EFFECT OF CAPITAL STRUCTURE ON THE PERFORMANCE OF QUOTED MANUFACTURING FIRMS IN SUB-SAHARAN AFRICA

BY

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CERTIFICATION

This is to certify that this thesis has been read and approved as meeting the requirements for the award of the degree of Doctor of Philosophy in Finance, in the Department of Accounting and Finance, College of Humanities, Management and Social Sciences, Kwara State University, Malete, Nigeria.

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DEDICATION

This thesis is dedicated to the Almighty Allah, the most Beneficent and most Merciful, for guiding me throughout my programme in the University. None is worthy of my thanks and adorations except Him.

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ABSTRACT

Capital structure enables companies to enjoy gearing effect which influences the returns to shareholders. However, the choice of an appropriate financing mix constitutes a critical decision and problem for the survival and continuous growth of any business organization. Hence, the study examined the impact of capital structure on the manufacturing firms' performance in Sub-Saharan Africa within 2006-2016 period. Specifically, the study: (i) examined the effect of different components of capital structure (Total Debt to Total Equity (TDTE), Long Term Debt to Total Assets (LTDTA, Short Term Debt to Total Asset (STDTA), SIZE, and LIQUIDITY) on the performance of quoted manufacturing firms in Sub-Saharan Africa;(ii) investigated the direction of causal relationship that exist between capital structure and the performance of listed manufacturing firms in Sub-Saharan Africa; and (iii) evaluated the cross-sectional performance of each country in relation to capital structure in Sub-Sahara Africa.

This study adopted Expost-facto method of research design while the population of the study is all manufacturing firms in Sub-Saharan African. The purposive sampling technique was employed to select 5 quoted manufacturing firms from sampled countries which are Ghana, Kenya, South Africa and Nigeria. Secondary data were sourced from the sampled manufacturing firms' annual and financial statement covering the period of 2006-2016. The four objectives of the study were achieved using correlation analysis, Johansen co-integration, pair wise granger causality test and panel data regression analysis.

The findings of the study were that:

- *(i) TDTE(β = -0.1927; $p < 0.05$), SIZE (β = -0.0331; $p < 0.05$) had a negative influence on the performance while LTDTA(β = -0.1927; $p < 0.05$), STDTA (β = 4.8544; $p < 0.05$) had a positive impact on the performance of quoted manufacturing firms in Sub-Saharan Africa.*
- *(ii) ROA-TDTE had Uni-directional causal relationship, the ROA-LTDTA had Bi-directional causal relationship while ROA-STDTA has Bi-directional causal relationship. Similarly, ROA-SIZE had Uni-directional causal relationship while no causality relationship existed between the ROA-LIQ of listed manufacturing firms in Sub-Saharan Africa.*
- *(iii) The capital structure of firms in Ghana(β = -0.0052; $p < 0.05$), Kenya (β = 0.0090; $p < 0.05$), South Africa (β = -0.2125; $p < 0.05$) and Nigeria (β = -3.5928; $p < 0.05$) had significant impact on the performance of quoted manufacturing firms.*

The study concluded that capital structure variable such as LTDTA, STDTA, SIZE and LIQUIDITY had great impacts on the performance of manufacturing firms in Sub-Saharan Africa. The study recommended that firms in Sub-Sahara countries should rely less on short term debt, which formed the major part of their leverage and focus more on developing internal strategies that can help improve more on their accounting performance. It was also recommended that firms (both highly and lowly geared) in selected Sub-Sahara Africa should take into cognizance the amount of leverage incurred because it is a significant determinant of firm's performance.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Commerce, industry, mining and agriculture are the main sectors of any economy. Although industry covers manufacturing and construction, manufacturing however, remains a major part of the industry, because it is the most dynamic component of the industrial sector. Manufacturing thus involves the conversion of raw materials into finished consumer goods or intermediate or producer goods.

The role of manufacturing as a sub-sector in the economic growth of a country cannot be over-emphasised. It is the catalyst for economic transformation and national development. Consequently, the performance of the manufacturing sector would affect the performance of the economy at large. In the light of this, governments, regulatory agencies and researchers focused attention on how to improve the performance of the manufacturing sector through several initiatives, programmes and policies (Nikoo, 2015).

One of the ways to assess the performance of manufacturing sector is through the mix of source of finance i.e. equity, debt, retained earnings, etc. This capital mix is referred to as capital structure. In Sub-Saharan Africa, capital structures of quoted firms are generally characterised by a dominant leverage on all equity finance, which is why sub-region fails to take advantage of the benefits of debt finance. This supports the view of Singh and Hamid (2006) that firms in developing countries rely more on equity finance than debt finance and that capital structure of quoted manufacturing firms in Sub-Saharan Africa is characterised by all-equity finance; thus failing to take the advantage of debt finance in their capital structure (Adesina & Nwidobie, 2015).

Firms are constantly looking for ways to achieve high performance; a lot of theories have been propounded and studies conducted in order to determine the factors that influence performance of firms. A set of these theories and studies identify capital structure as one major factor affecting a firm's performance. Capital structure has been an increasingly debatable phenomenon in the performance of firms. Some of the firms in the world performed poorly or have collapsed due to various challenges facing them in relation to their capital structure. Idigbe (2006) noted that capital structure is regarded as the cornerstone of any organisation's financial strength. It supports the operations by providing a buffer to absorb unanticipated losses from its activities and, in the event of problems, enable the firm to continue to operate in a sound and viable manner while the problems are addressed.

A firm's basic resource is the stream of cash flows produced by its assets. When the firm is financed entirely by common stock, all of those cash flows belong to the stockholders. When firm issues both debt and equity securities, it undertakes to split up the cash flows into two streams, a relatively safe stream that goes to the debt-holders and a more risky one that goes to the stock holders. Debt and equity are the two components of a firm's capital structure. Each of these is associated with different levels of risk, benefits, and control. While debt holders exert lower control, they earn a pre-determined rate of return and are protected by contractual obligations with respect to their investment. Equity holders are the residual claimants, bearing most of the risk, and, correspondingly, have greater control over decisions. Firm's decision on the use of different forms of financing results into different capital structures which may have different impact on the firm performance (Erasmus & James, 2014).

The effect of different capital structure and associated business risks are reflected in a firm's income statement. Operating leverage tends to magnify the effect of fluctuating

sales and produce a percentage change in earnings before interest and tax (EBIT) larger than the changes in sales (Akintoye, 2008). An appropriate capital structure is a critical decision for any business organisation. The decision is not only because of the need to maximize returns to various organisational constituencies, but on an organisation's ability to deal with its competitive environment (Muritala, 2012). Consequently, the theory of the capital structure is an important reference theory in enterprise's financing policy. Whether or not an optimal capital structure exists is one of the most important and complex issues in corporate finance. How an organisation is financed is of paramount importance to both the managers of firms and providers of funds. Muritala averred that this is because if a wrong mix of finance is employed, the performance and survival of the business enterprise may be seriously affected. Thus, capital structure is closely linked to firm performance (Tian & Zeitun, 2007).

In the same vein, debt ratios in developing countries seem to be affected by the same types of variables that are significant in developed countries; however, there are systematic differences in the way these ratios are affected by country factors such as the Gross Domestic Product, inflation rate, and the capital market.

Firm performance can be measured by variables which impinge productivity, profitability, growth, customers' satisfaction etcetera. These variables are related to one another and they include Return on Investment (ROI), Residual Income (RI), Earning Per Share (EPS), Dividend Yield, Return On Assets (ROA), and Growth in Sales and Return on Equity (ROE) (Barbosa & Louri, 2005). For the purpose of this study, performance is measured by two proxies namely; Return on Equity (ROE) and Return on Assets (ROA). The use of the Return on Assets (ROA) here is germane because it represents what the firm earns on all assets held in a firm. On the other hand, Return on Equity (ROE) reflects how effectively a firm management is using shareholders'

investment. It tells the shareholders how much the firm is earning on the book value of their investment (Goudreau, 1992). In fact, ROE is an utmost important measurement of a firm's returns because it is influenced by how well the firm has performed on all other return categories, and indicates whether the firm can compete for private sources in the economy. ROE is defined as net income divided by average equity (Noraini, 2012).

It is, however, important to note that, in evaluating the performance of a firm, the wealth of a firm may influence the level of risk a company's investors and managers may be willing to assume as well as determine the resources available to support the business. As a result of ownership and wealth incentive, it is important to investors and others to understand its effects on firm performance. This is because capital structure decision on financing the assets (such as personnel, machinery and buildings) of an organization by debt or by equity will continue to influence the performance of a firm for a very long period of time. This is based on the fact that capital structure influences the returns and risks of shareholders and this consequently affects the market value of the shares. Thus, the concern of this research was to examine the impact of capital structure on the performance of quoted firms in Sub-Saharan Africa.

1.2 Statement of the Problem

There has been an unending debate on whether or not capital structure can affect firm performance. Theories of capital structure and effect of capital structure on performance of firms have remained a great concern among finance scholars. There are three major schools of thought in the front line of this debate; these are the positive-link school, the negative-link school and the no-link school (Ayodeji, 2011).

The proponent of the positive link believe that highly leveraged capital structure of firms positively and significantly affects the firm performance (Abor, 2005; Agboola &

Salawu, 2006; Simon-Oke & Afolabi, 2011; Saeed, Gull & Rasheed, 2013; Muraleetharan, 2013; Akinyomi, 2013; Adesina & Nwidobie, 2015; & Nikoo, 2015). The leading proponents of this school are Jensen and Meckling (1976), Grossman and Hart (1982), Jensen (1986) and Williams (1987). They argued that leverage, i.e. debt, reduces agency costs, thereby increasing firm performance in different dimensions.

The advocates of the negative link, however, argued that highly leveraged capital structure negatively and significantly affect firm's performance (Osuji & Odita, 2012; Muritala, 2013; Birru, 2016; Siddik, Kabiraj & Joghee, 2017). They posited that when leverage becomes relatively high, any further increase in debt generates costs such as bankruptcy cost or financial distress resulting in negative impact on performance. This is in line with the traditional theory (Muritala, 2012; Osuji & Odita, 2012) which states that when leverage gets to a judicious point, any further increase in the use of debt will negatively affect the value of the firm because of tax exhaustion and bankruptcy cost. However, the no-link school advocates that there is no link between capital structure and firm performance. This is based on the postulation of Modigliani and Miller (1958) which states that the capital structure of a firm has no effect on its market value; thus taking the assumption that firms operate under a perfect market condition, where there is no transaction cost such as brokerage cost, floatation cost, agency cost and taxes.

Studies which have indicated no link between capital structure and firm performance include those of Anofor, (2007), Onalapo and Kajola (2007), Ibrahim (2009), Ebaid (2009), San and Heng (2011), Pratheepkanth (2011), Pachori and Totala (2012), Hasanzadeh et al. (2013), Al-Taani (2013), Younus, Ishfaq, Usman and Azeem (2014) and Onoja and Ovayioza (2015). All these studies have found that capital structure has

no significant link on the performance of manufacturing firms in their various jurisdictions.

Arising from the continued controversies in extant literature, three gaps have been identified. There is divergent opinion by past studies on the subject matter to which the proxies of capital structure can induce performance. Some of these studies either use one or two components of capital structure without incorporating all forms of capital structure components (Onaolapo & Kajola, 2007); Abdul (2010); Akeem, Edwin, Kiyanjui & Kayode, 2014). More so, several studies on this subject matter only concentrated on each country. Nevertheless, those that concentrated on the sub-Sahara focused on food and beverages companies, petroleum industry, non-financial firms and bank financial industry (Anorfo, 2015; Tale, 2014; Osuji & Odita, 2012; Dokua, 2011; Agboola & Salawu, 2006; Akintoye, 2008, David and Olorunfemi, 2010 Oladimeji, 2012). Those that actually examined quoted manufacturing firms did so within the period of 2006-2010 (Kleff & Weber 2004; Ahmad, 2010; Ong & Teh 2011; Tifow & Sayilir 2015; Banafa, 2015; Yabs, 2015). In the same vein, few studies, to the best of the researcher's knowledge, had carried out investigation on capital structure and performance of quoted firms in Sub-Saharan Africa using Kenya, Nigeria, South Africa and Ghana as the sample. Also, there is a dearth of literature on the direction of causal relationship between capital structure and performance of quoted manufacturing firms in Sub-Saharan Africa. Hence, most conclusions could not suggest which variable that can granger-cause the other, much more that previous studies have only concentrated on the use of correlation and regression methods of analysis.

