IMPACT OF FIRM CHARACTERISTICS ON FIRM VALUE OF LISTED HEALTHCARE FIRMS IN NIGERIA

BY

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DECLARATION

I declare that the work in this Dissertation entitled "Impact of Firm Characteristics on Firm Value of Listed Healthcare 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.

_____ _____

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CERTIFICATION

This Dissertation entitled "Impact of Firm Characteristics on Firm Value of Listed Healthcare Firms in Nigeria" by MOHAMMED TAHIR GARBA meets the regulations governing the award of the Degree of Master of Science in Accounting and Finance of Ahmadu Bello University, Zaria and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

I hereby dedicate this M.Sc. research to my parents, my wife and children, and other members of my family for their unending support and encouragement.

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ABSTRACT

This study investigated the impact of firm characteristics on firm value of listed healthcare firms in Nigeria. The aim is to identify the extent to which the selected firm characteristics affect the firm value of the healthcare firms in Nigeria. In carrying out this study, a panel data is used with the adoption of ex-post facto design. The study formulated five hypotheses and used panel data regression to analyze the secondary data extracted from the annual reports and accounts of the ten firms for the period 2008 to 2015. Firm value was represented by two proxies; share prices and Tobin's Q. The study found that firm size has positive significant impact on the firm value of listed healthcare firms in Nigeria. The study also found that liquidity has negative significant influence on the firm value of listed healthcare firms in Nigeria suggesting that excess liquidity position will be counter-productive to the firms because it decreases their value. Lastly, it was reported that leverage has negative and significant effect on firm value implying that high leverage does not lead to increase in value of the firm. In view of the findings, it is recommended that the management of the healthcare firms should increase their assets base so as to raise the scope of their activities. The study also recommended that companies should develop sound techniques of managing current assets to ensure that neither insufficient nor unnecessary funds are invested in current assets because maintaining a balance between short-term assets and short-term liabilities is critical.

TABLE OF CONTENTS

Title page- - - - - - - - - - - i

Declaration- - - - - - - - - - - iii

Certification- - - - - - - - - - - iv

Dedication- - - - - - - - - - - v

Acknowledgements- - - - - - - - - - vi

Abstract- - - - - - - - - - - viii

Table of Contents- - - - - - - - - - ix

List of Tables- - - - - - - - - - - xi

CHAPTER ONE: INTRODUCTION

1.1 Background to the Study 1

1.2 Statement of the problem 4

1.3 Research Questions 5

1.4 Objectives of the study 6

1.5 Hypotheses of the study 6

1.6 Scope of the study 7

1.7 Significance of the study 7

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction 9

2.2 Conceptual Issues 9

2.2.1 Firm Value 9

2.2.2 Firm Characteristics 13

2.3 Review of Empirical Literature 21

2.4 Theoretical Framework 29

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction 34

3.2 Research Design 34

3.3 Population and Sample of the study 34

3.4 Sources and Method of Data Collection 35

3.5 Techniques of Data Analysis 35

3.6 Model Specification and variable measurement 36
3.7 Robustness Tests 37
CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATION
4.1 Introduction 39
4.1 Descriptive Statistics 39
4.3 Correlation Matrix 41
4.4 Analysis of Regression Result, Discussion and Summary of Major Findings 42
4.5 Policy Implications 47
CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS
5.1 Summary 49
5.2 Conclusions 50
5.3 Recommendations 50
5.4 Limitations of the Study 51
5.5 Areas for further research 51
References 53
Appendices 69

List of Tables

Table 3.1	List of the Healthcare Firms- - - - - - -	35
Table 3.2	Variables Measurement and Definition- - - - - -	37
Table 4.1	Descriptive Statistics- - - - - - - - -	39
Table 4.2	Correlation Matrix- - - - - - - - -	41
Table 4.3	Regression Results- - - - - - - - -	43

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The contribution of the healthcare sector to the growth and development of the entire economy cannot be overemphasized. As the saying goes, "Health is wealth", the health sector is critical to social and economic development with ample evidence linking productivity to healthcare delivery. In Nigeria, the vision of becoming one of the leading largest 20 economies of the world by the year 2020 is closely tied to the development of its human capital through the health sector (Babatunde, 2009). Also, aside from the federal, state and local government's ministries, departments and parastatals, healthcare industry is among the top in terms of employment of labor. It is also capital intensive with capitalization of 74.06 billion naira (NSE, 2013).

All investors, either institutional or individual, hold one common goal when they invest in shares and hope to maximize expected return at some preferred level of risk. Researchers have tried to use different types of information to explain firm value. For example, the change in economic and financial factors have been commonly used to explain the behavior of different stock markets around the world. As suggested by signaling theory, the stock price should reflect the expectation of corporate performance. This is because investors seek to maximize their returns by purchasing stocks of firms that report high profits. In addition, the stock market has been the major driver for economic growth and plays a significant role in allocation of economic resources into the productive activities of the economy in both emerging and developed countries (Sudhahar & Raja, 2010).

There are both internal and external factors that influence the price of shares. The internal characteristics are otherwise referred to as firm characteristics, which is majorly the scope covered by this study. What constitutes the concept of corporate firm characteristics has been viewed differently by different researchers. These typically include firm size, growth, liquidity and interest coverage ratio, investment opportunity, profitability, risk and tangibility (Suhaila, Kila, Mahamood & Monsur, 2008). Others include firm age and firm size, cash flow, dividend, leverage, operating expenses and internal governance mechanisms (Hassan & Ahmad, 2013; Abdullahi, 2016). Therefore, variables that consist of firm characteristics are chosen based on researchers' interest. The external factors, on the other hand, are those factors that are largely beyond the control of the firm and are usually seen as macro-economic characteristics. These include economic growth (Gross Domestic Product), inflation (represented by consumer price index), exchange rate and monetary policies. Studies that examined the macro-economic variables are concerned with time series analysis of how these factors determine firm value.

The price of a commodity is determined by the forces of demand and supply in a free market economy. In the securities market, whether the primary or the secondary market, the price of shares is significantly influenced by a number of firm characteristics (factors) such as book value of the firm, dividend per share, earnings per share, price earnings ratio and dividend cover (Somoye, Akintoye & Oseni, 2009). Sunde and Sanderson (2009) summed up the factors that affect share price to include corporate earnings, management strength, news of law suit, mergers, takeovers, market liquidity, market stability, availability of substitute, government policies, analyst reports, macroeconomic issues, investor's perception and technical influences.

Firm characteristics variables examined by this study includes firm size, liquidity, operating efficiency, firm growth and leverage. This is because although these variables have prominently featured in prior literature, the result of the previous studies are marred by inconsistent findings. These differences are mainly due to methodological differences such as the sample size and study domain, period covered and techniques of analysis employed. Since different sectors present different findings with respect to the effect of firm characteristics on firm value, the result of previous studies in other sectors may not hold true in our case. It follows therefore that there is the need to study this research phenomena in the context of the Nigerian healthcare firms given their strategic importance to the economy.

The Nigerian healthcare is a sub-sector of the manufacturing industry, which engages in the production of drugs and laboratory equipment that is required for the rendering of effective healthcare services. Much like the other manufacturing firms, it has seen turbulent and harsh business environment, which is made worst by the recent fall in the value of the Naira relative to the U.S. Dollar. The decline in the Naira value means significant increase in import expenditure for the purchase of raw material, the bulk of which comes from the developed countries. This has serious ramification in production and demand for the products because of the increase in cost of production, which is reflected in the sharp increase in the price of drugs experienced recently. The implication of this is that it may affect the value of the firm because securities prices are set based on the current and expected business outlook. The good news, however, is that the present administration has demonstrated serious concern over the low performance of the sector and the most glaring effort exerted to reverse this include making the dollar available to the manufacturers at all times. Expectedly, this will

increase investors' confidence in the sector and consequently reflected in the overall firm value.

1.2 Statement of the Problem

Prior Nigerian studies have examined the influence of firm characteristics on firm value in various sectors. However, most of these studies did not include operating efficiency as a proxy of firm attributes despite the strong relationship that has been established in the literature between operating efficiency and firm values of firms by other influential studies (Amarjit, Manjeet, Neil & Harvinder 2014; Rahma & Farah 2012; Dietrich 2010; Baik, Chae, Choi & Farber 2010; Ahmad & Noor 2010; McWilliams & Smart 1993). Investigating operating efficiency in relation to firm value is desirable because it depicts the link between how well the management utilized the firms' resources in generating corporate wealth and hence corporate value. This study argues that prior studies that ignored this factor are deficient, because operating efficiency is a direct reflection of the management's prowess and it is entirely subject to their control. It is therefore expected that the more efficient the management is, the more the value of the firm.

Similarly, the existing studies in Nigeria focused on building materials, manufacturing and food & beverages firms (Ibrahim & Hussaini, 2015, Shehu 2009, Abdullahi 2016) and excluded healthcare firms which are also significant to the Nigerian economy. The healthcare firms are regulated by additional bodies such as the National Agency for Food and Drug Administration and Control and the Nigerian Drug Law Enforcement Agency, which make the sector distinct from the other firms in the manufacturing sector. This makes the finding of

studies from other sectors hardly applicable to the healthcare firms because of the difference in regulation and business environment such as risk and uncertainties.

Despite the variety of studies in this area, none of them to the best of my knowledge were conducted in the healthcare firms in Nigeria covering a period of eight (8) years and measuring share value as the average price of shares as most of the studies used only the value as at last day of the year. This approach is inappropriate because investors react to corporate outcomes, which is reflected in the prices of shares, when the news become available. Thus, measuring firm value as the share price at the end of the financial year will not give a true picture of the relationship between firm characteristics and firm value. It is on the basis of this that the study is considered essential as an attempt to fill these literature gaps by taking the quarterly average share price and Tobin's Q as a measure of firm value. Also, the healthcare sector is considered different from the other sectors studied by previous studies because it is backed by some additional regulations and standards. This offers a good reason why the sector should be examined in isolation from the other manufacturing firms.

1.3 Research Questions

i. How does firm size affect the firm value of the listed healthcare firms in Nigeria?

ii. How does liquidity affect firm value of the listed healthcare firms in Nigeria?

iii. How does operating efficiency affect firm value of the listed health care firms in Nigeria?

iv. How does firm growth affect firm value of the listed healthcare firms in Nigeria?

v. How does leverage affect firm value of the listed healthcare firms in Nigeria?

