0061092        .0089938
        prof |   -.606114    -.5782331      -.0278809        .0855003
        tang |   .4520017     .4585456       -.006544        .0964346
        ndts |    -.48595    -.0314637      -.4544863        .6013081
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        1.81
                Prob>chi2 =      0.8745
```

```
. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        lev2[id,t] = Xb + u[id] + e[id,t]

        Estimated results:
                     |       Var     sd = sqrt(Var)
             ---------+-----------------------------
                lev2 |   .0335511       .1831696
                   e |   .0182827       .1352136
                   u |   .0041052       .0640718

        Test:   Var(u) = 0
                            chi2(1) =     1.23
                         Prob > chi2 =     0.2665

.
```

c