Based on the gaps identified above, the study examined the effect of the different components of capital structure, which comprise long term debt, short term debt and total

debt together with control variables such as size and liquidity on the performance of quoted manufacturing firms in Sub-Saharan Africa during the period of 2006-2016. The study also examined if there is a long run relationship and causal relationship between capital structure and performance of quoted manufacturing firms in Sub-Saharan Africa. It also evaluated the effect of capital structure on the performance of manufacturing companies in each countries of Sub-Saharan Africa country.

1.3 Research Questions

Consequent upon the above statement of the problem, this study raised the following questions:

i. To what extent do the different components of capital structure have effects on the performance of quoted manufacturing firms in Sub-Saharan Africa?
ii. What is the direction of causal relationship between capital structure and the performance of the listed manufacturing firms in Sub-Saharan Africa?
iii. What is the effect of capital structure on the performance of listed manufacturing firms in each of the sampled countries in Sub-Saharan Africa?

1.4 Objectives of the Study

In tandem with the research questions raised in the study, the main objective of this study is to examine the effect of capital structure on the performance of listed manufacturing firms in Sub-Saharan Africa. The specific objectives are to:

i. examine the effect of the different components of capital structure on the performance of quoted manufacturing firms in Sub-Saharan Africa;
ii. investigate the direction of causal relationship between capital structure and the performance of listed manufacturing firms in Sub-Saharan Africa; and

iii. evaluate the effect of capital structure on performance of listed manufacturing firms in each of the sampled countries in Sub-Saharan Africa.

1.5 Research Hypotheses

Stemming from the research questions and objectives above, the hypotheses to be tested were stated in their null forms.

H_{O1}: There is no significant relationship between the different components of capital structure and the performance of quoted manufacturing firms in Sub-Saharan Africa.

H_{O2}: No significant causal relationship exists between capital structure and the performance of listed manufacturing firms in Sub-Sahara Africa.

H_{O3}: Capital structure has no significant effect on the performance of manufacturing firms in each of the sampled countries in Sub-Sahara African.

1.6 Justification for the Study

Several studies such as Yusuf, Onafalujo, Idowu and Soyebo (2014); Onoja and Ovayioza (2015); Kumar (2015) and Muraleetharan (2016) had examined the effect of capital structure on the performance of firms while focusing on debt-equity ratio and debt-assets ratio, ignoring the essence of debt-capital employed ratio, which is a consideration of debt in relation to the total capital employed in the firm. Furthermore, previous studies are based on correlation and ordinary least square analysis while this study employed fixed effect and pooled OLS. Similarly, the previous studies only measured relationship between the capital structure indices and financial performance indicators. However, none of the previous studies considered the causal relationship

between the different nature of capital structure and performance of manufacturing firms in Sub-Saharan countries.

Nevertheless, previous research attention was not focused on the causal relationship between capital structure and financial performance. Based on the gaps identified above, the study examined the effect of the different components of capital structure which comprised long term debt, short term debt, total debt, and control variables such as size and liquidity on the performance of quoted manufacturing firms in Sub-Saharan Africa within the timeframe of 2006-2016.

Bearing in mind the significance of capital structure on the performance of manufacturing companies, there is the need to conduct a research into the effect of capital structure on the performance of listed manufacturing companies in Sub-Saharan Africa. Directors and managers of manufacturing companies in Sub-Saharan Africa would benefit from this study as it would detail out the different capital mix and their attendant effects on the performance of manufacturing companies in Sub-Saharan Africa. In essence, it would be a useful guide to managerial finance decision vis-a-vis the choice of capital mix. Furthermore, shareholders of manufacturing companies in Sub-Saharan Africa would find this work a useful tool in understanding what capital structure entails and its effect on companies' performance in order to effectively review board decisions on capital mix and achieve optimal capital structure policy.

Governments and policy makers would also find this work a useful guide in understanding the direction of policies and programmes on when firm should include leverage as a source of financing in order to enhance the performance of manufacturing companies in Sub-Saharan Africa, which will in turn influence the level of the performance of the regional economy. This study will assist government to identify the point at which tax can be adjusted so as to generate more internally generated revenue.

Finally, researchers would benefit from this study as the findings of this thesis would enhance and enrich their knowledge and understanding of the subject matter. Therefore, the significance of this research work is two-fold, that is, to find solutions to the identified problems and to contribute to the existing knowledge in the field.

1.7 Scope of the Study

The study focused on the effect of capital structure on the performance of manufacturing companies in Sub-Saharan Africa covering only four countries: Ghana, Kenya, South Africa and Nigeria. This study used the four countries because of their level of capital market development. The study focused on manufacturing firms because more attention has been given to capital structure and bank performance either from each country or from the region and there is the need to change focus from bank to other firms in the region to see how their capital structure had either enhanced their performance or hindered it.

The study employed panel data because it is the most appropriate for this study. Also, the data for the study was collected over time and from the annual financial statement of several quoted manufacturing companies in the four Sub-Saharan countries. The justification for choosing these countries is because there exist a robust stock exchange and capital market development in those countries. These countries also had the highest average number of manufacturing companies in the region and they had established social and governance (ESG) reporting requirements in their respective stock exchanges.

The countries were also chosen based on the records of their populations, market development and economy in the region. The time-frame for the study was 2006 - 2016. The selection of this period was based on the fact that panel data of this nature do not require many years; a period of 11 years was considered very appropriate. The following components of capital structure and control variables (TDTA, LTDTA, STDTA, SIZE

&LIQ) were employed to measure capital structure of the firms while ROA, ROE were used as proxies for manufacturing firm performance.

1.8 Organisation of the Study

The study was divided into five chapters. The first chapter contained the introduction and it covered the background to the study, the statement of the problem, the research questions, objectives and hypotheses, justification for the study and the organisation of the study. The second chapter consisted of the literature review and the discourse covered three main issues: the conceptual framework; theoretical background; and the review of empirical studies. The third chapter contained the model specification, model estimation, sources of data, population of the study, sample size, sampling technique, and method of data collection and method of data analysis. Chapter four contains the data analysis, discussion and presentation of results, while the fifth chapter discussed the summary, conclusions and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Issues:

2.1.1 Capital Structure: Meaning and Measurement

Capital structure enables companies to enjoy gearing effect which enhances the possibility to greatly increase returns to shareholders through the use of loan capital. Damodaran (2001) stated that capital structure decision is the mix of debt and equity that a company uses to finance its business. Despite the simplistic feature of this definition, it confuses capital structure with capital structure decision. There is the need to contextualize the two concepts, as they are not the same. Undoubtedly, the mix of debt and equity in a firm's capital employed is the capital structure while the choice of the mix of debt and equity in a firm's capital employed is the capital structure decision.

Muritala (2012) viewed capital structure as the means by which an organisation is financed. It is also a company's proportion of short and long term debt which is considered when analyzing capital structure. It is the mix of debt and equity maintained by a firm. This definition directly confuses capital structure with financing by seeing it as a means, whereas it is better referred to a mix, a combination or the proportion of long-term sources of finance. Not only that, the definer also included short-term debt in the definition of capital structure; this is an outright negation of the concept of capital structure, which is considered in relation to long-term growth prospects and value of the firm.

Khanam, Nasreen and Syed (2014) asserted that capital structure is the combination of equity, debt or hybrid securities through which a company finances its assets. A firm's leverage refers to the percentage of total debt in total financing. Decision of Capital structure involves what type of source should be used, either equity or short or long term

debt, or mix of sources of funding which will better the firm's financial performance. This opinion is loaded with a number of points.

First, it sees capital structure as a mix (i.e. a combination) of long-term capital, whereby the hybrid capital is the preference share capital as it combines both the features of equity capital and debt capital. Second, it portends that capital is represented by assets, such that, assets are financed by capital. Third, the proportion of debt in a firm's capital structure is leverage, called gearing. Fourth, it separates capital structure from capital structure decision; the latter involving a question of choice of capital types or sources; however, the assertion confused capital structure decision with financing decision, which includes the consideration of short-term finance; thus, capital structure decision is a sub-set of the financing decision. Fifth, this definition portends that, capital structure decision should be taken in the context of how to better the lot or financial performance of the firm; hence capital structure decision should be considered in the light of the circumstances of the firm.

Siddik, Kabiraj and Joghee (2017) also contextualised that capital structure to denote the mode of finance, usually a blend of the loan and equity capital, through which a firm is financed. They further asserted that the concept of capital structure can be defined as in the proportional relation between a firm's debt capital and equity capital. Firms use capital structure usually to fund their business as well as expand. This decision is vital for a firm as it has a direct influence on the risk and return of a firm. This position does not mean that capital structure is a mode of finance; rather, it portrays it as denoting the mode of finance, whether it is equity or debt. It perceives capital structure as a blend or mix of long-term sources of finance which can be used to finance long-term expansion requirements of the firm. Finally, it indicates that capital structure determines the

financial risk of the firm, as the proportion of debt in the firm's capital structure determines its level of gearing.

On other issues relating to capital structure decision, Harris and Raviv (1991) stated that the financing or capital structure decision is a significant managerial decision as it influences the shareholder return and risk. The market value of the share also is affected by the capital structure decision. It is of essence a managerial finance function within the purview of financing decision, and must be performed with utmost care. This is particularly due to the fact that interest on debt capital must be paid at all costs whether profit is made or not; and long-term creditors can commence a winding up proceeding against the firm should it fail in interest payment and eventual capital repayment. The financial risk of the firm is denoted by gearing and measured by debt-equity ratio or debt-capital employed ratio.

A demand for raising funds generates a new capital structure which needs a critical analysis (Bodhanwala, 2003). This is because capital structure decision represents an important financial decision of a business organisation apart from investment decisions. It is important since it involves a huge amount of money and has long-term implications on the firm (Ahmad, Abdullah & Roslan, 2012). There could be hundreds of options but to decide which option is best in a firm's interest in a particular scenario needs to have deep insight in the field of finance as use of more proportion of debt in capital structure can be effective as it is less costly than equity but it also has some limitations because after a certain limit it affects a company's leverage; therefore, a balance needs to be maintained (Muraleetharan, 2013).

Companies keep balance in composition of capital structure. This is very necessary for return of the companies because it attached the level of risk of return if the composition

includes more debt instead of equity which results into the disturbance of cash flows in companies. Therefore, the decision about the composition of capital structure is very hard for the companies and it is an important topic for the scholars of accounting and finance. This is due to the fact that the overall objective of the companies is to reduce the cost of capital when capital structure decision is taken into account in order so that the value of the company is maximized (Younus, Ishfaq, Usman & Azeem, 2014).

To survive and grow any business, capital or resources is needed. But how can business organisations get that capital? Other words, what is the source of finances? Capital structure decision should answer this question. An appropriate capital structure is important not only because of the need to survival and growth or maximizing returns of business organisations, but also because of the impact of such decision on a firm's ability to deal with its competitive environment. Financing and investment are two major decision areas in a firm. In the financing decision, the manager is concerned with determining the best (Birru, 2016).