1.4. Objectives of the Study

The general objective of the study is to examine the effect of corporate firm characteristics on firm value of listed healthcare firms in Nigeria. The specific objectives of the study are to;

i. Determine the effect of firm size on firm value of the listed healthcare firms in Nigeria;

ii. Evaluate the impact of liquidity on firm value of the listed healthcare firms in Nigeria;

iii. Examine the effect of operating efficiency on firm value of the listed healthcare firms in Nigeria;

iv. Ascertain the impact of firm growth affect the firm value of the listed healthcare firms in Nigeria; and

v. Ascertain how leverage affects the firm value of the listed healthcare firms in Nigeria.

1.5 Hypotheses of the study

In line with the stated objectives, the following hypotheses are formulated in the null form;

$H0_1$ Firm size has no significant impact on firm value of the listed healthcare firms in Nigeria

$H0_2$ Liquidity has no significant impact on firm value of the listed healthcare firms in Nigeria.

$H0_3$ Operating efficiency has no significant effect on firm value of the listed healthcare firms in Nigeria.

$H0_4$ Firm growth has no significant effect on firm value of the listed healthcare firms in Nigeria.

$H0_5$ Leverage has no significant effect on firm value of the listed healthcare firms in Nigeria.

1.6 Scope of the Study

The study is designed to examine the impact of firm characteristics on the firm value of listed healthcare firms in Nigeria. It covers the period of eight (8) years from 2008 to 2015. The study chooses the healthcare firms as domain of the study because of increasing demand of their products due to increasing population and manifestation of several diseases ravaging the world. Furthermore, the choice of the Healthcare sector is due to the fact that the sector has been largely ignored by previous studies in this line of research. Needless to say that the sector is important as it significantly contributes to the total Gross Domestic Product (GDP) of Nigeria.

The study covers all the ten healthcare firms listed on the Nigerian Stock Exchange because they already have completed financial records on their websites and that of the Nigerian Stock Exchange for the period of the study. The independent variables of the study are firm characteristics proxied by firm size, liquidity, operating efficiency, firm growth and leverage, while the dependent variable is represented by firm value, which is proxied by share prices of the healthcare firms.

1.7 Significance of the Study

The outcome of this study is expected to immensely contribute to the existing body of knowledge. This is because there are a lot of studies on firm characteristics vis-a-vis firm values of firms around the globe. There is dearth of evidence that investigated the

relationship between firm characteristics and firm values of listed healthcare firms in Nigeria. The outcome of this study will therefore serve as a reference for further research in this area.

Also, the outcome of this study will be of immense benefit to a number of users of accounting information. Investors will know the relationship between firm characteristics and firm values of the sub-sector as they invest their funds in anticipation of expected value. The study will also make some significant contribution to the field of accounting and finance in Nigeria.

Literature-wise, because there is a mixed of opinion in the existing literature between firm characteristics and stock market stock value of quoted firms, there is always the need for further empirical evidence. For that, the study will be among those that may provide additional evidences for future debates in the field of accounting and finance by students and researchers.

For policy, the findings of this study provides better understanding of regulators and corporate managers on the firm characteristics that play significant role in the value of shares of the healthcare sector. This is relevant as policy efforts could be geared towards achieving the desired level of the variables studied in order to enhance the market value of the sector.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter discusses the concept of firm value and firm attributes. It also reviews relevant empirical literature on the relationship between firm attributes and value of a firm. The chapter finally discusses the theoretical frameworks that underpin the study.

2.2 Conceptual Issues

This section discusses the conceptual issues associated with the study. It covers both the concepts and components of the dependent and independent variables used in this study.

2.2.1 Firm Value

Firm value represents the assets owned by the company. Firm value is considered as a crucial thing since it describes the prosperity of the company's owner. Therefore, the manager, as the representative of the company, is responsible to achieve the firm value optimally (Nurul, 2014). A good firm value is able to attract other parties' interests to join the company. Modigliani and Miller (1958) stated that firm value is determined by company's asset earnings power. The positive impact of asset earnings power shows that if the company has higher earning powers, then the asset turnover will be more efficient and the profit will be bigger. As a result, the firm value will also increase. Besides asset and profit, the company debt policy also influences the changes of firm value. The higher the debt, the higher the stock price. However, it will be the opposite in certain conditions when the benefit of debt utilization is less than the cost incurred. The debt policy can create the expected firm value, but it depends on the firm size. This means firm size will influence the competition in the stock exchange.

Güleryüz (2009) said that a firm value was the acquisition and the trade value of the company anticipated by volunteer buyers and sellers with thorough information about the company free from any problem. This is an indicator that study on firm value is relevant in all aspects of business. This is the reason why different measurements of firm value were used, such as Earnings Capitalization Model, Market Value Added, Economic Value Added, Market Value of year-end stocks (Huang, Shih, Huang and Liu, 2006), Return on Asset, Earnings Per Share (Gherghina, 2014) and Tobin's Q.

To measure the value of the firm, this study used Average Share Price and Tobin's Q. Tobin's Q measures the relationship of the firm stock market value to the firm's resources replacement cost (Sahay and Pillai, 2009). It is considered as the best predictor of market correction (Pett, 2013) and it can also explain the majority of the investment variability (Cooper and Ejarque, 2003). It can also be applied in the financial condition analysis of the company which means that the investors who acquire the firm stock would first calculate the Tobin's Q. High firm value indicated that the replacement value of the plant and equipment of the company was low and vice versa. By this situation, the companies with high Q coefficient were appropriate (Jahani, Zalghadr-Nasab and Soofi, 2013). Due to the data limitations, a substitute measure of Tobin's Q ratio is used for the present study. It is calculated by first adding the market value of equity, book value of preferred stock and book value of debt and then dividing the sum with book value of assets (Sweety & Mandeep, 2014).

Most of the study determines what factors can affect the firm value. It was stated that firm's wealth, technology, organizational structure, human resources with discounted future cash flows (Kayali, Yereli and Ada, 2007) and environmental factors of industrial

establishments (Konar, Bailly and Cohen, 2001) can affect firm value. Another study uses customer satisfaction, management understanding, technology usage, and product quality as factors that influence firm value (Düzer, 2008; and Akgüç, 1998). There is also a study that has identified firms' competitiveness as a factor that can affect firm value (Ansari and Riasi, 2016). Additionally, there is a study that focused on sustainable growth (Riasi and Pourmiri, 2016) and firm's financing in order to determine the factors that affect firm value (Riasi, 2015).

Investors, both existing and potential, regard value as the fundamental reason for investing in a particular firm. Stock value can be in form of capital appreciation/depreciation (as obtained in the Nigerian Stock Exchange) plus dividend received if any. Stock prices are important metrics of measuring firm values. Therefore, the value attached to them matters a lot to both existing and prospective investors in the stock market. There are several factors in stock prices determination in the stock market, which ranges from accounting to non-accounting information (Ibrahim & Hussaini, 2015).

The most common way of knowing is through trading in the secondary market, where investors trade in stocks. That is, book value of equity constitutes the accounting based value for owners and be useful in judging on the true value of equity (Hallefors, 2013). Capital market serves as a place or arrangement where investors and investees interact. The share at which is being sold is determined by the corporate firm characteristics which usually affect the amount of capital a company can raise from the stock market. Stock market provides a link between firms need to raise fund for business continuity or expansion and those investors wish to invest their excess resources. Therefore, it is a point for buying and selling

of shares, and share prices are determined by demand and supply, which is usually influenced by firm specific factors and/or macroeconomic variables (Adedoyin, 2011).

The value of a company can be determined in different ways. The most basic and easiest way to measure this value, both the company and the stock, is to look at the company's market value. This is also known as the company's market capitalization. Market capitalization is the value arrived at when all the outstanding shares of the company's stock is multiplied by the current price of a single share. If a firm has one type of stock its market capitalization will be the current market share price multiplied by the number of shares. However, if a company has multiple types of equities then the market capitalization will be the total of the market value of the different types of shares.

The stock exchange is an exceedingly fluid, dynamic and engaging entity. It facilitates thousands of transactions which occur simultaneously from traders striving to outbid and outsell each other. From the moment it opens there is unceasing activity until the second it closes. Decisions to buy and sell are based on analysis of sophisticated theoretical models or the instinct of a speculator. New information about company developments and stock recommendations are continuously made available while papers are released on new and different ways in which the market can be exploited (Safdar, Hazoor, Toheed & Ammaral, 2013).

The main goal for a firm going public is to increase the shareholder welfare by increasing the value of a firm (Salvatore, 2005). The firm value is very important, as higher firm’s value will increase the welfare of the stockholder (Bringham & Gapensi, 2006). The welfare of the shareholder and value of the firm are commonly represented on the stock price, which implicitly represent the investment decision, financing and asset management.

Firm value is the investor's perception towards the value of the success of firm related to its stock price (Sujoko & Soebiantoro, 2007). The stock price used commonly is the closing price (Fakhruddin & Hadianto, 2001).

2.2.2 Firm Characteristics

Firm characteristics can be defined as the wide varieties of information disclosed in the financial statement of business entities that serve as the predictors of the firms' quality of accounting information and performance (Lang & Lundholm, 1993). They can also be defined as the behavioral patterns of company's operation which enables them to achieve their objectives throughout the period of their operations. Company's characteristics vary from one business entity to another. They can be determined based on the relevant information disclosed on financial statements for a particular accounting period (Stainer, 2006).

Empirical studies have been carried out to examine the relationship between firm characteristics and performance of business entities around the globe. Mohammed (2005) posited that firm characteristics seem to play an important role in determining the overall performance of corporate entities. Wiklund and Shepherd (2005) are of the view that firms that are able to align firm attributes with the environmental characteristics perform better than the other firms. Dean, Bulent & Christopher (2000) posited that firm characteristics are essential determinants of a firm's performance as well as its success in business. Firm characteristics used in this study include firm size, firm growth, liquidity, leverage and operating efficiency. Each of them is discussed in turn as follows;

Firm Size

Firm size has been variously defined in the literature to refer to the total assets, scale of operations and number of employees among others. Larger firms are assumed to have more resources at their disposal and therefore have the wherewithal to commitment them to several investment opportunities. Athanasoglou, Brissimis and Delis (2005) assert that increase in company size increases the performance of the bank. Almajali et al (2012) argued that the size of the firm can affect its financial performance. However, for firms that become exceptionally large, the effect of size could be negative due to bureaucratic and other reasons (Yuqi, 2007).