The decision of how a firm would be financed is subjected to both the managers of the firms and fund suppliers. If financing is done by employing an incorrect combination of debt and equity, a negative effect is seen in the performance and even endurance of a firm. Thus, in order to maximize the firm value, managers need to carefully consider the capital structure decision, which is a complex task, as the use of leverage varies from one firm to another. Therefore, what managers usually do is try to achieve the best combination of debt and equity in their capital structure. In this context, there have been several studies that tried to inspect the affiliation of capital structure with the performance of firms (Siddik, Kabiraj, & Joghee, 2017).

Capital structure is essential on how a firm finances its overall operations and growth by using different sources of funds. Capital structure is a very important financial decision because it is directly related to the risk and return of a firm. Any immature capital structure decision can result in high cost of capital, thereby lowering the firm's value while effective capital structure decision can do the opposite. Capital structure is vital and crucial in the financial management of a firm because capital structure provides insight of a firm's risks. A highly levered firm is a firm that possesses higher level of debt. Thus, the highly leverage firm has much greater risk compared to firms with lower level of debt. In addition, major misjudgment in financing may cause financial distress, liquidation and bankruptcy.

2.1.2 Measurement of Capital Structure

Total debt ratio is one of the measurements of capital structure and it measures the amount of a firm's total assets that is financed with external debt. This measure encompasses all short term liabilities and long-term liabilities (Nwude 2003). He stressed that this measures the firm's assets that are financed by debt. As the total debt ratio increase, so do a firm's fixed-interest charges. If the total debt ratio becomes too high, the cash flow the firm generates during economic recessions may not be sufficient to meet interest payments. The total debt ratio is measured by dividing total debt with the total assets of the firm.

Debt equity ratio is the most common measurements of capital structure and is similar to the debt ratio and relates the amount of a firm's debt financing to the amount of equity financing. It is an indicator of company's financial structure and whether the company is more reliant on borrowing (debt) or shareholders capital (equity) to fund assets and

activities. Debt equity ratio can be determined by dividing shareholder's funds with total debt (Enekwe, Agu & Eziedo, 2014).

Short term debt is another measurement of capital structure which the obligation to pay matures within one accounting year. This measure is very appropriate to be included in the measures of leverage ratio due to it implication which normally revealed when there is occurrence of mismatch of funding by a firm. This may be one of the reasons that led to adoption of different measures of leverage ratio rather than narrow measure of financial structure by some scholars. Thus, mismatching funds is a situation when long term investments are financed by short-term debt rather than long-term debt. Apparently, the occurrence of this is prone to default as payment of interest and repayment of principal may fall due when the proceeds (cash inflow) from the investment are not readily available. The inability of the firm to repay the principal will expose it to the embarrassments resulting from legal actions. This measure however, indicates will magnitude of current liabilities (obligations) to changes in the value of overall assets of a firm. According to Shah and Hijazi (2004), short term debt can be measure by dividing total assets by short term debts.

Another measurement of capital structure is long term debt ratio. Although this method of capital structure is incorporated in the last two measures highlighted above, some analysis generally use this measure because most interest costs are incurred on long-term borrowed funds and because long-term borrowing places multi-year, fixed financial obligations on a firm. Long term debt ratio is measured by dividing long-term debt with the total assets of the firm (Enekwe, Agu & Eziedo, 2014).

2.1.3 Concept of Performance: Meaning and Measurements

Performance is to a large extent expressed in terms of profits and losses and this is observed by how a business performs over a given period of time (Stanwick, 2002). This position however limits performance indicators to profit and profitability aspects. This accounts for the past and present net results of the firm in relation to capital or assets utilised without the consideration of growth prospect that is a measure future performance. According to Erasmus (2008), performance is considered as the best possible way of as to how a firm generates its' revenues through utilization of its assets. This of essence connotes the ability of the firm to utilise the assets or capital at its disposal in generating returns over and over again. This bespeaks return on asset, return on equity and return on capital employed, which require accounting information for computation.

Metcalf and Titard (1976) mentioned that performance in financial perspective involves the act of carrying out financial activity so as to realise the financial objectives within a given time period. It is not only used to determine a given period financial status but also the results of its operations and policies through monetary terms. These measures are important since they can be used for comparison between firms which are on the same or different industry. Performance is firm's ability to generate new resources from its daily procedures, for a certain time period. Performance may also refer to the firms' ability to make good use of their resources in an effective and efficient manner for achievement of the firm's objectives and goals (Warsame, 2016).

According to Kagoyire and Shukla (2016), performance is the firm's ability to efficiently operate, be more profitable, to grow and survive for a long period of time. All organisations strive to utilise their resources effectively to achieve a high performance

level especially in financial terms. Thus, performance is the outcome of any of many different activities undertaken by an organisation (Fujo & Ali, 2016).

In a broader sense, performance refers to the degree to which objectives are being or have been accomplished or used as a general measure of a firm's overall financial health over a given period of time, and can be used to compare similar firms across the same industry or to compare industries or sectors in aggregation (Metcalfand & Tetrad, 1976). However, this study linked performance to financial objectives, as the latter is expressed in quantitative and monetary terms, hence measurable. As such, financial performance is the extent to which a firm can achieve its financial objectives so as to be termed successful.

The firm's future financial performance is influenced by growth (Rajan, 2008). Higher growth also means an increase in future prospect for investors. Economic growth helps a firm to better position itself on the markets, hence having a good competitive advantage against its competitors. Growth prospect may be considered as an asset that adds to a firm's value, but cannot be collateralised and are not subject to taxable income. It therefore, suggested that firms with high-growth prospects will prefer using internally generated funds which is not risky as compared to debt and equity. The rising of external finance is costly due to information asymmetry which might hamper future growth prospect and also reduce future earnings.

Similarly, Muraleetharan (2013) opines that profitability is a measure of the amount by which a firm's revenues exceeds its relevant expenses. Potential investors are interested in dividends and appreciation in market price of stock, so they pay more attention on the profitability ratios. Managers however, on the other hand are interested in measuring the operating performance in terms of profitability. Hence, a low profit margin would

suggest ineffective management and investors would be hesitant to invest in the company. Profitability is the most important factor for managers. Firms with high profitability level are more likely to have better performances. Putting profitability measurement systems in place can be an important way of not only keeping track on the progress of the firm by giving vital information about what is happening now, but also enables such firm to achieve growth.

Further to this, Ahmadinia, Afrasiabishani and Hesami (2012) stated that profitability, as a measure, is the ability of a firm to gain profit through goal-oriented financial plans and decisions. The return on asset (ROA) and return on equity (ROE) are generally applied to measure profitability. Loth (2012) posited that return on equity between 15% and 20% is considered to be good. Debt to equity ratio indicates the percentage of shareholders equity and debt that a firm uses in financing its assets.

Thus, performance is the firm's ability to efficiently operate, be more profitable, to grow and survive for a long period of time. All organisations strive to utilise its resources effectively to achieve a high performance level especially in financial terms (Kagoyire & Shukla, 2016). Thus, financial performance is the outcome of any of many different activities undertaken by an organisation (Fujo & Ali, 2016). In conclusion, The notion of performance is a controversial issue in finance largely because of its multi-dimensional meanings (Birru, 2016).

Measuring is considered to be a simple task despite its specific complications with many researchers preferring to use market measures and others opting for accounting measures (Waddock, 1997). Accounting as a measure usually use historical information of firms' performance which may be subject to managerial manipulation and as such it becomes difficult to compare firms' performance using accounting information especially if

different firms use different accounting procedures. When using accounting measures, different sectors of economy features or characteristics and risk associated with such sectors need to be taken into account. To measure the profitability of firms, there are variety of ratios used of which Return on Asset, Return on Equity and Net Interest Margin are the major ones (Murthy & Sree, 2003; Alexandru *et al*., 2008).

ROE is a financial ratio that refers to how much profit a company earned compared to the total amount of shareholder equity invested or found on the balance sheet. ROE is what the shareholders look in return for their investment. A business that has a high ROE is more likely to be one that is capable of generating cash internally. Thus, the higher the ROE, the better the company is in terms of profit generation. It is further explained by Khrawish (2011) that ROE is the ratio of Net Income after Taxes divided by Total Equity Capital. It represents the rate of return earned on the funds invested in the bank by its stockholders. ROE reflects how effectively a bank management is using shareholders funds. Thus, it can be deduced from the above statement that the better the ROE, the more effective the management in utilising the shareholders capital. ROA is also another major ratio that indicates the profitability of a bank. It is a ratio of income to its total asset (Khrawish, 2011). It measures the ability of the bank management to generate income by utilizing company assets at their disposal.

Ayodeji (2011) pointed out that growth prospects seek to measure persistent increase in the firm's earnings, dividend, equity investment, market capitalisation and assets. Basically, earnings per share will answer earnings growth, dividend per share will account for dividend growth, market price per share will specify equity investment growth, market capitalisation per share will measure market capitalisation growth, and assets per share and/or return on asset will indicate assets growth. Hence, if net profit margin, return on equity and return on assets specifically selected to measure

profitability, earnings per share, dividend per share, market price per share and market capitalisation per share would be selected to measure growth since return on assets is already included in the measurement of profitability.

In other words, it shows how efficiently the resources of the company are used to generate the income. It further indicates the efficiency of the management of a company in generating net income from all the resources of the institution (Khrawish, 2011). Wen (2010) states that a higher ROA shows that the company efficiently uses its resources.

2.1.4 Influence of Capital Structure on Manufacturing Firm Performance

A study of a firm's capital structure and a firm's performance is widely discussed in most of the capital structure theories. The agency theory for free cash flows by Jensen (1986) assumes that the free cash flow available to managers can be reduced through the utilization of debt (Ramadan *et al*., 2012) and consequently will act in the interest of shareholders. However, this theory is not applicable in the case of manufacturing firms as the owner and manager of the firm is not the same individual.

The asymmetric information model by Myers and Majluf (1984) assumes that owner-managers usually have better information about their firms than outside investors. Owing to limited information received by the outsiders, they tend to look at the debt level of the firms. High level of debt indicates that owner-managers are certain about the future of the firm. Conversely, high level of equity indicates the poor performance of the firms as the earnings will fall in the future (Ramadan *et al*., 2012). Ramadan et al. (2012) also stressed that debt mediates the association between determinants of capital structure and firm's performance.

In addition, Miller (1977) asserted that the firms will trade-off between benefit and cost of debt until it reaches the optimal level of debt. An appropriate capital structure mix

may minimize the cost of capital of the firm. This situation will maximize the net returns for the firm that indirectly improves the firm's performance.

Capital is one of the specific factors that influence the level of firms' profitability. Capital is the amount of own fund available to support a firm's business (Athanasoglou *et al.,* 2005). Krishnan and Moyer (1997) pointed out that a list of factors relative to capital structure decisions include profitability, growth of the firm, size of the firm, debt maturity, debt ratio, tax and tangibility the firm had. However, considerations affecting the capital structure decisions can be studied in the light of minimisation of risk. A firm's capital structure must be developed with an eye towards risk because it has a direct link with the value.

The capital structure of a firm directly affects its financial risk, which may be described as the risk resulting from the use of financial leverage. Financial leverage is concerned with the relationship between earnings before interest and taxes and earnings before tax. The more fixed-cost financing, i.e. debt (including financial leases) and preferred stock, a firm has in its capital structure, the greater its financial risk. Since the level of this risk and the associated level of returns are key inputs to the valuation process, the firm must estimate the potential impact of alternative capital structures on these factors and ultimately on value in order to select the best capital structure. Chowdhury and Chowdhury (2010) noted that firms' traditional mode of getting funds at a low cost and the spread between getting funds has reduced. Thus, these activities yielded low profits and firms have started looking for new avenues for increasing their bottom-line. The financial structure and financial performance are also important to firms in determining the financial patterns. For instance, in a study by Omet and Nobanee (2001), large firms held a lot of debt in their capital structure, compared to smaller firms. Such findings

would be useful to firms in finding out which financial patterns they would adopt in the short term and the long term. This helps them organise their firms, accordingly.

2.2 Theoretical Discussions

2.2.1 Determinants of Capital Structure

This section discusses various determinants of capital structure which can either be categorised into internal and external factors. Internal factors are mainly influenced by a firm's management decisions and policy objectives (Staikouras & Wood, 2004), whereas external factors focus on industry- related and macroeconomic variables reflected in the economic and legal environment where firms operate (Athanasoglou, Delis & Staikouras, 2006).

Age of the company appears to be an important factor in determining the capital structure choice. The firm's age means how old a business is in operations. Age determines a firm's reputation gathered from experience over the years which in turn results to goodwill. As firms operate over the years, it establishes and strengthens itself as an ongoing concern which builds its chances to take on more debts. It is, therefore, believed that age is positively related to capital structure of a firm. Age could actually help firms become more efficient. However, old age may also make knowledge, abilities, and skills obsolete and induce organisational decay (Agarwal & Gort, 2002).

Sorensen and Stuart (2000) argued that companies' age affect firms' performances. They further argued that organisational inertia operating in old firms tend to make them inflexible and unable to appreciate changes in the environment. Liargovas and Skandalis (2008) reported that older firms are more skilled since they have enjoyed the benefits of learning and not prone to the liabilities of newness, hence they have a superior

performance. Biener, Eling and Wirfs (2015) asserted that firms with a long history are also likely to be more well-known and to enjoy a good reputation.

Asset structure of a firm plays a very critical function in determining its capital structure. According to Harris and Raviv (1991), the degree to which assets of a firm are tangible should result to greater value for the firm. Also, Bradley, Jarrey and Han Kim (1984) opined that if firms invest maximally in tangible assets, they stand to have greater financial leverage because they borrow at a lower interest rate, if their assets serve as collateral for such loans. Aivazian, Dmirguc-Kunt and Maksimovic (2001) maintained that said the more tangible the firms' assets, the greater its ability to issue secured debts and the less information revealed about future profits.

Profitability is one of the internal determinants of capital structure because it gives a clear indication of business performance. Profitability portrays the efficiency of the management in converting the firm's resources to profits (Muya & Gathogo, 2016). Thus, firms are likely to gain a lot of benefits related to increased profitability (Niresh & Velnampy, 2014). One important precondition for any long-term survival and success of a firm is profitability. It is profitability that attracts investors and the business is likely to survive for a long period of time (Farah & Nina, 2016). Many firms strive to improve their profitability and they do spend countless hours on meetings trying to come up with a way of reducing operating costs as well as on how to increase their sales (Schreibfeder, 2006).

Athula, Anura, Khorshed and Anil (2011) posited that corporate tax have a direct as well as an indirect bearing on capital structure decisions. Interest is paid on debt prior to the calculation of the corporate income tax. Dividends are declared after the tax calculation. This tax policy makes the payment of dividends more costly than the payment of interest

and has severely reduced the number of issues of preferred stock in the recent years (Dang, 2011). A firm with a high probability of having zero tax rates or a firm with high tax shield is less likely to finance with debt. The reason is that tax shields reduce the effective marginal tax rate on interest deduction, while a firm with lower tax yield is more likely to finance with tax.

The size of a firm is also one of the internal determinants of capital structure because it determines the level of diversification of such firm and therefore has easy access to the capital market with higher credit rating for debt issues and pay low interest rate on debt capital. Also, larger firms are less prone to bankruptcy. Rajar and Zingle (1995) stated that larger firms tend to be more diversified. Size also enhances a firm to information outside the organisation which should increase their ability to raise funds. The size of the firm or enterprise also determines the cash flow sensibility to investments (Predescu, 2008). In measuring the size of the firm size, total number of employees of the firm, volume of sales and amount of property are the main factors that are usually measured (Salman & Yazdanfar, 2012).

Jong (2008) argue that a developed bond market can directly affect the usage of higher leverage in a country, while a developed stock market can have the opposite effect. Samarakoon (1999) revealed that the use of debt financing especially long-term debt by firms in developing countries is significantly low. The low use of debt capital is mainly due to the lack of a developed long-term debt market in developing countries.

Onaolapo (2010) avered that a firm that promptly repay its obligation will be at a better position to smoothly operate its activities without any funding constraints, besides, this will also reduce the costs associated with borrowing hence improve performance by cutting cost. However, there are conflicting views when it comes to relating liquidity and

leverage. According to trade off theory, firms that have proper liquidity prefer using external financing since they have the ability to repay the debt and also benefit from tax shields, hence resulting in a positive relation between liquidity and leverage. Conversely, pecking order theory suggests that when financing new investments, the more liquid firms prefer to use the internal funds as compared to external funds, resulting in negative relationship between liquidity and leverage.

The firm's future financial performance is influenced by growth (Rajan, 2008). Higher growth also means an increase in future prospect for investors. Economic growth helps a firm to better position itself on the markets, hence a good competitive advantage against its competitors. Growth prospect may be considered as an asset that adds firm's value, but cannot be collateralized and are not subject to taxable income. According to pecking order theory, firms may utilise internal funds as its initial financing instead of borrowing externally to fund its operations (Watson & Head, 2010). It therefore suggests that firms with high-growth prospects will prefer using internally generated funds which is not risky as compared to debt and equity. Rising of external finance is costly due to information asymmetry which might hamper future growth prospect and also reduce future earnings.

Discussing the external determinants Lee,*et al*(2010) opined that GDP growth, the inflation rate and interest rate have implications for the debt available to firms. The Gross Domestic Product (GDP) is an estimation of total economic activity inside of an economy. The real GDP is the sum of the value added in the economy during a given period or the sum of incomes in the economy during a given period adjusted for the effect of increasing prices (Daferighe & Aje, 2009). Nominal GDP is the determination of GDP without taking into account other factors or variables such as inflation (Business Dictionary, 2013). It is considered as an external determinant of capital structure given

the positive relationship between the development of the economy and the prosperity of the citizen of such country which in-turn enhances the savings that can be used in investing either in stocks or bonds.

Interest rate has direct as well as indirect bearing on capital structure decisions. An increase interest rate weakens loan payment capacity of the borrower therefore capital structure is negatively correlated with the interest rates. As far as interest rate policy is concerned it plays very important role in capital structure in any firm. Discount rate is set by the central bank as per the requirement to offset inflationary pressures (Munib & Atiya, 2013).

An increase in general price level of goods and services in an economy up to a certain extent when a unit of currency buys fewer goods and services is called inflation. An increase in the amount of money in circulation can also be referred as inflation. Consumer price index is used in this study as the proxy of inflation as a most comprehensive measure of inflation defines as a change in the price of consumer goods and services purchased by households. Increase in CPI compels monetary regulators to use contractionary measures by increasing the interest rates to control inflation which later reduces the ability of firms in raising capital structure. Inflation has a negative relationship with ability of firms in raising capital.

2.2.2 Net Income Approach Theory

According to Adesina and Nwidobie (2015), the one line principle of this theory is – a firm increases its value or lowers the overall cost of the capital by increasing the proportion of debt in its capital structure. That means, more the use of debt, lesser will be the overall cost of the capital. There are certain assumptions relating to this theory namely: This theory says that the cost of debt will be lower than cost of equity.

Secondly, cost of debt and cost of equity will be known to us and they will remain constant. The expectation of the shareholders for the revenue by the use of debt will not change. That means EBIT will remain generally fixed. Lastly, taxation will not be there at all.

Meaning of the principle is if the degree of financial leverage increases, the weighted average cost of the capital declines. With every increase in debt content, the total fund employed that will result in increasing the value of firm.

2.2.3 Net Operating Income Approach Theory

According to this approach, Capital Structure decision is irrelevant to the valuation of the firm. The market value of the firm is not at all affected by the capital structure changes. According to this approach, the change in capital structure will not lead to any change in the total value of the firm and market price of shares as well as the overall cost of capital (Adesina & Nwidobie, 2015).

Net Operating Income Approach Theory posits that the weighted average cost of capital and the total value of the firm are independent of one another. It implies that no matter how modest or excessive the firm's use of debt is in financing, the common stock price will not be affected. Riahi-Belkaoni (1999) however states that financial risk is placed on the common stockholders as a result of the decision to use debt financing or financial leverage in the capital structure.

According to the Net Operating Income (NOI) approach, the market value of the firm is not affected by the capital structure changes. The market value of the firm is found out by capitalizing the net operating income at overall, or the weighted average cost of capital (Ke) which is constant.

The market value of the firm (V), is determine by Equation (8)

$$V = (D + S) = \frac{NOI}{Ko} = \frac{X}{Ko}$$

Where ko is the overall capitalization rate and depend on the business risk of the firm. It is independent of financial mix. If NOI and Ko are independent of financial mix, V will be a constant and independent of capital structure changes.

Thus decline in the overall cost of capital by the use of debt will be offset and the overall cost shall be same. This is called implicit cost of equity where with the use of debt expectation of the shareholders increases which in turn increases the cost of equity nullifying the benefit, so overall cost shall be the same.

Now what's the method of computation of value of firm? First of all we have to find out the value of firm by capitalizing net operating income with the cost of capital i.e., overall cost of the capital KO. So formula will be EBIT/KO, it shall give us value of firm. When value of firm is known, we will subtract cost of debt which is known to us so we will get value of equity. Now when value of equity is known we need to find out cost of equity which is represented by Ke. So its formula will be:

Earnings available to equity shareholders or EBIT-I divided by market value of equity which has been determined using the formula V=S+D, we need to interpolate this formula as S=V-D in this approach.

2.2.4 Modigliani and Miller Approach

Modigliani and Miller approach states that the financing decision of a firm does not affect the market value of a firm in a perfect capital market. In other words MM approach maintains that the average cost of capital does not change with change in the debt weighted equity mix or capital structures of the firm (Nikoo, 2015).

Modigliani and Miller, two professors in the 1950s studied capital structure theory intensively. From their analysis, they developed the capital structure irrelevant proposition. They do not agree with the traditional view. The argued that, in perfect capital markets without taxes and transaction costs, it does not matter what capital structure a company uses to finance its operations (Muritala, 2012). They theorized that the market value of a firm is determined by its earning power and by the risk of a firm underlying assets, and that the value is independent of the way it chooses to finance its investments or distribute dividend.

In their 1958 article, they provide analytically sound and logically consistent behavioural justification in favour of their hypothesis and reject any other capital structure theory as incorrect (Idigbe, 2006).

Assumptions:

The MM hypotheses can be best explained in terms of their two propositions. It should be noted that their proposition are based on certain assumptions as described below, particularly relate to behaviour of investors and capital market, the actions of the firm and the tax environment.

Perfect capital markets securities (shares and debt instruments) are traded in the perfect capital market situation. This specifically means that; investors are free to buy and sell securities, they can borrow without restriction at same terms as the firms do and they behave rationally, it is also implied that the transaction cost i.e cost of buying and selling securities do not exist.

Homogeneous risk classes: Firm can be grouped into homogeneous risk classes. Firms would be considered to belong to a homogeneous risk class if their expected earnings have identical risk characteristics. It is generally implied under the M-M hypothesis that firms within same industry constitute a homogeneous class (Akinyomi, 2013).

Risk: the risk of investors is defined in terms of the variability of the net operating income (NOI). The risk of investor depends on both the random fluctuations of the expected NOI and possibility that the actual value of the variable may turn out to be different than their best estimate. No Taxes: in the original formulation of their hypothesis, M-M assume that no corporate income taxes exist. Full payout: Firms distribute all net earnings to the shareholders, which mean a 100% payout.

2.3 Theoretical Review

Various theories exist in literature that justifies the impact of capital structure on companies' performance. These theories present diverse views of firms' management and further incorporate mechanisms that the firm employ in order to enhance the performance of the organisation.