The size of a firm cannot be overruled in determining the value of the firm. Larger firms are prone to having a maximized value than smaller firms. This is obvious in their level of operation, which is expected to be larger than smaller firms. If the value of the firm is measured by performance, then this large volume of operation will translate into better performance than smaller firms. Most companies are intent to expand the size of their business operation for them to grow either in revenue, number of employees, or size of facilities (Pervan & Visic, 2012). Large firms may generate superior performance as they are more able to use economics of scale and scope, and they may organize their activities more efficiently (Majumdar, 1997).

Many companies compete in rapidly changing industries, expansion of manufacturing capacity, geographical presence, market shares and so on which may be imperative for survival (Dogan, 2013). Schiner (1996) noted that one of the factors influencing firm size is the availability of workers and other resources in the surrounding community where the business is operating. He further suggested that it is possible for the company to outgrow the

communities in which they operate, particularly when they are located in a remote area. Some factors that may indicate that a company has outgrown its operating community in size include; growing at a faster rate than the community labor force, providing more than one-third of the local government's funding through taxes, and being responsible for the death of the community, if the company should shut down (Shiner, 1996).

Firms size are measured in different ways such as asset, employment, sales, and market capitalization. This study measured firm size as natural logarithms of firm's total assets, which can be easily regressed in order to determine the influence of the firm's total assets on its performance (Driffield, Mahambare & Pal, 2005). A lot of empirical studies have been conducted using firm size. Some of them used firm size as a control variable while others used it as a predictor variable in their studies. Firm size is used in this study as independent variable, because the study is on firm characteristics and size is among the proxies of firm attributes.

Liquidity

The International Financial Reporting Standards (2006) define liquidity as the available cash for the near future, after taking into account the financial obligations corresponding to that period. Liargovas and Skandalis, (2008) argues that firm can use liquid assets to finance its activities and investments when external finance are not available. On the other hand, higher liquidity can allow a firm to deal with unexpected contingencies and to cope with its obligations during periods of low earnings.

One of the most common measure of liquidity is the current ratio. Current ratio is a measure of relative liquidity that takes into account differences in absolute size. It is used to compare companies with different total current assets and liabilities (Louderback et al.,

2000). Liquidity is the amount of money that a company used for its daily operations or short term assets that can easily be converted into cash in order to meet its daily financial needs. Liquidity is measured as a ratio of current asset to current liabilities, which is considered as an important determinant of firms' performance since liquidity influences firm's opportunity to take up viable investment which can lead to performance. Liquidity gives companies the ability to negotiate with lenders, to delay payment and take advantage of this liquidity in investment as well as enhance the ability of companies to obtain loan at preferential interest rate (Kallberg & Parkinson, 1993).

Suppliers, creditors and other short-term lenders of funds require a very sound liquidity position of a firm in order to have confidence in the firm's ability to satisfy their requirements (Kurfi, 2003). This is because a firm with weak liquidity position would scare suppliers and creditors, particularly banks who often impose minimum liquidity constraints in their loan agreements with firms. Liquidity also represents the amount of cash or current assets that can be easily converted in cash for the day-to-day operations of a company. It represents the amount that is invested in assets that are expected to be realized within a single accounting period. The relationship between current assets and current liabilities should be in such a way that the current assets is twice the size of the current liabilities of firms, hence it is said that the ideal current ratio (current assets/current liabilities) is generally accepted to be 2:1, but this proportion can obviously be varied in practice, depending on the circumstances of an individual company (Akinsulire, 2014).

Liquidity ratios are of how solvent a company is, because it will not become insolvent overnight, deterioration in these ratios is thus an indication of insolvency. If a company is unable to renew its short-term liabilities, there would be a danger of insolvency unless the

company is able to realize sufficient amount of its current assets into cash. A current ratio of 2:1 is regarded to be indicative that a company is reasonably well-protected against the danger of insolvency through sufficient liquidity. Liquidity is the ability of a company to meet its demand for funds (Biety, 2003). Liquidity management means ensuring that a company maintains sufficient cash and liquid assets to satisfy the interest of suppliers and creditors. It involves a daily analysis and detailed estimation of the size and timing of cash flows and outflows within a particular accounting period. A business organization should have a formal liquidity policy that is developed and written by the officials with the assistance of management. The policy should be reviewed and revised as needed, not less than a year and the policy should also be flexible, so that managers may react quickly to any unforeseen events (Omolehinwa, 2006).

Operating Efficiency

One of the most important goals of a corporation's leadership is to maximize their present and future financial and operational performance because they impact on the market price per share and consequently, shareholders' wealth. Common business practice implies that operational efficiency (OE) plays an important role in improving current and future firm performance (Heaney & McCoster, 2005). Operational Efficiency is defined as the extent to which changes in the cash conversion cycle, operating expenses to sales revenue ratio, operating cash flow, and total asset turnover ratio, total debt to total assets ratio, firm size, and operating risk impact on the future performance of the firm. The term 'efficiency' is viewed in both the industrial organization and strategic management literature as the product of firm-specific factors such as management skills, innovation, cost control, and market share

as determinants of current firm performance and its stability (Abuzayed & Molyneux, 2009; McWilliams & Smart, 1993).

Firm Growth

Growth opportunity is the probability of the firm to grow (Mai, 2006). Firms which are expected to grow highly in the future tend to use stock to finance their operational activity. Since the growth opportunity varies across firms, their financing decision by management will also vary (Akinsulire, 2011). The other definition of growth opportunity is the change of the firm total assets (Kartini & Arianto, 2008).

A firm which is predicted to have rapid growth in the future tends to choose using stock to finance the operations of the firm. In contrast, firm which is predicted to have low growth will make effort to divide the risk of low growth with the creditor through the issuance of debt which is in the form of long term payable (Mai, 2006). One of the basic reasons of this pattern is the floating price on the stock emission higher than bond. Thus, firm with rapid growth level tends to use more debt compared to the low growth firm. The firm's growth opportunity cannot be left out in the study of firm value. The growth opportunity of the firm can be described as the growth of the total asset of the firm. The greater the growth opportunity of the firm the better their value. Most especially since they have high potential of effectively diversifying their growth opportunity to further perform better (Akinsulire, 2011).

Sales growth can be expected to influence rate of return and market value measures in both simulated and actual industries. It is unclear if growth in one year will affect profitability and market value measures in a succeeding year in simulated and actual environments. Asset growth, which can be used as a proxy for plant and equipment

expenditures, and research intensity, may also affect sales growth in a base year or succeeding year, indirectly affecting profitability and market value (Safdar, Hazoor, Toheed & Ammara.2013). This study measured firm growth as the changes in total sales as used by Mohammed & Usman (2016).

Leverage

According to Rajan and Zingales (1995), leverage is the ratio of total liabilities to total assets. It refers to the proportion of debt to equity in the capital structure of a firm (Salehi, 2009). The financing or leverage decision is a significant managerial decision because it may influence the shareholder's value, risk and the market value of the firm. The ratio of debt-equity has implications for the shareholders' dividends and risk. This affects the cost of capital and the market value of the firm (Pandey, 2007).

Several researchers have studied firms' debt use and suggested the determinants of financial leverage by reporting that firm's debt-equity decision is generally based on a trade-off between interest tax shields and the costs of financial stress (Upneja & Dalbor, 2001). According to the trade-off theory of capital structure, optimal debt level balances the benefits of debt against the costs of debt (Gu, 1993) hence, the use of debt to a certain debt ratio results in higher value on equity. However, the benefit of debt would be lower than the cost after this level of capital structure. In other words, the more a company uses debt, the less income tax the company pays, but the greater its financial risk. Based on the trade-off theory for capital structure, firms can take advantage of debt to make a better value on equity.

Leverage finance refers to the funding of a company or business entity with debt with the hope of improving the firm's financial performance. Leverage financing is commonly employed by a company to achieve a specific or temporary objective, such as acquisition of

another business, to effect a buy-out, to purchase shares or fund a one-time dividend, or to invest in self-sustaining cash-generating assets (Pachori & Tatala, 2012). Leverage financing on the other hand refers to the ratio of debt to equity capital of a company. As a result of the payment of interest and repayment of principal amount of the debt a large part of the firm's cash flow would decrease (Magpayo, 2011). Financial leverage also involved the use of debt to acquire additional assets. It can be financial or operating leverage.

Financial leverage is the use of borrowed money to increase production volume and sales as well as earnings of a company for better performance. It is measured as the ratio of total debt to equity of a firm (Yoon & Jang, 2005). The greater the amount of debt, the greater the financial leverage of a firm. Since interest is a fixed cost which can be written off against revenue, a loan allows an organization to generate more earnings without a corresponding increase in equity capital which will require increase in dividend payment that cannot be written off against the firm's earnings (Magpayo, 2011). However, high leverage may be beneficial in boom periods; and it may cause serious cash flow problems in recession periods, because there might not be enough sales revenue to cover the interest payment (Tudose, 2012). In other words, leverage is the advantageous condition of having a relatively small amount of cost yield and a relatively high level of values (Ojo, 2012).

Operating leverage is the extent to which a firm commits itself to high level of fixed operating costs which vary with time, such as insurance, rent, salary, with no interest attached to it as compared to the level of variable costs which vary with volume of energy, labour and raw materials (Tudose, 2012). Firms with high level of operating leverage have high break-even points, but when the break-even point is crossed, they show a greater increase in operating income with every increase in sales revenue and greater losses with

every drop in sales revenue in comparison with firms that have lower operating leverage (Omolehinwa, 2006). Investment leverage is the ability of a firm to control a large value of commodities or securities in a future contract by buying on margin and thus, leveraging a relatively small investment (Omolehinwa, 2006). Thus, leverage is a concept of borrowing money to buy an asset that will appreciate in value, so that the ultimate sale will value profits on equity invested and on the borrowed funds. The use of various financial instruments or borrowed capital, such as margin to increase the potential value on investment is also known as leverage (Omolehinwa, 2006).

2.3 Review of Empirical Studies.

This study considers specific factors such as firm size, liquidity, operating efficiency, firm growth and leverage as constituents of firm characteristics variables. Thus, the empirical review of literature specifically focuses on how these attributes have influenced the value of firms as determined by those studies.

Safdar, Hazoor, Toheed and Ammara (2013) studied the impact of firm's characteristics on stock value of non-financial listed companies in Pakistan. Data of 307 non-financial companies listed on the Karachi Stock Exchange (KSE) were collected from the B-Recorder and Basic Balance Sheet Analysis (BBA) issued by the State Bank of Pakistan for the period 2000 to 2012. Market Capitalization (MC), Sales Growth (SG), Earnings Per shares (EPS) were taken as independent variables and stock price as the dependent variable. The MC and SG (independent variables) were used as proxies for size effect. Correlation Matrix, Multiple Regression Analysis, Unit Root Test and Granger Causality were applied for analysis of data. Results revealed that MC and EPS had positive significant impact while sales growth had positive insignificant impact on firm value.