The Modigliani and Miller (M & M) (1958; 1963) model being the pioneer of the theories has been repeatedly referred to when researching the capital structure theories. Studies such as Bokpin and Isshaq (2008), Salawu and Agboola (2008), Adeyemi and Oboh (2011), Mohohlo (2013) and Pagano (2005) reviewed most theorems based on the Modigliani and Miller model and their relevance. An understanding of capital structure theory will enable management to make the best decision on the financing of the firm. Myers (1984; 2001& 2003) who happened to be one of the researchers on capital structure stated that there is no universal theory of the debt-equity choice and no reason to expect one. There are numerous theories on the subject and although the theory does not provide all the needed answers, it provides useful insights which will aid management in their decision making process (De Wet, 2013). These theories were therefore reviewed in details below.

2.3.1 Trade-Off Theory of Capital Structure

The trade-off theory of capital structure states that a firm's choice of its debt–equity ratio is a trade-off between its interest tax shields and the costs of financial distress. The trade-off theories suggest that firms in the same industry should have similar or identical debt ratios in order to maximise tax savings. The tax benefit among other factors makes the after-tax cost of debt lower and hence the weighted average cost of capital will also be lowered. Brigham and Gapenski (1996) argued that an optimal capital structure can be obtained if there exist tax benefit which is equal to the bankruptcy cost. It can be concluded that there is an optimal capital structure where the weighted average cost of capital is at its minimum.

However, as a firm leverage ratio rises, tax benefits will eventually be offset by increased bankruptcy cost. The trade-off theory sought to establish an optimal capital structure where the weighted average cost of capital will be minimised and the firm value maximised. At the optimal level of capital structure, tax benefit will be equal to bankruptcy costs.

2.3.2 Agency Theory of Capital Structure

The agency cost theory of capital structure emanates from the principal-agent relationship which was propounded by Jensen and Meckling (1976). The theory suggests a level of optimal debt in capital structure by minimizing the agency costs arising from divergent interests of managers and debt holders. In order to moderate managerial behavior, debt financing can be used to mediate the conflict of interest which exists between shareholders and managers one hand and also between shareholder and bondholders on the other hand. The conflict of interest is mediated because managers get debt discipline which will cause them to align their goals to shareholders goals.

Jensen and Meckling (1976) and Jensen and Ruback (1983) argued that managers do not always pursue shareholders' interest. To mitigate this problem, the leverage ratio should increase (Pinegar & Wilbricht, 1989). This will force the managers to invest in profitable ventures that will be of benefit to the shareholders. If they decide to invest in non-profit tax businesses or investment and are not able to pay interest on debt, then the bondholders will file for bankruptcy and they will lose their jobs. The contribution of the Agency cost theory is that, leverage firms are better for shareholders as debt can be used to monitor managerial behavior (Boodhoo, 2009). Thus, higher leverage is expected to lower agency cost, reduce managerial inefficiency and thereby enhancing firm and managerial performance (Jensen 1986, Koehhar 1996, Aghion, Dewatnipont & Rey, 1999).

2.3.3 Irrelevance and Relevance Theory

This theory was propounded by Modigliani and Miller (MM) in 1958. They opined that capital market is assumed to be perfect in Modigliani and Miller's world, where insiders and outsiders have free access to information; bankruptcy cost no transaction cost, and no taxation exist; equity and debt choice become irrelevant and internal and external funds can be perfectly substituted. The M-M theory (1958) argues that the value of a firm should not depend on its capital structure. The theory argued further that a firm should have the same market value and the same Weighted Average Cost of Capital (WACC) at all capital structure levels because the value of a company should depend on the return and risks of its operation and not on the way it finances those operations (Akeem, Edwin, Kiyanjui & Kayode, 2014).

Modigliani and Miller modified an earlier capital structure irrelevance theory in which they argued that capital structure really does matter in determining the value of a firm.

The theory was based on the argument that the use of debt offers a tax shield. Based on this assertion, firms could opt for an all-debt capital structure. According to Brigham and Gapenski (2004), Miller-Modigliani (M-M) model is true only in theory, because in practice, bankruptcy costs exist and will even increase when equity is traded off for debt. This theory is important in this study because firm must evaluate the capital structure in order not to reduce the value of the firm which may further affect the performance of the firm.

2.4 Empirical Review

2.4.1 Review of Empirical Studies from Developed Countries

There were many empirical studies undertaken by scholars on capital structure choices in developed nations. Among the scholars who have studied the capital structure issue in developed nations include Krishnan and Moyer (1996). They examined the determinants of capital structure of large corporation of industrialised countries. Data was collected from 1993 on Disclosure Worldscope of non-regulated corporations having total assets of over 5 billion dollars. The sample of 283 firms was selected for this purpose which consisted of 96 US companies, 71 from Japan, 25 from the UK, 22 each from Germany and France and 47 from other countries. Regression analysis was performed to analyse the data. The result appeared that corporations from Germany had lower leverage ratio than U.S. corporations but corporations from Italy had relatively higher leverage ratio than U.S corporations. Because of close ties between Japanese firms and banks, corporations in Japan used more than short-term debt than long-term debt. Hence, the long-term leverage ratio for Japanese corporations appeared to be smaller than others. It is evidenced from the research that the variables affecting the U.S. companies on capital structure were also similarly affecting companies from other countries. Apart from that,

profitability was seen as major determinant of leverage. The firm size and growth were also proven to be significant variables in explaining capital structure variations.

Antoniou, *et al* (2002) studied the determinants of corporate capital structure of European countries. Firms from UK, France and Germany for the period from 1960 till 2000 were analyzed. Both firm specific variables, institutional and macroeconomic factors were examined. Among the independent variables examined in their model were profitability ratio, effective tax rate, market to book ratio, fixed assets ratio, size of the firm, liquidity ratio, earnings volatility, market equity premium, term structure of interest rates and change in share prices. The results showed that firms adjusted their leverage ratios to achieve their target capital structure and this compiled with the static trade-off theory of capital structure. Leverage was positively affected by the size of the firm for all the three countries. Market to book ratio, term structure of interest rate and share price performance was negatively related to leverage. When the interest rate is high, firms generally used less debt and when share price decline or when lower stock performance experience by firms, they tend to use more debt until the stock price signal good rise. Inverse relations were noted between profitability and market to book ratio with leverage respectively in France and the UK. Tangibility of assets with leverage appeared positive in Germany, insignificant in France and negative in the UK. This suggested that asset tangibility was an important element for borrowing in Germany. Liquidity and volatility in earnings appeared insignificant in affecting leverage in Germany, France and the UK.

In another study from the Spanish dataset, Padron *et al* (2005) examined 65 non-financial listed corporations in the Spanish stock exchange from 1990 till 1999. The balance sheets and the companies share closing price at 31 December each year were extracted from the Comision Nacional del Mercado de Valoners and the Madrid Stock Exchange respectively. Six factors were examined empirically to see their influences on

capital structure namely, firm size, generated resources, level of warrants, cost of debt, growth opportunities and firm reputation (number of years of age). The results indicated that only the firm reputation (age of firm) seemed to be insignificant. Size and level of warrants showed a positive relation with leverage while generated resources cost of debt and growth opportunities indicated negative relationship with leverage.

Gaud *et al*. (2006) conducted a comprehensive study on capital structure choice covering 13 European countries that included the United Kingdom, France, Germany, Sweden, Italy, Netherlands, Switzerland, Norway, Denmark, Spain, Belgium, Finland and Australia. This study was somewhat different from previous studies in the Europe such that here, three theories of capital structure namely, the trade-off theory, pecking order theory and agency costs model were tested through a panel analysis of firm specific determinants of capital structure choice. A panel data of 5,074 firms for the period from 1988 till 2000 was analysed. It was noted that debt levels around Europe are fairly homogenous, with the range between 0.207 and 0.388. The lowest and the highest leverage are seen in UK and Norway respectively. The effect of firm size and asset tangibility on leverage turned out to be positive as expected and this supports the trade-odd theory of capital structure. Negative association was noted with leverage for the effect of return on asset and cash for all the European countries in the sample which supports the pecking order hypothesis of capital structure. The growth opportunities also showed a negative coefficient and this compiled with the static trade-off theory. Another point earned from this study was that profitable firms prefer increasing dividends rather than decreasing debt levels with supports the agency cost theory.

Kleff and Weber (2004) examined the determinants of capital structure of German banks during the period of 1992 and 2001. The study found out that capitalized banks try to maintain their regulatory buffer capital due to potential regulatory costs. They observed

changes in portfolio risk have a positive and significant impact on changes in the capital ratio for savings banks. They further noticed that banks increase capital and decrease portfolio risk to rebuild their capital buffer. Kleff and Weber provided evidence that banks' profitability has a positive and significant impact on the target capital ratio for savings and cooperative banks.

Margaritis and Psillaki (2009) explored the relationship between capital structure, equity ownership and firm performance in New Zealand. The results showed that the effect of leverage on firm performance as well as the reverse causality relationship while controlling for the effects of ownership structure and ownership type. The study also found that more concentrated ownership is generally associated with more debt in the capital structure. However, the study found no evidence that ownership type has an effect on leverage choices.

Lin *et al*., (2011) used a large sample of U.S. firms during the period of 1994–2002, find that the shadow value of external funds is significantly higher for companies with a wider insider control-ownership divergence, suggesting that companies whose corporate insiders have larger excess control rights are more financially constrained. The study also showed that the effect of insider excess control rights on external finance constraints is more pronounced for firms with higher degrees of informational opacity and for firms with financial misreporting, and is moderated by institutional ownership. In addition, their results show that the agency problems associated with the control-ownership divergence can have a real impact on corporate financial and investment outcomes.

Lin *et al*. (2010), using a new, hand-collected data set on corporate ownership and control of 3,468 firms in 22 countries during the 1996–2008 period, found that the cost of debt financing is significantly higher for companies with a wider divergence between

the largest ultimate owner's control rights and cash-flow rights. The results suggested that potential tunnelling and other moral hazard activities by large shareholders are facilitated by their excess control rights. These activities increase the monitoring costs and the credit risk faced by banks and, in turn, raises the cost of debt for the borrower.

Criticism of Empirical Studies in Developed Countries

Previous studies were based on correlation and ordinary least square analysis while this study employed fixed effect and pooled OLS. Similarly, the previous studies only measured relationship between the capital structure indices and financial performance indicators. However, none of the previous considered the causal relationship between different nature of capital structure and performance of manufacturing firms in Sub-Saharan countries.

2.4.2 Review of Empirical Studies from Developing Countries

Booth, *et al* (2001) studied the determinants of capital structure in 10 developing countries, namely India, Pakistan, Thailand, Malaysia, Turkey, Zimbabwe, Mexico, Brazil, Jordan and Korea. The balance sheet and income statements data was collected from the International Finance Corporations (IFC) and stock prices for a maximum of 100 largest publicly traded firms in each country were also collected for a period from 1980 to 1991. Three main important ratios which are the total debt ratios, long-terms book-debt ratios and long-term market-debt ratios were calculated from the data collected. The independent variables examined in their model include tax rates, business risk, asset tangibility, natural logarithm of sales, return on assets and marker-to-book ratio. From their analysis, they concluded that the variables that explained the capital structures in developed nations were also relevant in the developing countries irrespective of differences in institutional factors across these developing nations. The

same type of variables, which affect developed nations, were significant in developing nations too. However, the research scholars have identified some systematic differences in the way these ratios were affected by GDP growth rates, inflation rates and the development of capital markets.

Bhaduri (2002) studied the capital structure decision in Indian corporate sector. The balance sheets from 1989 till 1995 from 363 manufacturing firms in India with nine types of industries were collected from the Centre for Monitoring Indian Economy (CMIE) database. Three measures of leverages that were calculated include total borrowing to asset ratio, long-term borrowing to asset ratio and short-term borrowing to asset ratio. The independent variables examined in this study include asset structure, non-debt tax shield, firm size, financial distress, growth, profitability, age, signaling and uniqueness. From the analysis, firms with large size depend more on the long-term borrowing while the small firms depend more on short-term borrowings. Firms with high growth opportunities would like to increase their long-term debt taking capacity. The measure of profitability seemed to be significant for the short-term and total borrowings but not for long-term borrowing. The asset structure showed that there was no association between share of fixed assets and short-term borrowings as theory recommends that they do with collateral argument.