Muneesh and Sanjay (2004), examined the relationship between company characteristics and common stock values using the data from the Indian Stock Exchange. The data comprises of adjusted month-end share prices for 364 companies from July 1989 to March 1999. The sample companies account for a major pattern of market capitalization and daily trading volume on the Indian Stock Market. The results showed that firm size had positive significant impact on stock value.

Panu, Peng and Dennis (2007), investigated the relationship between firm characteristics and stock value. The general findings are that certain firm characteristics do have an effect on stocks values; among these characteristics, is the firm size. However, Nasrollah, Zahra and Zahra (2011) examine the relation between growth rate and firm performance for a sample of 54 firms listed on the Iran Financial Market during 2006 to 2009. The study used a linear regression analysis to examine the association between the deviation of actual growth rate from sustainable growth rate and Return on Assets (ROA). The study shows that the growth rate is having a positive significant relationship with ROA. Also, a study by Lan (2012) investigated how Firm Size influences the prediction of equity values**.** Data were collected from Aspect Fin Analysis during the period from 1995 to 2004. The final sample arranged across all ten industrial sectors including 54 observations of 153 stocks for the period of 1995 to 2004. Firm size was measured by market capitalization. The result of the study shows that firm size has positive insignificant impact on equity values.

Shengquan and Guochang (2007) studied relative firm profitability and stock price sensitivity of all companies listed on the floor of China Stock Exchange. The study sample consists of 77,973 observations covering the period of 1973-2004, represented by 231 four-digit SIC industries. The empirical study showed that in a given industry, the values of less

profitable firms are more highly correlated with industry values after controlling for the price movements attributed to firm-specific accounting information. It was also found that there is inverse relation between relative profitability and industry beta. Extending the analysis to market-wide news, the study found a similar, albeit somewhat weaker, inverse relation between relative profitability and market beta.

Ulil, Bambang, Djumahir and Gugus (2013) examine the effect of firm characteristics, which include size, firm age, profitability and firm growth on the governance quality and its impact on firm value. The results reveal that there is positive effect of firm characteristics on quality of governance, which in turn affect firm value. Impliedly, firm characteristics have positive and significant impact on the value of firms.

Li-Ju and Shun (2011) studied the influence of profitability on firm value using Taiwanese listed companies from 2005 to 2009 as the research objects. After the deletion of the incomplete data, they arrived at a total of 647 samples, including 302 companies categorized as belonging to the electronic industry and 345 companies belonging to other industries. The result shows that profitability has a significant positive influence on firm value. This indicates that the greater the profitability, the higher the value of the company.

Chen, Yu and Zhang (2008) examine the effect of corporate asset growth on stock returns using data on nine equity markets in the Pacific-Basin region. The data composed of varying samples from different countries, which necessitated the use of unbalanced panel data. The study used cross-sectional regression analysis to estimate the effect across different periods. It was concluded that there is a pervasive negative relation between asset growth and subsequent stock returns. It was further suggested that the findings revealed potential

inefficiencies of the region's financial systems in allocating capitals and valuing investment opportunities.

Shafana, Fathima and Inun (2013), investigated the behavior of expected stock values with respect to two popularly known firm level characteristics, firm size and book-to-market equity in Sri Lankan context. The sample of the study consisted of 12 companies out of total 25 companies listed on Milanka Price Index in base year of 2005 on Colombo Stock Exchange for the period from 2005 to 2010. Empirical findings reveal that firm size has insignificant positive effect on expected stock values. Further, Muhammad and Saqib (2010) studied the effect of firm size on stock values (with time variant factor of January and July). Specifically, the study examined the firms belonging to four major manufacturing sectors of Karachi Stock Exchange (KSE) that is, Automobile and Parts, Constructions and Materials, Oil and Gas and Pharmaceuticals and Bio- Tech sectors. Monthly data was used covering the period from January 2007 to June 2013 inclusive, Monthly closing stock price, KSE-100 index values and market capitalization were the main variables of the study. Ordinary Least Square (OLS) and Fixed-effect regression techniques were applied and results suggested that the size of the firm is negatively and significantly related to the stock values.

The study by Chrysovalantis, Iftekhar and Fotios (2013) investigated whether the capital market values the efficiency of firms. After tracing stock values and efficiency changes of 399 listed insurance firms in 52 countries during the 2002-2008 period, the paper reported a positive and statistically significant relationship between profit efficiency change and market adjusted stock values. Amarjit, Manjeet, Neil & Harvinder (2014) investigated the relationship between changes in operational efficiency and changes in future performance (value) of Indian manufacturing firms applying a correlational research design. A sample of

244 firms were selected from the top 500 companies listed on the Bombay Stock Exchange (BSE) for a period of five years (from 2008–2012). Findings showed that an increase in the cash conversion cycle has a negative impact on the future performance of the firms. A positive change in the total debt to total assets ratio improved the future performance of the Indian manufacturing firms.

Baik, Chae, Choi, and Farber (2010) used 72,303 US firm-year observations for the period 1976–2007, and showed that efficiency changes predict future firm performance. Ahmad and Noor (2010), using 78 Islamic banks in 25 countries for the period 1992–2009, found a positive relationship between operating efficiency and profitability. Dietrich (2010) examined the impact of efficiency on profitability using a panel of 11,728 UK manufacturing firms for the period 1993–2007, and found that operating efficiency above the threshold positively impacts profitability in the short-run. Rahman and Farah (2012) investigated the indicators of profitability in the non-banking financial institutions (NBFIs) industry of Bangladesh and found that operating efficiency improves profitability. Hedander (2005) examined the effect of liquidity and firm value, using a panel data of 39 non-listed Australian firms for the period of 1992 to 2003, and found a significant positive relationship among the variables of the study. Cheung, Chung and Fung (2012) too investigated the impact of stock liquidity, corporate governance and firm performance of US real estate investment trust for the period of 1992 to 2008; the results of their analysis showed a negative significant impact of liquidity on firms' financial performance. But they failed to mention their statistical tool of analysis in their research report.

Hausen and Sungsuk (2013) investigated the influence of stock liquidity to firm value in Indonesian Stock Market, and reported that high liquidity firm can generate high operating

profit. The study of liquidity is of importance to both internal and external users of accounting information, because of its relationship with the day-to-day operations of firms. Reheman and Nasr (2007) viewed liquidity management as a desired trade-off between liquidity and profitability of a firm. Owolabi and Obida (2012) examined the relationship between liquidity management and corporate performance of listed manufacturing companies in Nigerian Stock Exchange for the period of 2005 to 2009, using a sample of 12 manufacturing firms. The result of their findings showed a significant impact of liquidity management on corporate financial performance.

An empirical study was conducted on the impact of liquidity ratios on profitability of Pakistan oil and gas companies by Saleem and Rehman (2011). The results showed that there is significant impact of liquidity ratios on financial performance. The required liquidity for each company depends on the balance sheet situation of the firm (Saleem & Rehman). Niresh (2012) viewed liquidity ratio as realizable cash on the balance sheet to short term liabilities. Firms with fewer current assets will have problems to operate in line with the on going concern concept of accounting while if the current assets are too much, it shows that the value on investment for the company is not in perfect condition. Qi, Subrananyam and Zhang (2010) stated that higher accounting quality is associated with higher liquidity, reducing the cost of debt as well as improving liquidity for future financial performance of company.

A theoretical study on the relationship between liquidity, corporate governance, and firm value was carried out by Pourali and Arasteh (2013) and the results of their study showed a positive relation between liquidity and firms' financial performance. But their research was done based on content analysis instead of quantitative research which could

have given a better result based on logical conclusion. Niresh (2012) examined the trade-off between liquidity and profitability of 31 listed manufacturing firms in Sri Lanka for the period of 2007 to 2011. The result of the study showed that there was no significant relationship between liquidity and financial performance of the sampled firms. Dalvi and Baghi (2014) investigated the relationship between company performance and stock market liquidity, using a sample of 154 companies listed in Tehran Stock Exchange, and found a strong positive relationship between liquidity and financial performance.

Welch and Ivo (2004) conducted a research on relationship between capital structure and stock values by examining the US listed firms for the period 1960-2000, and found that stock values were negatively correlated to debt-equity ratio when firms were inactive and did not reschedule their debt ratios in period of stock prices increase or decrease. Naz, Khan, and Ahmad (2013) studied the impact of capital structure and financial performance on stock values of Pakistan textile industry. Using OLS method, the result revealed that Debt/Equity ratio and EPS affect stock values positively. Similarly, Chambers, Sezgin and Karaaslan (2013) investigated the effect of capital structure on stock values of companies listed on Istambul Stock Exchange. The study used three periods: the whole period from 1994 to 2010, the sub-period from 1994 to 2002 and another sub-period from 2003 to 2010. Panel regression analysis was used in which total debt to market value (TD/MV) and beta ratio were found to have statistically significant effect on both nominal and real stock values in all the three periods. The TD/MV ratio is also found to be statistically significant but with a negative effect on both nominal and real stock values in the 1994 to 2002 sub-period but in the 1994 to 2010 period only real stock value that was statistically significant. However,

Tudor (2006), in his study of the relationship between financial leverage and stock value documented a positive association between total debt to total equity and stock values.

Bhandari (1998) studied the relationship between stock values and the expected leverage ratio during the period 1949 to 1979. A significant positive association between leverage and stock values of the firms was found in the manufacturing firms. He stressed that the leverage ratio is a strong variable in explaining stock values compared to other variables examined. Yang, Lee, Gu and Lee (2010) examined the relationship between capital structure and stock values of firms listed on Taiwan Stock Exchange for the period 2002-2005 in the Taiwan Stock Exchange. Among other findings, the results of the analysis showed that leverage ratio significantly and positively affect stock values. On the other way round, stock values affect the leverage ratio negatively. He concluded by saying that the variables affect each other only that the direction of the relationship varied.