A recent study on Asian countries was attempted by Deeosomsak *et al* (2004). Firms operating in four countries in the Asia Pacific region, namely Malaysia, Thailand, Singapore and Australia were sampled in this study. All the four countries selected were different in respect of the legal traditions, financial markets, bankruptcy codes and corporate ownership structure. The financial information was gathered from the respective country's national stock analysis covering a period 1993 till 2001. The sample study consists of 294 Thai, 669 Malaysia, 245 Singapore and 219 Australian firms.

Using a cross-sectional framework, industrial firms leverage ratios were modeled as a fraction of the firm specific factors namely, tangibility, profitability, firm size, growth opportunities, a non-debt tax shield, liquidity, earning volatility and stock price performance. The effect of country specific variables was also tested here and they include the degree of stock market's activity, level of interest rates, legal protection of creditor right and ownership concentration.

The results revealed that Thai and Malaysian firms were highly leveraged while the lowest revealed by Australian firms. Tangibility of assets was positively related in Australia and appeared to be insignificant for other countries. This is explained by Australia being the country which has the lowest level of protection of creditors and it is rational for Australian lenders to request for some extra security. Profitability showed a negative relationship with leverage only for Malaysia and remained insignificant for other three countries. Firm size showed a positive impact on leverage in all selected countries except Singapore while growth opportunity appeared to be negatively correlated with leverage for Thailand and Singapore and insignificant for Australia and Malaysia. The non-debt tax shields, liquidity and share price performance showed significant negative relationship leverage for all the four countries. Earnings volatility appeared to be insignificant for all the countries and this may be according to the authors firms ignoring risk when cost of entering liquidation is low.

Baral (2004) explored determinants of capital structure of financial institutions in Nepal Stock Exchange as of July 2003. The study provided evidence that size of the financial institutions has statistically significant influence on financial leverage which is consistent with the theoretical relation explained by the bankruptcy costs theory. The study found growth rate has positive relationship with leverage ratio suggesting high significant coefficient of relation postulated by pecking order theory. It was further observed that

financial institutions do not care of their debt service capacity but do care about the expansion of their businesses.

Raheman, Zulfiqar and Mustafa (2007) conducted research on 94 non final companies listed on the Islamabad Stock Exchange (ISE) and used data from 1999 to 2004. Pearson's correlation and regression analysis were used to find relationship between capital structure and firm profitability. It was revealed that capital structure does impact firm profitability. Pouraghajan, Malekian, Emamgholipour, Lotfollahpour and Bagheri (2012) studied 400 companies from 12 sectors listed on the Tehran Stock Exchange (TSE). The study found that there was a significant relationship between capital structure and firm performance. Nirajini and Priya (2013) used data of trading companies listed in Sri Lanka from year 2006 to 2010 and with the aid of correlation and multiple regression analysis the study found that there is a significant relationship between capital structure and firm performance.

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

In Pakistan, Abdul (2010) involved 36 engineering sector firms in Pakistani market listed on the Karachi Stock Exchange (KSE) during the period 2003-2009 and applied Pooled Ordinary Least Square regression. The results showed that financial leverage measured by short term debt to total assets (STDTA) and total debt to total assets (TDTA) had a significantly negative relationship with the firm performance measured by Return on

Assets (ROA), Gross Profit Margin (GM) and Tobin's Q. The relationship between financial leverage and firm performance measured by the return on equity (ROE) is negative but insignificant. Asset size has an insignificant relationship with the firm performance measured by ROA and GM but negative and significant relationship exists with Tobin's Q. Firms in the engineering sector of Pakistan are largely dependent on short term debt but debts are attached with strong covenants which affect the performance of the firm.

Ahmad (2010) examined the influence of capital structure on firms' performances of firms listed as consumers and industrial sectors in Malaysian equity market from 2005 to 2010. The study used return on equity (ROE) and return on asset (ROA) to measure firm performance and to measure capital structure they use long-term debt (LTD), short-term debt (STD), and total debt (TD). The study results that each of debt level has significant negative relationship with ROE, while ROA has significant positive relationship only with STD and TD.

Puwanenthiren (2011) carried out an investigation on capital structure and financial performance of some selected companies in Colombo Stock Exchange between 2005-2009. Capital structure was surrogated by debt while performance was proxy by gross profit, net profit, return on investment/capital employed and returns on assets. The study employed multiple regressions to analyse the data. The results shown the relationship between the capital structure and financial performance is negative.

Ong and Teh (2011) investigated on the capital structure and firms performance of construction companies for a period of four years (2005-2008) in Malaysia. Long term debt to capital, debt to asset, debt to equity market value, debt to common equity, long term debt to common equity were used as proxies as the independent variables (capital

structure) while returns on capital, return on equity, earnings per share, operating margin, net margin were used to proxy the corporate performance. The result shows that there is relationship between capital structure and corporate performance.

Khalaf (2013), using a sample of 45 manufacturing companies listed on the Amman Stock Exchange, covered a period of five (5) years from 2005-2009. Multiple regression analysis was applied on performance indicators such as Return on Asset (ROA) and Profit Margin (PM) as well as Short-term debt to Total assets (STDTA), Long term debt to Total assets (LTDTA) and Total debt to Equity (TDE) as capital structure variables. The results showed that there is a negative and insignificant relationship between STDTA and LTDTA, and ROA and PM; while TDE is positively related with ROA and negatively related with PM. STDTA is significant using ROA while LTDTA is significant using PM.

Tifow and Sayilir (2015) examined capital structure and firm performance so as to establish if there exists any relationship. This study was conducted within the framework of 2008 and 2013 on 130 manufacturing firms listed on Borsa Istanbul and panel data analysis was used. The methodology used was multiple regression analysis. The study revealed that leverage has a negative significant association with performance of the firm.

Basnet (2015) explored whether standard determinants of capital structure such as profitability, assets tangibility, size, collateral, business risk dividends, GDP growth and inflation impact the capital structure of Nepalese commercial banks. Using multiple regressions, the study revealed that internal factors were significant determinant of capital structure. The study concluded that standard determinants of banks' capital

structure do affect the market leverage of the banks and capital structure theories-trade-off and pecking order are complementary for the Nepalese commercial banks.

Criticism of Empirical Studies in Developing Countries

Previous studies focused on debt-equity ratio and debt-assets ratio while ignoring the essence of debt-capital employed ratio, which was a consideration of debt in relation to the total capital employed in the firm. Previous studies were based on correlation and ordinary least square analysis while this study employed fixed effect and pooled OLS. Similarly, the previous studies only measured relationship between the capital structure indices and financial performance indicators. However, none of the previous considered the causal relationship between different nature of capital structure and performance of manufacturing firms in Sub-Sahara countries.

2.4.3 Review of Empirical Studies from Sub-Saharan Countries

Onaolapo and Kajola (2007) investigated the influence of capital structure on firms' financial performance and applied on non-financial firms listed on Sub-Saharan African Stock Exchange from the period of 2001 to 2007. To examine capital structure on firm performance, it used Debt Ratio (DR), Return on Assets (ROA) and Return on Equity (ROE). The study found that capital structure had a significantly negative impact on financial firm performance.

Ibrahim (2009) examined the relation between leverage and firms' performance in financial perspective in Egypt using multiple regression analysis. The study concluded that capital structure had no effect on firms' performance in financial perspective. Ebaid (2009) conducted a study on the impact of capital structure choice on firms in Egypt. The findings of the study revealed that financial performance was negatively influenced by

short term debt and total debt but there wasn't any significant relationship with long term debt.

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

Anarfo (2015) examined the relationship between capital structure and bank performance in Sub-Sahara Africa. The study employed the use of panel data techniques. The performance variables used in the study were return on asset (ROA), Return on equity (ROE) and net interest margin (NIM). The results revealed that capital structure did not determine bank performance but rather it was performance that determined banks capital structure.

Akeem, Edwin, Kiyanjui and Kayode (2014) conducted a study on the effect of capital structure on firm's performance with a case study of manufacturing companies in Sub-Saharan Africa from 2003 to 2012. Descriptive and regression research technique were employed to consider the impact of some key variables such as total debt to total asset (TD), total debt to equity ratio (DE) on firms' performance. Secondary data was employed using data derived from ten (10) manufacturing companies. From the findings, the study observed that capital structure measures (total debt to total assets and debt to equity ratio) were negatively related to firms' performances.

Osuji and Odita (2012) carried out a study on the impact of capital structure on financial performance of Sub-Saharan African firms using a sample of thirty non-financial firms

listed on the Sub-Saharan African Stock Exchange during a seven year period of 2004 – 2010. Panel data was employed as a method of estimation. The result revealed that a firm's capital structure had a significantly negative impact on the firm's financial measures (Return on Asset, ROA, and Return on Equity, ROE).

Taiwo (2012) examined ten firms listed on the Sub-Saharan African Stock Exchange for a period of five years (2006-2010) from the static trade-off, pecking order and agency theory point of view. The study employed Panel Least Square test and revealed that the sampled firms were not able to utilise the fixed asset composition of their total assets judiciously to impact positively on their firms' performance.

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

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

Migiro and Abata (2016) investigated capital structure and firm performance of the Sub-Saharan African firms with an aim of ascertaining if there was any relationship between them. A sample of 30 listed firms was examined between 2005 and 2014 and multiple regressions were used. A significantly negative relation between debt/equity mix and ROE was revealed from the study's findings.

Criticism of Empirical Studies in Sub-Saharan Countries

Several studies in Sub-Saharan countries considered a single country analysis neglecting the effect on a cross-country thereby employing correlation and ordinary least square analysis while ignoring the fixed effect and pooled OLS. Furthermore, previous studies focused on debt-equity ratio and debt-assets ratio while ignoring the essence of debt-capital employed ratio, which is a consideration of debt in relation to the total capital employed in the firm. Similarly, the previous studies only measured relationship between the capital structure indices and financial performance indicators. However, none of the previous considered the causal relationship between different nature of capital structure and performance of manufacturing firms in Sub-Sahara countries.

2.4.4 Review of Empirical Studies in Ghana

In Ghana, Abor (2007) compared the determinants of capital structure of SMEs and listed firms in Ghana. The study sampled all firms that were listed on the Ghana Stock Exchange (GSE) during the six-year period 1998 - 2003. Twenty two firms were included in the study sample. The SME sample was selected from the Association of Ghana Industries' and the National Board for Small Scale Industries' databases of firms. A total of one hundred and sixty firms having fewer than a hundred employees were included in the study. The study found out that age of the firm had statistically significant positive relationships with long-term and total debt ratios among SMEs.

However in the case of quoted firms, the results revealed a statistically significant negative association between age and long-term debt ratio.

Dokua *et al*(2011) explored the relationship between financial market development and choice of finance (debt-equity) of listed firms in Ghana in a panel data framework. The core concern of this study was to test whether debt and equity finance were complements or substitutes. The study used panel data which involved pooling of twenty-one listed firms on the Ghana Stock Exchange (GSE) over the period 1995-2005. The study found evidence of complementarities between banking and stock market developments in financing decisions of listed firms in Ghana. The stock market development was indicated to have a positive effect on the capital structure decisions of listed firms. However, substitution effect between debt and equity mainly in favour of equity financing sets in as the financial landscape develops further. This finding emphasized the important role equity markets in developing countries played in capital structure of listed firms.

In a more recent study, Oppong-Boakye *et al*. (2013) investigated the determinants of capital structure using dataset from 33 listed and non-listed companies during the period of 2003-2007 in Ghana. A multiple regression analysis of pooled-cross sectional and time-series observations was employed in the analysis. The results identified long-term debt to be irrelevant component of capital structure of large unquoted and quoted firms in Ghana as there was a greater reliance on equity. Furthermore, profitability, size, business risk and tangible assets had a positive correlation with level of gearing of companies in Ghana. Nevertheless, growth and tax indicated a negative correlation with the level of gearing.