Ahmad, Fida and Zakaria (2013) examined the co-determinants of capital structure and stock values for the period 2006-2010 by employing a panel dataset for 100 non-financial firms listed on the Kingdom of Saudi Arabia Stock Exchange. Generalized Method of Moments was employed to analyze the data. The statistical result of the study showed that stock values and leverage affect each other, but, the effect of leverage (positive effect) on stock values is greater than the effect of stock values (negative effect) on leverage. In addition, Uwubanmwen and Obayagbona (2012) studied the effect of company fundamentals and values on equity in the Nigeria Stock Market by using a sample of eight firms with 11 years observation from 2001 to 2011. Apart from Book to market value of equity that passes significant test at 1% level, only financial leverage is able to pass the significant test at 10% level with positive impact on firm values. Rahmani, Sheri and Tajvidi (2006) examined the

relationship between accounting and market variables and the stock values on the basis of pooled cross-sectional data of the period 1997-2003 by applying both multivariate and univariate models. The coefficient of debt to equity under multi variables model was significant in one year only. But the model was not significant for the year 2000 and 2001. In the single variable model Debt/Equity ratio was found to be statistically insignificant.

In Kenya, Ayako and Wamalwa (2015) analyzed the determinants of firm value of commercial banks listed at the Nairobi Securities Exchange (NSE) based on secondary panel data of 46 commercial banks over the period 2002 to 2012. Data were analyzed by means of random effect regression model. The estimation results showed that although the relationship between leverage and firm value is positive, it was not significant. This finding is robust even under different measures of firm value. Because the study is Kenya-based, the result may not be the same when applied to the Nigerian.

2.4 Theoretical Framework

Different theories have been used by previous researchers to underpin studies in this area. However, stewardship theory, trade-off theory and signaling theory have been found to be the most appropriate theories that underpin this study.

Stewardship Theory

Stewardship theory assumes that managers whose behavior is aligned with the objectives of their principals are steward to their organizations. Donaldson and Davis (1991) viewed steward as a person who essentially wants to do a good job, be a good steward of the corporate assets and his role is seen as a caretaker or an individual for whom the prosperity of the firm is internalized as something good. The theory argues and looks at a different firm motivation for managers drawn from organizational theory. Managers are viewed as loyal to

the company and interested in achieving higher performance for the company. The major motive, which directs managers to accomplish their job, is their desire to perform excellently for the organization. Managers are conceived as being motivated by a need to achieve intrinsic satisfaction through successfully performing inherently challenging work, to exercise responsibility and authority thereby gaining recognition from peers and bosses.

Stewardship theory has been structured as the organizational behavior counterbalance to rational action theories of management (Donaldson & Davis, 1991). This theory holds that there is no conflict of interest between managers and shareholders, and the goal of firm characteristics is to find the mechanisms and structure that facilitate the most effective coordination between the managers and the shareholders (Donaldson, 1990). The theory holds that there is no inherent problem of management control, meaning that organizational managers tend to be honest in their actions (Donaldson, 2008). The major assumption underlying the meaning of stewardship theory is that the behavior of the managers is aligned with the interests of the principals (shareholders). The theory places greater value on corporate goal among the parties involved in managing the affairs of the company than on the manager's personal interest (Van Slyke, 2006). The economic benefit for the shareholders in a principal-steward relationship results from lower transaction costs associated with the lower need for economic incentives and monitoring by the managers.

A steward's utility function is maximized when the shareholders' wealth is maximized. The steward believed that the utility gained from interest alignment and collaborative behavior with the principal is higher than the utility obtained through personal interest and self-serving behavior of managers (Davis, Schoorman & Donaldson 1997). Stewards are motivated by intrinsic rewards, such as good relationship and mission

alignment, instead of solely extrinsic rewards. The steward, as opposed to agent, places more emphasis on achieving collective objectives rather than individual goals. The steward understands the success of the company as his own achievement. The stewardship theory is concerned mainly with identifying the situations in which the interests of the principal and the steward are aligned (Donaldson & Davis, 1993). Stewardship theory is of the assumption that becoming a steward or an agent is the result of a rational process. In this rational process, the individual evaluates the advantages and disadvantages of one position and the other. There are contributions in stewardship literature that are of the view that stewards are not unselfish, but that there are some situations where executives perceive that serving shareholders' interests also serve their own personal interest (Lane, Cannella & Lubatkin 1998). In this case, agents would recognize that the company's performance directly impacts positively on their individual performance as well as enable them to manage their own careers effectively (Daily, Dalton & Canella 2003). The theory proposed that stewardship relationships rely heavily on the trust and honesty developed between the principal and the managers through historical transaction. When the principal's relationships with the manager is characterized by honesty and trust, he is helping the manager to learn how to value the consequences of his decision towards firms performance and he may change his preferences and develop a good strategy that will be of great benefit to the company.

However, in a principal-steward relationship, the principal invests significantly in time to manage the relationship in a collectively interested manner. For the purpose of this study, the stewardship theory was adopted to underpin one of the firm characteristics variables proxied by operating efficiency, because in the stewardship relationship, the stewards focused more attention on the intrinsic rewards that are not easily quantified such as

growth, goals attainment, recognition as well as the overall performance of company. In a principal-steward relationship, agency costs associated with the relationship is in the early stages of the relationship, while firm structural mechanism in stewardship relationship is an appropriate mechanism of controlling opportunism in the long run. The explaination here is that agency problems are not uniform throughout the life of a relationship; they are likely to occur at the early stage of the relationship. However, agency costs may decline rapidly as results of potential trust and increasing honesty among the parties. In the long run, there will be benefits associated with a principal-steward relationship, because there would not be costs associated with the reviewing of contract and strict monitoring controls. Such a cost reduction is not only beneficial to a company, but also to the steward, who benefits from a higher involvement in contract definition and less exposure to monitoring cost (Van-Slyke, 2006).

Signaling theory

Signaling theory is concerned with understanding why certain signals are reliable and others are not in terms of decision making. The theory looks at the quality and reliability of accounting information sent by a company to its users of accounting information for investment decision making by the potential investors. Spence (1973) posited that a well performing firm distinguishes itself from the nonperforming one by sending a credible signal about its performance to capital markets as well as potential investors. Signals sent by a firm are the results of its operating activities which would inform investors about the company's future prospects. The theory assumed that managers and shareholders of a company differ in terms of getting access to some vital information about firm operation. Some information can

only be accessed by the managers while the shareholders do not have access to such information.

Signaling theory was adopted in this study to underpin firm characteristics represented by firm size, liquidity, operating efficiency, firm growth and leverage because a sound liquidity position of a company is showing its ability to meet up with its short term financial need without stoppages in production. Also, effective management and staff would enable a company to maximize its operating efficiency of production thereby leading to an improvement in firm's financial performance and firm value which by implication is showing a good signal to both current and potential investors that the company can continue to operate in line with the going concern concept of accounting as well as satisfying the interest of its stakeholders through wealth maximization. The argument of the theory is relevant in anchoring the study because it holds that accounting information sends signal to the market which influences the investment decisions. This decision is reflected in the price of stock, which is the value of the firm.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the methodology adopted for the study. The chapter discusses the research design, population and sampling method and sources of data collection, statistical tool for data analysis, variables measurement and model specification of the study. The chapter also highlights the robustness tests conducted in the study.

3.2 Research Design

In carrying out this study, a correlational and ex-post facto research design was used, because the study measures the relationship between firm characteristics and firm values of listed healthcare firms in Nigeria. These research designs are preferred when the goal is to establish cause and effect relationship usually using quantitative method. It is also useful in modelling positivist research paradigm where the study is assumed to be distinct from the researcher and the outcome of the research is free from bias and subjectivism.

3.3 Population and Sampling

The population of this study consists of all the healthcare firms listed on the Nigerian Stock Exchange and have complete financial records on their websites or Nigerian Stock Exchange for the period of 2008 – 2015. As at 31st December 2015, ten firms were listed and all the ten firms have their financial statements available either on their website or available at the Nigerian Stock Exchange throughout the study period. The study adopted census approach by studying all the firms. The list of the firms is given in Table 3.1.

Table 3.1 List of the Companies .

	Names	Date Of Incorporation	Date Of Listing
i.	Eko corporation plc	1984	1984
ii.	Evans Medicals plc	1954	1979
iii.	Fidson Healthcare plc	1995	2008
iv.	GSK Consumers plc	1971	1977
v.	May & Bakers plc	1944	1994
vi.	Morison Industries plc	1955	1978
vii.	Neimeth Pharmaceuticals plc	1957	1979
viii.	Nigeria-German plc	1963	1979
ix.	Pharma-Dekoplc	1969	1979
x.	Union Diagnostics plc.	1994	2007

.

Source: Generated by the author 2015 from NSE FACT Book

3.4 Sources and Method of Data Collection

This study used secondary sources of data collection. The data were obtained from the annual reports and accounts of the ten (10) listed healthcare firms in Nigeria Stock Exchange (NSE) for the period 2008 to 2015. This documentary source of data was used because of the nature variables under study. The data on stock prices were obtained from the Website of the Nigerian Stock Exchange.

3.5 Technique for Data Analysis

In analyzing the data, both the inferential and descriptive statistics were adopted. Descriptive statistics was used to summarize the basic characteristics of the data. The statistics included mean, median, minimum and maximum. Also, correlation matrix was used to explain the relationship between each of the firm characteristics and firm value. Panel data regression was considered appropriate in view of the fact that it helps in establishing relationship, cause and effect between the variables. In order to determine the best choice of analysis technique, the study run three types of regression; Ordinary Least Square (OLS), Fixed Effect and Random Effect regression. All these method have various assumptions and

conditions that must be fulfilled in order to achieve efficient estimates. However, the best techniques were decided by the Hausman Specification test (either fixed effect or random effect regression) and Lagrangian Multpiplier Test (either random effect or OLS).

Based on the results obtained, the random effect regression was considered most appropriate as the final technique of analysis. The random effect has the advantage of accounting for the panel effect in the data as opposed to OLS, which pools the data and treats it as if it were obtained from a single entity. In order to achieve reliability of the result, robustness tests like Multicolinearity test, Hausman test, Lagrangian multiplier test for random effect and Heteroscedasticity test were conducted. These tests are discussed in the robustness section (3.7).

3.6 Model Specification and Variables Measurement

In order to achieve the objectives of this study and test of the hypotheses, a functional relationship in form of multiple linear regression model consisting of dependent and independent variables is formulated. The study employed two measures of firm value- Stock price and Tobin's Q as dependent variables which are regressed against the explanatory variables that comprise firm size (FSIZE), liquidity (LIQT), operating efficiency (OPEF), firm growth (FGRT) and leverage (LVRG). The two regression models are presented as follows;

$$\mathbf{SP_{it} = \beta_0 + \beta_1 FSIZE_{it} + \beta_2 LIQT_{it} + \beta_3 OPEFF_{it} + \beta_4 FGRT_{it} + \beta_5 LVRG_{it} + \varepsilon_{it}}$$

$$\mathbf{Tobin's\ Q_{it} = \beta_0 + \beta_1 FSIZE_{it} + \beta_2 LIQT_{it} + \beta_3 OPEFF_{it} + \beta_4 FGRT_{it} + \beta_5 LVRG_{it} + \varepsilon_{it}}$$

The measurement of the variables are presented in Table 3.2

Table 3.2

Variable Acronym	Variable Name	Variable Measurement and Source
SP	Stock Price	The quarterly average of the market price of shares of the firms (Mahmud, 2016)
TQ	Tobin's Q	Market value of equity plus book value of preferred stock plus book value of total debt divided by the sum of book value of total assets (Sweety & Mandeep, 2014)
FSIZE	Firm Size	Natural logarithm of a firm's total assets (Dogan, 2013)
LIQT	Liquidity	The ratio of firm's current assets to current liabilities (Owolabi & Obida, 2012)
OPEF	Operating Efficiency	Turnover divided by total assets (Mou & Wanrapee 2015)
FGRT	Firm Growth	Firm growth is measured as change in turnover (Mohammed & Usman, 2016).
LVRG	Leverage	Measured as the ratio of firm's total debt to equity (Salehi, 2009)
β	Intercept	
ε	Error Term	
it	Firm i at time t	

Source: Compiled by the Author from Various Literature

3.7 Robustness Test

The following robustness tests were conducted in order to improve the validity of statistical results:

(i) Multicollinearity test: The study adopted multiple regression models to ascertain the association among the firm characteristics variables. Where the association among the pairs of regressors are high, with coefficient above 0.80, there is strong indication that multicolinearity exists. For that, the study tested for it, to see the

possibility of its existence or otherwise. This was done using variance inflation factor (VIF) and tolerance value.

(ii) Heteroskedasticity test: The study deals with observations that constitute different sizes, some are in decimal while others in units, and that heteroskedasticity sometimes occurs when there is a large difference among the sizes of observations. For that, the study had to run a heteroskedasticity test in order to see its existence or otherwise. It was done using Breusch-pagan/cook-weisberg test for heteroskedasticity.

(iii) Hausman test: In view of the fact that both fixed and random effect tests were conducted. Hausman test was used to decide the best out of the two results. The test enabled the researcher to choose the most appropriate between the fixed and random effect models.

(iv) Lagrangian Multiplier (LM) Test: The (LM) test help decide between a random effects regression and a simple Ordinary Least Square regression. The null hypothesis in the LM test is that variance across entities is zero. That is, no significant difference across units (i.e. no panel effect).

CHAPTER FOUR
DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter analyses and statistically interprets the data collected for the study. The chapter begins with presentation and discussion of descriptive statistics and subsequently the result of correlation analysis. It then presents the regression results and discusses the findings in the light of previous studies. The chapter concludes with highlight of the policy implications of the findings.

4.2 Descriptive Statistics

The descriptive statistics of the variables are presented in Table 4.1.

Table 4.1 Descriptive Statistics .

Variables	Min.	Max.	Mean	Std. Dev.
SP	0.500	69.000	7.053	12.168
Tobin's Q	0.550	1.200	0.961	0.159
FSIZE	8.650	10.850	9.520	0.456
LIQT	0.200	10.480	2.109	2.062
OPEFF	0.120	1.310	0.765	0.336
FGRT	4.610	9.670	8.148	0.959
LVRG	0.120	113.140	14.508	26.715

SOURCE: Extract from stata output

From table 4.1, the minimum and maximum firm value are N0.5k and N69 respectively. Higher value on assets signifies better stock value while lower value on assets shows lower stock value. The mean share price is N7.05k, which signifies that the average share price of listed healthcare firms in Nigeria is N7.05k. The high standard deviation of

12.16 indicates that the data is widely dispersed from the mean suggesting that the firms in the sample have large difference in terms of their asset size. Firm value as measured by the Tobin's Q reveals and average of 0.961 with a standard deviation of 0.159. The minimum and maximum are 0.550 and 1.20 respectively.

Firm size shows an average value of 8.65 as represented by the natural logarithm of total assets. The low standard deviation as compared with the mean shows that there is no much variation in total assets of the firms that constitute the study sample. This is further confirmed by the minimum and maximum firm size that are 8.65 and 10.85 respectively. The firms' liquidity shows average values of 0.21 indicating that near cash assets constitute 21% of the current liabilities, which suggests low liquidity of the sector. There is no much variation of liquidity across the firms as indicated by standard deviation of 2.06. However, the minimum and maximum of 0.21 and 10.48 respectively suggests disparity in the liquidity behavior of these firms.

Further, the operating efficiency of the firms shows minimum and maximum of 12% and 13% respectively. These mean that the turnover-total assets ratio is considerably high in the sector. This can be further observed from the average of 76%. The low standard deviation indicates that the data clustered around the mean. As regards firm growth, the result show an average of 8.15 and a standard deviation of 0. 959 indicating that the healthcare firms grew by 8% during the period under review. The minimum of 1.3 indicates that the growth in terms of turnover does not fall below 1%, which further indicates absence of decline in turnover across individual periods. Lastly, the Table show mean leverage of 14.50 and standard deviation of 26.71 indicating that the firms employed more of debt than equity to finance their operations. The large difference between the mean and standard deviation

suggests that there is considerable difference in the use of debt financing across the firms. This is also evident from the minimum and maximum of 0.12 and 113.14 respectively.

4.3 Correlation Matrix

The correlation matrix explains the nature of relationship between the dependent and independent variables of the study as well as the independent variables among themselves. The summary of the associations among the variables of the study is presented in Table 4.2.

Table 4.2: Correlation Matrix

Variable	SP	Tobin's Q	FSIZ	LIQT	OPEFF	FGRT	LVRG
SP	1						
Tobin's Q	-0.0185	1					
FSIZ	0.5190*	-0.2271*	1				
LIQT	-0.2000	-0.2789*	0.0549	1			
OPEFF	0.0753	-0.1724	0.2417*	0.1943	1		
FGRT	0.3115*	-0.0536	0.3001*	-0.2833*	0.0457	1	
LVRG	0.3933*	-0.2310*	0.4128	-0.2800*	0.0343	0.3017*	1

SOURCE: Stata Output

Table 4.2, shows no indication of multicollinearity as the highest correlation is 0.4178 (between firm size and leverage). The Table shows that firm size, operating efficiency and firm growth are positively and strongly correlated with share price, with respective correlation coefficients of 0.5190, 0.3115 and 0.3933. While leverage has positive correlation with stock price but the relationship is the weakest as indicated by the coefficients and level of significance. The table also shows that liquidity is negatively correlated with firm value significantly at 10%.

Regarding the Tobin's Q, the result shows that all the variables have inverse correlation with firm value. The coefficients for firm size and liquidity are -0.2271 and -0.2781, which are significant at 5%. However, the correlation coefficients for operating efficiency (-0.1724) and firm growth (-0.0536) are not statistically significant. Leverage also has a negative correlation with Tobin's Q with coefficient of -0.2310 which is strong and significant. Overall, the correlation matrix suggests that firm characteristics have inverse association with firm value as measured by Tobin's Q.

The relationship of the independent variables among themselves indicates that firm size and liquidity, operating efficiency, firm growth & leverage are positively correlated. Liquidity and operating efficiency are positively correlated among themselves; while On the other hand, the relationship between liquidity with leverage and firm growth is a negative one. Furthermore, operating efficiency with firm growth & leverage are positively correlated. Firm growth is positively correlated with leverage.

4.4 Analysis of Regression Results, Discussion and Summary of Major Findings

In view of the panel data, fixed effect and random effect regression were run and subsequently, lagrangian multipier test for random effects models was carried out. Hausman specification test was then used to decide between the two results. The result from the Hausman test revealed a Chi^2 value of 9.20 with p-value of 0.1013 that is statistically insignificant. This implies that the test considered the random effect as the most appropriate estimator and as a result of that the Lagrangian multiplier test for random effect is conducted which showed a Chi^2 value of 79.06 and p-value of 0.0000 that is statistically significant. This suggests that the random effect result should be considered which also required further

robustness test before its interpretation. Therefore, robust random effect results was adopted for the study.

Table 4.3 below presents the summary of the robust random effect results.

Table 4.3 Regression Results

	Share Price			Tobin's Q		
Variable	**Coef.**	**z. value**	**Prob.**	**Coefficient**	**T. Value**	**Prob.**
Constant	-129.62	-3.22	0.001	1.32	4.11	0.000
FSIZ	13.85	3.39	0.001	-0.02	-0.50	0.618
LIQT	-0.51	-0.95	0.344	-0.03	-2.35	0.021
OPEFF	1.95	0.52	0.602	-0.04	-0.74	0.464
FGRT	0.34	0.39	0.698	-0.01	-0.39	0.697
LVRG	0.11	1.24	0.215	-0.002	-2.19	0.032
R- Squared		0.2610		0.1948		
Wald Chi2/ (F.)		21.92		2.97		
Prob.		0.000		0.017		

Source: STATA Output

Table 4.3 proves that the functional relationship between the dependent and independent variables is:

$$SP = -129.62 + 13.85FSIZE - 0.517LIQT + 1.95OPEFF + 0.34FGRT + 0.11LVRG$$

$$Tobin's\ Q = 1.32 - 0.02FSIZ - 0.03LIQT - 0.04OPEFF - 0.01FGRT - 0.002LVRG$$

The table revealed that firm size is positively and significantly correlated with the firm value of listed healthcare firms in Nigeria. The beta coefficient of the variable is 13.852

and the p-value is 0.001 which is significant at 5% level of significance. When Tobin's Q is used as the dependent variable, it shows a negative insignificant effect on firm value. The result returned a coefficient of -0.02 and a t. value of -0.50, which is not significant at 10%. Overall, given that firm value as measured by stock price has a significant effect, it indicates that size plays a significant role on the firm value of firms. The implication of this finding is that the bigger the size of the firms the higher the stock prices. The result provides a basis for rejecting the first hypothesis, which states that firm size has no significant effect on stock value of listed healthcare firms in Nigeria. The finding is consistent with the findings of Muneesh and Sanjay (2004) who found a positive significant positive relationship between firm size and market share performance, but inconsistent with those of Panu, Peng and Dennis (2007) and Lan (2012), who found a significant negative relationship between firm size and market share value.