Criticism of Empirical Studies in Ghana

Studies in Ghana considered a single country analysis neglecting the effect on a cross country thereby employing correlation and ordinary least square analysis while ignoring the fixed effect and pooled OLS. Furthermore previous studies focused on debt-equity ratio and debt-assets ratio while ignoring the essence of debt-capital employed ratio, which is a consideration of debt in relation to the total capital employed in the firm. Similarly, the previous studies only measured relationship between the capital structure indices and financial performance indicators. However, none of the previous studies considered the causal relationship between different nature of capital structure and performance of manufacturing firms in Sub-Saharan countries.

2.4.5 Review of Empirical Studies in Nigeria

Agboola and Salawu (2008) carried out a study on the determinants of capital structure non-financial listed firms in Nigeria and found that profitability has a positive relationship with debt of large firms in Nigeria, and also that the large and profitable firms prefer debt because of the tax saving advantage. The results of the study also show that the large firms prefer short-term debt to long-term debt financing and also that relationship between tangibility and long-term debt ratios was significantly positive, thus showing the importance of collateral in the issue of debt finance. Size of the firm also showed a statistically significant and positive relationship with total debt and short-term debt.

Akintoye (2008), in a research on the sensitivity of performance to capital structure in selected Food and Beverage companies in Nigeria, used performance indicators such as the EBIT (earnings before interest and tax), EPS (earnings per share), and DPS (Dividend per share) and the level of turnover as a performance measure of capital

structure of these companies. Results from the research showed that for most of the companies analyzed, their EBIT, EPS and DPS were sensitive to capital structure. In other words, an increase in turnover reflected a corresponding increase in EBIT, EPS and DPS and vice versa.

Ezeoha and Okafor (2009) evaluated how local ownership of firms influenced capital structure decisions in Nigeria. Results from the paper showed that the discrimination between domestic and foreign firms played a big role in determining level of financial leverage in Nigeria, it also showed that local firms in the country had more total debts than foreign firms, while the foreign firms which were more diversified were considered as larger in size, more profitable and relied more on long-term financing. Overall, this paper showed that the inadequacy in access to the capital market in Nigeria was a major reason why most domestic firms relied on more short-term debts and internal capital and thus, these firms capital decision structures conform to theories that support short-term financing systems.

In another study, David and Olorunfemi (2010) examined the relationship between capital structure and corporate performance in the Nigerian petroleum industry. The study used the earnings per share (EPS) and dividend per share (DPS) as performance indicators, and results showed that the relationship between the EPS and the leverage ratio was positive implying that an increase in leverage ratio would lead to an increase in EPS, the paper also showed that there exists a positive relationship between the DPS and the leverage ratio, thus showing that debt has a huge impacts on performance in the Nigerian petroleum industry.

Finally, Oladimeji (2012) examined the determinants of capital structure of non-financial listed firms in Nigeria. The research was conducted using panel data methodology for a

sample of 20 firms listed on Nigerian Stock Exchange during 2006-2010. The results showed that the major determinants of capital structure based on this study include: profitability, tangibility and liquidity. Age, size and tangibility play determining roles in accessing long-term debt finance within the Nigerian context.

Babalola (2014) involved 31 manufacturing firms in Nigeria with audited financial statements for a period of fourteen years (1999-2012) from static trade-off point of view. He employed the triangulation analysis and the study revealed that capital structure is a trade-off between the costs and benefits of debt, and it had been refuted that large firms are more inclined to retain higher performance than middle firms under the same level debt ratio.

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

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

there was a significant relationship between capital structure and financial performance using both return on asset and return on equity.

Criticism of Empirical Studies in Nigeria

The studies in Nigeria were done over five years while ending the investigation by 2014 without considering other events that has occurred hence this study will broaden the body of knowledge body of knowledge by considering eleven years from 2006 – 2016. Furthermore, this study considered cross country investigation thereby employing fixed effect and pooled OLS. This study focused on debt-equity ratio and debt-assets ratio while ignoring the essence of debt-capital employed ratio, which is a consideration of debt in relation to the total capital employed in the firm. Similarly, the previous studies only measured relationship between the capital structure indices and financial performance indicators. However, none of the previous studies considered the causal relationship between different nature of capital structure and performance of manufacturing firms in Sub-Sahara countries.

2.4.6 Review of Empirical Studies in South Africa

In the case of South Africa, Correia and Cramer (2008) (hereafter CC) surveyed 28 CFOs in all sectors of the JSE. Although they give little attention to the capital structure question (only addressing the target debt equity ratio), they find that most firms have a loose debt-equity target ratio, and that the target debt-equity ratios are lower than predicted by the Static Trade-Off theory. Bargon and Gossel (2011) find empirically that South African firms' behaviour is consistent with the Pecking Order theory and a inconsistent with the Static Trade-Off theory.

Mans and Erasmus (2011) perform a time-series cross-section regression procedure on JSE listed industrial firms over the period 1989 to 2008, analyzing the impact of internal

and external factors on firms financing decisions. Although they find support for both the Pecking Order and Static Trade-Off theories, they also report that profitability played a more significant role in the capital structure decision than tax effects. Hence, their results are more consistent with the Pecking Order theory.

Gwatizdo and Ojah (2009) used a panel data regression model and similarly found that profitability was a major factor in South African firm's financing decision, thus once again supporting the Pecking Order theory.

Hence, the empirical literature suggests that South Africa capital structure decisions are consistent with those of other emerging markets in supporting the Pecking-Order theory. However, the results are inconclusive as to date there is no in-depth capital structure specific survey study based on Graham and Harvey (2001) tailored to the South African context. Thus this study seeks to fill this gap in the literature by conducting such a study.

Criticism of Empirical Studies in South Africa

Few studies were conducted in South Africa on capital structure and performance of firms. However, the few studies were conducted on debt-equity ratio and debt-assets ratio while ignoring the essence of debt-capital employed ratio, which is a consideration of debt in relation to the total capital employed in the firm. Previous studies were based on correlation and ordinary least square analysis while this study employed fixed effect and pooled OLS. Similarly, the previous studies only measured relationship between the capital structure indices and financial performance indicators. However, none of the previous considered the causal relationship between different nature of capital structure and performance of manufacturing firms in Sub-Sahara countries.

2.4.7 Review of Empirical Studies in Kenya

Banafa (2015) conducted a study on manufacturing sector in Kenya focusing on capital structure effects and profitability. Convenience sampling was adopted in the study and the study revealed that capital structure has a significant positive effect on firms' performance. Amenya (2015) conducted a research on capital structure and firms performance in financial perspective in Kenya so as to determine their relationship for a six years period from 2008-2013. The study population was 61 firms listed at the NSE but the study narrowed to a sample of 26 firms using the random selection sampling technique. The study revealed that when financial leverage is increased, there exist negative effects on performance of the firm.

Muhoro (2013) examined the effect of capital structure decisions on performance in financial perspective of construction and allied firms listed at Nairobi Securities Exchange from 2003 – 2012. The population used in this study was five listed construction and allied companies. The relationship was established using multiple linear regression model. The study established a positive relation between total debt, long term debt, short term debt, size, sales growth and return on equity.

Tale (2014) carried out a study to establish capital structure and performance relationship. The study covered the period of 2008 to 2013 on 40 non-financial firms listed at the Nairobi Securities Exchange. Analysis was done using regression analysis model and the study's findings revealed a positive insignificant relationship between financial performance and tangible assets was established.

Yabs (2015) examined capital structure and performance in financial perspective for Kenyan real estate firms so as to determine their relationship. The focus of the study was on a sample size of 28 real estate firms for a period of five years. Regression analysis was used and the findings from the study was a positive effect between capital structure and firm's performance in financial perspective.

Criticism of Empirical Studies in Kenya

Studies in Kenya were done over five years while ending the investigation by 2014 without considering other events that has occurred hence this study will broaden the body of knowledge body of knowledge by considering eleven years from 2006 – 2016. Furthermore this study considered cross country investigation thereby employing fixed effect and pooled OLS. This study uniquely focused on debt-equity ratio and debt-assets ratio while ignoring the essence of debt-capital employed ratio which was a consideration of debt in relation to the total capital employed in the firm. Previous studies were based on correlation and ordinary least square analysis while this study employed fixed effect and pooled OLS. Similarly, the previous studies only measured relationship between the capital structure indices and financial performance indicators. However, none of the previous studies considered the causal relationship between the different nature of capital structure and performance of manufacturing firms in Sub-Saharan countries.

2.4.8 Summary of Empirical Review

S/N	Authors	Year	Objective	Method	Conclusion/Findings
1.	Krishim and Moye	1996	Examined determinants of capital structure of king Corporations of industrialized countries	Regression Analysis	The study concluded that corporations from Germany had lower average ratio them US corporations Japanege films used more short term fund resulting in smaller leverage ratio. Similar variables were seen affecting companies from various countries while profitability was a major determinant of leverage.
2.	Antoniou et.al	2002	Examined determinants of corporate capital structure of eruption countries	Poled Data observation	The study found that firms adjusted their leverage ratios to achieve through capital structure in thunder with static trade-off theory, and concluded that leverage was positively affected by size of the firms for all countries while market book ratio, term structure of interest rate and share price were negatively related to leverage.
3.	Pardon et al	2005	Examined factors influencing capital structure	Pooled ordinary least square	The study found that size and level of warrants should a significant positive relationship with leverage while generated resources, cost of debt and growth opportunities indicated negative relationship. Firm reputation seemed to be in significant
4.	Delcouve	2006	Examined the determinants of capital structure choice & Eastern Europe countries	Panel data analysis involving consideration and making choice many fixed effects model kingdom effect model and pooled effect model.	The result showed that the average debt ratio for Poland, Slorakia Czech Republic and Russia 0.56 0.51, 0.43 and 0.34 respectively. The low long term debt to asset ratio suggests that companies in the country were mainly financed by equity.
5.	Guad et.al	2006	Examined firm specific determinants of capital structure choice in 13 European countries.	Panel data analysis	The study found that debt levels around Europe are fairly homogenous with the ** between 0.2001 & 0.388 the effect of firm size and asset tangibility on leverage turned out positive while a negative association was noted in leverage for the effect of return on asset and cash. Similarly, growth opportunities also showed a negative effect on leverage.
6.	Kleff and Weber	2004	Examined determinants of capital structure of German Banks	Data Analysis	The study found that capitalized banks try to maintain their regulatory buffer capital due to potential regulatory costs. Charges in portfolio risk had a positive impact on charges in capital structure for savings banks. They also found that banks' profitability has a positive and

					significant effect on capital structure of savings and cooperative banks.
7.	Baral	2004	Examined determinants of capital structure of financial institutions in Nepal stock exchange	Panel data analysis	The study provided evidence that size of financial institutions has statistically significant influence on leverage and that growth rate has positive relationship with leverage ratio. If further found that financial institutions do not care about their debt service capacity but do care about business expansion.
8.	Raheman Zulfiqar and Mustafa	2007	Investigated relationship between capital structure and firm profitability	Correlation and regression analysis of panel data	They found that capital structure does impact firm profitability.
9.	Pouraghajan, Nalekian, Emamgholipour hotfollahpour and Baghen	2012	Examined the relationship between capital structure and firm performance	Panel data analysis	The study concluded that there is a significant between capital structure and firm performance.
10.	Nirajini and Priya	2013	Examined the relationship between capital structure and firms performance	Correlation and multiple regression analysis	The study found a significant relationship between capital structure and firms perofmrance.
11.	Zeitun and Tihn	2007	Investigated association between capital corporate performance of Jordanian firms	Panel data analysis	The study found a significant negative relationship between capital structure and corporate performance.
12.	Lorper and Kwanum	2009	Investigated the relationship between capital structure and financial performance of manufacturing firms listed on the sub-Saharan African stock exchange	Multiple regression analysis	They found that long term debts to total asset and short term debts to total assets have in significant relationship with indicators of financial performance while total debt to equity has positive relationship with return on assets and negative association with profit margin. They further found that short term debt to total asset is significantly related with return on assets while long term debt to total assets is significantly related with profit margin. Finally, the study concluded that capital structure is not a man determinant of firms performance.
13.	Ahmad	2010	Examined the influence of capital structure on firm performance of Malaysia listed companies in industrial and	Panel data analysis	The results showed that each of debt level has significant negative relationship with return on equity while return on asset has significant positive relationship[with short term debt and total debt.