Furthermore, the result exhibits evidence of negative significant relationship between liquidity and firm value of listed healthcare firms in Nigeria. The result shows a beta coefficient of -0.51 with p-value of 0.34 indicating a statistically insignificant relationship at 5% significant level. This implies that liquidity as one of the proxies of firm characteristics does not significantly affect the firm value of listed healthcare firms in Nigeria. However, it has an inverse and significant effect of Tobin's Q with a coefficient of -0.03 and t. value of -2.35. Thus, because the findings on the relationship between liquidity and firm value is contingent on measure of value adopted, this study proffers that it impacts on firm value based on the Tobin's Q model. Therefore, the results serve as basis for rejecting the second hypothesis, which states that liquidity has no significant impact on the firm value of listed healthcare firms in Nigeria. This conforms to the findings of Cheung, Chung and Fung

(2012) who reported negative significant association between liquidity and firms' financial performance.

The findings on the effect of liquidity on firm value suggest that there is a tradeoff between liquidity and firm value. Firms that are highly liquid tend to have idle cash that could have been channeled to profitable investments. Also, high liquidity serves as motivation for corporate managers to pursue self-enhancing activities such as increase in perks and executive compensations which may not be commensurate with current performance of the firm. Consequently, firms that are highly liquid may signal to the market the management's inefficiency in channeling the firms' resources to value maximizing projects.

Table 4.4 further reveals that operating efficiency has positive relationship with the stock value of listed healthcare firms in Nigeria. The relationship, which is statistically insignificant shows a beta coefficient of 1.95 with p-value of 0.511. With respect to the Tobin's Q model, the finding is similar as the result returned coefficient of -0.04 and a t. value of -0.74 which is not significant. The difference between the results of the two models, however, lies in the direction of the relationship. This implies that operating efficiency does not have significant effect on the firm value of the firms. The result provides a basis for failure to reject the third hypothesis which states that operating efficiency has no significant influence on the firm value of listed healthcare firms in Nigeria. This supports the findings of Ahmad and Noor (2010).

Further, the result signifies that firm growth has positive insignificant influence on the stock value of listed healthcare firms in Nigeria (coefficient of 0.34 and p. value of 0.641). For the Tobin's Q model, the finding shows a negative insignificant effect on firm

value, suggesting that growth hurts firm value. The coefficient for the second model has coefficient of -0.01 and t. value of -0.74, which is not significant at 10%. Thus, there is enough evidence for failing to reject the fourth hypothesis that assumed firm growth has no significant impact on the market stock performance of listed healthcare firms in Nigeria. The result is consistent with the finding of Safdar et al (2013) who found evidence of positive insignificant relationship between firm growth and firm values. The finding however contradicted the work of Nasrollah et al (2011) who documented a significant positive relationship between firm growth and financial performance of firms.

Lastly, the table shows a value of beta coefficient of 0.11 with p-value of 0.225 for leverage in the share price model. This signifies that leverage has an insignificant positive influence on the stock value of listed healthcare firms in Nigeria. However, the Tobin's Q model returned a coefficient of -0.002 and a t. value of -2.19, which is significant at 5%. Based on these findings, the study fails to reject the fifth hypothesis that assumed leverage has no significant impact on the stock value of listed healthcare firms in Nigeria. The result is contrary to the findings of Uwubanmwen and Obayagbon (2012) who found evidence of an insignificant positive relationship between firm growth and firm values. It further contradicts the works of Chambers et al (2013) and Tudor, (2006) who documented a positive significant relationship between firm growth and financial performance of firms.

Two possible reasons could be proffered for the unexpected findings on the association between leverage and firm value. One, the investors of the healthcare firms do not really value shares based on the speculation that high debt ratio entails more monitoring by debt-holders and hence better monitoring. On the contrary, they may view high leverage as an aggressive shift from shareholders' interest because of the goal divergence between

shareholders and debt-holders on certain areas such as risk taking behavior. Two, the mean leverage report based on the descriptive statistics is 14% of total assets. This clearly shows that there is low leverage in the capital structure of the healthcare sector, which may be the reason for the unexpected findings. Perhaps, the effect of leverage on firm value is explained in line with the theory in industries that are largely composed of highly levered firms.

The combined and overall effect of the predictor variables on the explained variable showed the models are adequate. The Wald chi square is 21.92 with probability chi square value 0.000 which is significant at 1% level of significance and indicates that the model is well-fitted with the variables of the study. This is close to the result of the second model, which has an F. statistics of 2.97, which is significant at 5%. Furthermore, the coefficient of determination R^2 which stands at 26% and 19.48% respectively for the average share price and Tobin's Q indicates that the proportion of the total variation in stock value that is explained by the independent variables (firm size, liquidity, operating efficiency firm growth and leverage).

4.5 Policy Implications of the Research Findings

The findings of this study have important implications for policy in Nigeria. One major implication is that healthcare firms are the main source of medical products and facilities needed by individuals to remain healthy and fit. It is demonstrated that there are significant inefficiencies in the healthcare firms in terms of allocating financial resources across firms and in terms of valuing investment opportunities. The findings reflect the need to review liquidity and capital structure of the healthcare firms as the current position has proven to hinder their market performance. Based on the result, listed healthcare firms in

Nigeria should focus more attention on liquidity management, since liquidity is having negative effect on their firm value.

CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

This study was conducted to investigate the impact of firm characteristics on firm value of listed healthcare firms in Nigeria. The study was divided into five chapters. The first chapter discussed the background issues, which led to developing five objectives and formulating five hypotheses for the research with a scope covering eight (8) years, from 2008 to 2015. The review of conceptual literature and empirical studies revealed inconsistency in findings of previous studies. The stewardship and signaling theories serve as theoretical framework that underpinned the study.

Ex-post facto research design was used in measuring the relationship among the variables of the study. Data was collected from secondary source through the annual reports and accounts of the sampled firms and from Nigeria stock exchange. The population of the study consisted of only the listed healthcare firms in Nigerian Stock Exchange that have the complete financial records either on their website or in the office of the Nigerian Stock Exchange. Census approach was adopted to enable the study cover the entire population. Multiple regressions was used to test the five hypotheses formulated by the study. The result of the descriptive statistics, correlation matrix and regression were presented, analyzed and discussed in chapter four. The regression result provided evidence for the rejection of hypotheses one and two; which hypothesized that, firm size and liquidity have no significant effect on the firm values of the healthcare firms in Nigeria.

5.2 Conclusions

The study examined the effect of firm characteristics of firm value of listed healthcare firms in Nigeria. Based on the study's findings, it is concluded that;

Firm size has positive and significant impact on value (share prices) of listed healthcare firms in Nigeria. This implies that larger firms enjoy more investors' confidence and patronage relative to their smaller counterparts.

Liquidity has negative and significant influence on the firm value (Tobin's Q) of listed healthcare firms in Nigeria. This signifies that high liquidity is considered counterproductive by investors, which is reflected in the lower value of these firms.

Operating efficiency has negative insignificant effect on the firm value of listed healthcare firms in Nigeria. The operating efficiency of the firms as the result showed is inadequate. This means that any further effort of the healthcare firms in the area of asset utilization will not enhance the value of the firms.

Firm growth has negative but insignificant influence on the firm value of listed healthcare firms in Nigeria. This suggests that firm growth is not sufficient for market valuation of securities and does not lead to value enhancement.

Leverage has negative but insignificant influences on the firm value of listed healthcare firms in Nigeria. High debt ratio does not lead to firm value as suggested by most prior studies.

5.3 Recommendations

In line with the findings of the study, the following recommendations are made:

(i) The management of the healthcare firms should ensure that their firms expand in a controlled way with the aim of achieving an optimal size so as to enjoy the

economies of scale which will ultimately result to a higher firm value. However, if they expand above optimal level, diseconomies of scale will set in and this will result to decline in firm value.

(ii) The listed healthcare firm in Nigeria's current liquidity position is detrimental to their firm value. Based on this, it is recommended that companies should reduce their current ratio and ensure that neither insufficient nor unnecessary funds are invested in current assets.

(iii) The management of listed healthcare firms in Nigeria should reduce the level of leverage in their capital structure in order to improve their firm value. Their capital structure should be majorly financed by equity rather than debt. Firms should avoid situations where they are highly leveraged since this may lead to bankruptcy if they are unable to make payment on their debt.

5.2 Limitations of the Study

As it is the case with all studies, this study has some limitations. The findings are therefore to be considered in the light of the limitation. The study considered only five proxies of firm characteristics without considering other proxies of firm characteristics. The result may be different if other variables were to be added.

5.4 Areas for Further Research

The issues involved in this study area cannot altogether be covered by a single research, and hence, the need for further research. It is recommended that future studies add to the five factors herein examined in relation to firm value of the listed healthcare companies. Thus, more research should be carried out to determine other factors that affect firm value. Factors such as managerial competency and capitalization of the firm are recommended for future

studies. This would enable the researchers and concerned investors to mitigate effects of such factors and hence enhance firm value.

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APPENDIX

```
 /__    /   ____/   /   ____/
___/   /   /___/   /   /___/   13.0   Copyright 1985-2013 StataCorp LP
  Statistics/Data Analysis            StataCorp
                                      4905 Lakeway Drive
     Special Edition                  College Station, Texas 77845 USA
                                      800-STATA-PC        http://www.stata.com
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Notes:
      1.  (/v# option or -set maxvar-) 5000 maximum variables

. edit

. *(9 variables, 80 observations pasted into data editor)

. encode id, generate (firm)

. summarize smv tobinsq fsiz liqt opeff fgrt lvrg
```

Variable	Obs	Mean	Std. Dev.	Min	Max
smv	80	7.053375	12.16751	.5	69
tobinsq	80	.961875	.1587219	.55	1.2
fsize	80	9.52025	.4558257	8.65	10.85
liqt	80	2.10925	2.061852	.2	10.48
opeff	80	.764625	.3360905	.12	1.31
fgrt	80	8.148	.9587708	4.61	9.67
lvrg	80	14.50763	26.71526	.12	113.14

```
. pwcorr sp tobinsq fsize liqt opeff fgrt lvrg, star (0.05) sig
```

	sp	tobinsq	fsize	liqt	opeff	fgrt	lvrg
sp	1.0000						
tobinsq	-0.0185 0.8703	1.0000					
fsize	0.5190* 0.0000	-0.2272* 0.0427	1.0000				
liqt	-0.2000 0.0753	-0.2789* 0.0122	0.0549 0.6283	1.0000			
opeff	0.3115* 0.0049	-0.1724 0.1261	0.2417* 0.0308	0.1943 0.0842	1.0000		
fgrt	0.3933* 0.0003	-0.0536 0.6367	0.3001* 0.0068	-0.2833* 0.0109	0.0457 0.6873	1.0000	
lvrg	0.1634 0.1476	-0.2310* 0.0393	0.4128* 0.0001	-0.2800* 0.0119	0.0343 0.7623	0.3017* 0.0065	1.0000

```
. xtset firm year
       panel variable:  firm (strongly balanced)
        time variable:  year, 2008 to 2015
                delta:  1 unit

. regress smv fsiz liqt opeff fgrt lvrg
```

Source	SS	df	MS		
Model	5095.08939	5	1019.01788	Number of obs	= 80
Residual	6600.72518	74	89.198989	F(5, 74)	= 11.42
				Prob > F	= 0.0000
Total	11695.8146	79	148.048286	R-squared	= 0.4356
				Adj R-squared	= 0.3975
				Root MSE	= 9.4445

smv	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
fsize	12.9798	2.756309	4.71	0.000	7.487731	18.47186
liqt	-1.557613	.5769126	-2.70	0.009	-2.707136	-.4080895
opeff	8.747807	3.318765	2.64	0.010	2.135024	15.36059
fgrt	2.758686	1.232433	2.24	0.028	.3030099	5.214362
lvrg	-.0843215	.0466081	-1.81	0.074	-.1771902	.0085472
_cons	-141.1754	24.88708	-5.67	0.000	-190.764	-91.58681

```
. hettest

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

         chi2(1)      =    34.57
         Prob > chi2  =   0.0000
```

```
. vif
```

Variable	VIF	1/VIF
fsize	1.40	0.715286
lvrg	1.37	0.728267
liqt	1.25	0.797991
fgrt	1.24	0.808680
opeff	1.10	0.907544
Mean VIF	1.27	

```
. xtreg smv fsiz liqt opeff fgrt lvrg, fe

Fixed-effects (within) regression               Number of obs      =        80
Group variable: firm                            Number of groups   =        10

R-sq:  within  = 0.2514                         Obs per group: min =         8
       between = 0.1527                                        avg =       8.0
       overall = 0.1550                                        max =         8

                                                F(5,65)            =      4.37
corr(u_i, Xb)  = -0.5350                        Prob > F           =    0.0017

------------------------------------------------------------------------------
         smv |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       fsize |   11.60494   4.871263     2.38   0.020     1.876356    21.33352
        liqt |  -.4393409   .5578944    -0.79   0.434    -1.553533     .674851
       opeff |   1.467942    4.08442     0.36   0.720    -6.689208    9.625091
        fgrt |   .2505074   .8782929     0.29   0.776    -1.503565    2.004579
        lvrg |   .2814307    .124038     2.27   0.027     .0337097    .5291517
       _cons |  -109.7483    48.0976    -2.28   0.026    -205.8059   -13.69077
-------------+----------------------------------------------------------------
     sigma_u |  12.520059
     sigma_e |  5.3014996
         rho |  .84795934   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(9, 65) =    18.87                 Prob > F = 0.0000

. est store fe
```

```
. xtreg smv fsiz liqt opeff fgrt lvrg, re

Random-effects GLS regression                   Number of obs      =        80
Group variable: firm                            Number of groups   =        10

R-sq:  within  = 0.2321                         Obs per group: min =         8
       between = 0.2769                                        avg =       8.0
       overall = 0.2610                                        max =         8

                                                Wald chi2(5)       =     21.92
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0005

------------------------------------------------------------------------------
         smv |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       fsize |   13.85221   4.082363     3.39   0.001     5.850925     21.8535
        liqt |   -.513447   .5428082    -0.95   0.344    -1.577331    .5504374
       opeff |   1.948875    3.74075     0.52   0.602    -5.382859     9.28061
        fgrt |   .3381096   .8719637     0.39   0.698    -1.370908    2.047127
        lvrg |   .1126972   .0908033     1.24   0.215     -.065274    .2906684
       _cons |  -129.6202   40.27894    -3.22   0.001    -208.5655   -50.67491
-------------+----------------------------------------------------------------
     sigma_u |  9.3064371
     sigma_e |  5.3014996
         rho |  .75499513   (fraction of variance due to u_i)
------------------------------------------------------------------------------

. est store re
```

```
. hausman fe re
```

	Coefficients (b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
fsize	11.60494	13.85221	-2.247271	2.657726
liqt	-.4393409	-.513447	.0741061	.128862
opeff	1.467942	1.948875	-.4809337	1.639902
fgrt	.2505074	.3381096	-.0876022	.1052504
lvrg	.2814307	.1126972	.1687335	.0844996

```
                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)
                   =        9.20
         Prob>chi2 =      0.1013
         (V_b-V_B is not positive definite)



. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        smv[firm,t] = Xb + u[firm] + e[firm,t]

        Estimated results:
                     |       Var     sd = sqrt(Var)
             ---------+-----------------------------
                 smv |    148.0483       12.16751
                   e |     28.1059         5.3015
                   u |    86.60977       9.306437

        Test:   Var(u) = 0
                             chibar2(01) =    79.06
                          Prob > chibar2 =   0.0000
```

Tobin's Q Model

```
. reg tobinsq fsiz liqt opeff fgrt lvrg
```

Source	SS	df	MS		
Model	.387633822	5	.077526764	Number of obs	= 80
Residual	1.60258501	74	.021656554	F(5, 74)	= 3.58
				Prob > F	= 0.0059
Total	1.99021883	79	.025192643	R-squared	= 0.1948
				Adj R-squared	= 0.1404
				Root MSE	= .14716

tobinsq	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
fsize	-.0190183	.042948	-0.44	0.659	-.104594	.0665574
liqt	-.0273636	.0089893	-3.04	0.003	-.0452752	-.0094521
opeff	-.0368577	.051712	-0.71	0.478	-.1398961	.0661807
fgrt	-.0076969	.0192034	-0.40	0.690	-.0459605	.0305667
lvrg	-.0017305	.0007262	-2.38	0.020	-.0031775	-.0002834
_cons	1.316653	.3877829	3.40	0.001	.5439787	2.089327

```
. hettest

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

         chi2(1)      =     4.38
         Prob > chi2  =   0.0363
```

```
. vif
```

Variable	VIF	1/VIF
fsize	1.40	0.715286
lvrg	1.37	0.728267
liqt	1.25	0.797991
fgrt	1.24	0.808680
opeff	1.10	0.907544
Mean VIF	1.27	

```
. xtreg tobinsq fsiz liqt opeff fgrt lvrg, fe

Fixed-effects (within) regression               Number of obs      =        80
Group variable: firm                            Number of groups   =        10

R-sq:  within  = 0.1432                         Obs per group: min =         8
       between = 0.2350                                        avg =       8.0
       overall = 0.1227                                        max =         8

                                                F(5,65)            =      2.17
corr(u_i, Xb)  = -0.7568                        Prob > F           =    0.0679

------------------------------------------------------------------------------
     tobinsq |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       fsize |   .0712515   .1264388     0.56   0.575    -.1812643    .3237672
        liqt |  -.0258887   .0144807    -1.79   0.078    -.0548087    .0030313
       opeff |  -.2245767   .1060155    -2.12   0.038    -.4363042   -.0128492
        fgrt |   .0222634    .022797     0.98   0.332    -.0232655    .0677922
        lvrg |  -.0053248   .0032195    -1.65   0.103    -.0117547    .0011051
       _cons |   .4057142   1.248424     0.32   0.746    -2.087562     2.89899
-------------+----------------------------------------------------------------
     sigma_u |  .12942338
     sigma_e |  .13760606
         rho |  .46938537   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(9, 65) =     2.18                 Prob > F = 0.0346
```

```
. xtreg tobinsq fsiz liqt opeff fgrt lvrg, re

Random-effects GLS regression                   Number of obs      =        80
Group variable: firm                            Number of groups   =        10

R-sq:  within  = 0.1033                         Obs per group: min =         8
       between = 0.4273                                        avg =       8.0
       overall = 0.1829                                        max =         8

                                                Wald chi2(5)       =     12.05
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0340

------------------------------------------------------------------------------
     tobinsq |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       fsize |  -.0050074   .0552524    -0.09   0.928    -.1133002    .1032854
        liqt |  -.0251126   .0105665    -2.38   0.017    -.0458226   -.0044026
       opeff |  -.0831806   .0636567    -1.31   0.191    -.2079454    .0415841
        fgrt |   .0038962   .0200212     0.19   0.846    -.0353447    .0431371
        lvrg |  -.0019777   .0009972    -1.98   0.047    -.0039322   -.0000233
       _cons |   1.123064   .5191918     2.16   0.031     .1054666    2.140661
-------------+----------------------------------------------------------------
     sigma_u |  .05484988
     sigma_e |  .13760606
         rho |   .1370998   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

```
. hausman fe re
```

	Coefficients (b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
fsize	.0712515	-.0050074	.0762589	.1137275
liqt	-.0258887	-.0251126	-.0007761	.0099015
opeff	-.2245767	-.0831806	-.1413961	.0847768
fgrt	.0222634	.0038962	.0183672	.010902
lvrg	-.0053248	-.0019777	-.003347	.0030612

```
                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)
                   =        7.86
         Prob>chi2 =      0.1638
```

```
. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        tobinsq[firm,t] = Xb + u[firm] + e[firm,t]

        Estimated results:
```

	Var	sd = sqrt(Var)
tobinsq	.0251926	.1587219
e	.0189354	.1376061
u	.0030085	.0548499

```
        Test:   Var(u) = 0
                             chibar2(01) =     0.36
                          Prob > chibar2 =   0.2735
```

```
. reg tobinsq fsiz liqt opeff fgrt lvrg, ro

Linear regression                               Number of obs =      80
                                                F(  5,    74) =    2.97
                                                Prob > F      =  0.0169
                                                R-squared     =  0.1948
                                                Root MSE      =  .14716

------------------------------------------------------------------------------
             |               Robust
    tobinsq |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       fsize |  -.0190183   .0380104    -0.50   0.618    -.0947557    .0567191
        liqt |  -.0273636   .0116205    -2.35   0.021    -.0505179   -.0042094
       opeff |  -.0368577   .0500662    -0.74   0.464    -.1366167    .0629013
        fgrt |  -.0076969   .0196628    -0.39   0.697     -.046876    .0314821
        lvrg |  -.0017305   .0007901    -2.19   0.032    -.0033047   -.0001562
       _cons |   1.316653   .3201946     4.11   0.000     .6786512    1.954655
------------------------------------------------------------------------------
```