			consumer sectors		
14.	Ruwanenthiren	2011	Investigated capital structure and financial performance of selected companies in Colombo stock exchange.	Panel data analysis	The study concluded or showed a negative relationship between capital structure and financial performance.
15.	Onganel	2011	Examined capital structure and performance of construction companies in Malaysia	Panel data analysis	The result showed a significant relationship between capital structure and corporate finance.
16.	Chandrase-Kharan	2012	Examined the effect firm specific factors and financial performance on leverage or debt ratio of firms listed on sub-Saharan Africa stock exchange.	Panel multiple regression analysis	The study revealed that firm size, growth and age have significant effect on debt ratio.
17.	Khalaf	2013	Assessed the effect of capital structure on performance of manufacturing companies listed on the Amman stock exchange	Multiple regression analysis	The results showed that total debt to equity is negatively related with profit margin and positively related with return on assets. Short term debt to total asset and long term debt to total assets were significant with return on assets and profit margin respectively.
18.	Tifow and Sayilir	2015	Conducted a study to examined the effect of capital structured firm performance of manufacturing firms listed on Borsa Istanbul.	Panel data analysis multiple regression analysis.	The study showed that leverage has a negative significant association with performance of firms.
19.	Banafa	2015	Examined effect of capital structure and profitability of manufacturing firms in Kenya.	Panel data analysis	The study found that capital structure has a significant positive effect on firms' performance.
20.	Amenya	2015	Examined capital structure effects and profitability	Panel data analysis	The study found that capital structure has a significant positive effect on firms' performance.
21.	Amenya	2015	Assessed capital structure and	Panel data analysis	The study revealed that when financial leverage is increased financial

			performance of firms listed on Nairobi stock exchange.		performance reduces.
22.	Yabs	2015	Examined capital structure and financial performance of Kenyan real estate firms	Regression analysis	The study showed that capital structure has a positive effect on firms' performance in financial perspective.
23.	Nigin and Abata	2016	Investigated capital structure and firm performance of sub-Saharan Africa firms	Multiple regression analysis	The study found a significant negative relation between debt/equity mix and return on equity.
24.	Basnet	2015	Examined whether standard determinants of capital structure on Nepalese commercial banks.		The study concluded that standard determinants of banks capital structure do affect the market leverage of the banks and capital structure theories trade off and packing order are complementary for Nepalese banks.
25.	Booth et.al	2001	Studied the determinants of capital structure in 10 developing countries	Panel data analysis (cross country)	They concluded that variables that explained the capital structures in developed nations were also relevant in developing nations. They however identified some systematic differences in the why these ratios were affected by GDP growth rates and development of capital markets.
26.	Bhaduri	2002	Studied capital structure decision in Indian corporate sector.	Panel data analysis	They found that firms with large size depend more on long-term borrowing while the small firms depend more on short-term borrowings. Firms with high growth opportunities seemed to increase their long-term debt taking capacity. The measure of profitability was significant for the short term and total borrowing but not for.
27.	Deeosomak et.al	2004	Examined determinants of capital structure in for Asian countries. The effect of country specific variable was also tested.	Cross sectioned framework	The results revealed that Thailand Malaysian firms were highly leveraged with the lowest revealed by Australian firms. Tangibility of assets showed positive relation only in Australia. Profitability showed negative relationship with leverage ordy in Malaysia, firm size showed a positive effect in all selected countries except Singapore while growth opportunity appeared to be negatively correlated with leverage for Thailand Singapore and significant for other countries.
28.	Onaolapo and	2007	Investigated the	Panel data	The study toward that capital structure

	Kajola		influence of capital structure on firms financial performance in non financial firms listed on sub-saharan Africa stock exchange.	analysis	has a significant negative effect on financial performance of firms.
29.	Ibrahim	2009	Examined the relation between leverage and firms' financial performance in Egypt	Multiple regression analysis	The findings revealed that financial performance is negatively influenced by short term debt and total debt but there was no significant relation with long term debt.
30.	Muhoro	2013	Examined the effect of capital structure decision on financial performance of construction and allied firms listed on NSE	Panel data analysis using multiple regression	The study found a positive relation between total debt, long term debt, short term debt size, sales growth and return on equity.
31.	Anarfo	2015	Examined the relationship between capital structure and bank performance in sub-saharan Africa	Panel data techniques	The result revealed that capital structure does not determine bank performance but rather the other way.
32.	Simon-Oke and Afolabi	2011	Examined the effect of capital structure on firms' performance from static trade off and agency cost theory point of view.	Panel data regression analysis.	The study found a positive relationship between firms performance and equity financing as well as between firms performance and debt equity ratio. Also, a negative relationship was found between firms' performance and debt financing due to high borrowing cost.
33.	Tale	2014	Investigated capital structure and performance relationship in listed non-financial firms on NSE	Regression analysis	Conclusion/findings the study showed a positive an insignificant relationship between capital structure, financial the finance and tangible assets.
34.	Akeem, Edwin, Kanganjui and Kayode	2014	Studied the effect of capital structure on firm's performance of manufacturing	Descriptive and regression analysis	The research concluded that capital structure is negatively related to firm's performance.

			companies in sub-sahara Africa.		
35.	Osuji and Odita	2012	Assessed the impact of capital structure on financial performance of sub-sahara Africa firms listed on the sub-sahara Africa stock exchange.	Panel data analysis	The result revealed that firms capital structure has a significantly negative impact in the firms financial performance.
36.	Babalola	2014	Examined relationship between capital structure and firm's performance from static trade off point of view	Triangulation analysis	The study revealed that capital structure is a trade off between the costs and benefits of debt and refuted the view that large firms are more inclined to retain higher performance than middle firms under the same level debt ratio.
37.	Akinyomi	2013	Examined the relationship between capital structure and financial performance from static trade off and packing order theory view point.	Correlation analysis	The findings revealed that all leverage ratios and firm size are significant and positively related with financial performance.
38.	Taiwo	2012	Examined ten firms listed on the sub-sahara Africa stock exchange from static trade off, packing order and agency theories point of view.	Panel least square	The study revealed that sampled firms were not able to utilise the fixed asset composition of their total asset judiciously to impact positively on their performance.
39.	Bassey, Arikan, Ikpe and Udo	2013	Examined capital structure determinants from agent cost theory perspective	Ordinary least square regresstion and descriptive statistics	The study revealed that only growth and educational level of firms were significant determinants of both long and short structure, age of the firms gends of owners and export status impact significantly on long term debt ratios while business risk, size, and profitability were major determinants of short term debt ratio.
40.	Semiu and Collins	2011	Investigated relationship between capital	descriptive and non parametric statistics	The study revealed that a significant relationship exist between firms choice of capital structure and its market value

			structure and firms performance		in Sub Sahara Africa
41.	Abdul	2010	Examined the association between capital structure and firms performance	Pooled ordinary least square regression	The results revealed that financial leverage (measured by short term debt to total assets and total debt to total assets) has significant negative relationship with firms performance.
42	Marganitis and Psillaki	2009	Explored the relationship between capital structure, equity ownership and firms performance	Regression analysis	The study found that the effect of leverage on firm performance is a reverse causality. The study also found that more concentrated ownership is generally associated with more debt in the capital structure. The study however found no evidence that ownership type has an effect on leverage choices.
43.	Bary et al	2010	Studied the relationship between ownership structure and risk in Publicly held and owned banks	Regression analysis	They found that ownership structure is significant in explaining risk differences but manly for privately owned banks. Also, they showed that a higher equity stake of individuals is associated with a decrease in asset risk and default risk
44.	Henry	2009	Investigated the relationship between agency costs ownership structure and corporate governance compliance		The study showed that the influence of voluntary governance compliance on agency cost is independent of firm ownership structure.
45.	Abor	2007	Compared the determinants of capital structure of quoted firms in Ghana stock exchange with SMGs	Regression analysis	The study found that age of firms has statistically positive relationship with long term and total debt ratios among SMEs. However, in the case of quoted firms, the result revealed a statistically significant negative association between age and long term debt ratio
46.	Dokua et al	2011	Explored the relation between financial market development and choice of fiancé of listed firms in Ghana	Panel data analysis	They study found non evidence of complementariness between banking and stock market developments in financing decisions of listed firms in Ghana. The study revealed that stock market development has a positive effect on capital structure decisions of listed firms.
47.	Oppong-Boakye et.al	2013	Investigated determinants of capital structure of listed andnon listed firms in Ghana.	Panel data analysis	The result identified long term debt to be irrelevant component of capital structure of large unquoted and quoted firms in Ghana as there is a greater reliance on equity. In addition, profitability, size, business risk and tangible assets have positive correlation with level of gearing while growth and tax showed a negative

					correlation with the level of gearing.
48.	Agboola and Salau	2008	Examined determinants of capital structure of non-financial listed firms in Nigeria	Regression Analysis	The study showed that profitability has a positive relationship with debt of large firms, and found that large and profitable firms prefer debt because of tax savings advantage. The result also showed that large firms prefer short term to long term debt financing, and that the relationship between tangibility and long term debt ratios was positive.
49.	Akintoye	2008	Studied sensitivity of performance to capital in selected food and beverage companies in Nigeria.		The research showed that for most of the companies, performance indicator (EBIT, EPS, and DDS) were sensitive to capital structure.
50.	Ezeoha and Okafor	2009	Evaluated how local ownership of firms influenced capital structure decisions in Nigeria.	Regression analysis	The result that the disseminations between domestic and foreign firms played a big role in determining level of financial leverage in Nigeria. Foreign firms relied more on long-term debts while the inadequacy in access to the capital market in Nigeria was a major reason most domestic firms relied on more short-term debts and internal capital.
51.	David and Olorunfemi	2010	Examined the relationship between capital structure and corporate performance in Nigerian petroleum industry.	Regression analysis	The results showed that relationship between the EPS and leverage and DPS and leverage were positive and negative respectively. Thus concluding that debt has huge impact on performance in petroleum industry.
52.	Oladimeji	2012	Examined determinants of capital structure of non-financial listed firms in Nigeria	Panel data technique	The results showed that the major determinants of capital structure include profitability, tangibility and liquidity, age, and size. Tangibility seemed to play determining roles in accessing long-term finance in Nigeria.
53.	Bargon and Gossel	2011	Explored firms financing behaviours from the view point of static trade off and packing order theories in south Africa	Panel data analysis	The study found that south African firms financing behaviour is consistent with the packing order theory and inconsistent with the static trade off theory.
54.	Nans and Erasmus	2011	Analyzed the impact of internal and external factors	Panel data analysis	The findings of the study support both the pecking order and static trade-off theories. In addition, the study revealed that profitability played a more

			on firms financing decision		significant role in capital structure decision than tax effects, suggesting the results are more consisting with pecking order theory.
55.	Gwatizdo and Ojah	2009	Examined the determinants of capital structure in south African firms	Panel data analysis	The study found profitability as the major factor affecting south African firms' financing decision, supporting packing order theory.

2.5 Summary of Gaps in Literature

It has been discovered that previous works on capital structure and performance had only concentrated on debt-equity ratio and debt-assets ratio while ignoring the essence of debt-capital employed ratio, which is a consideration of debt in relation to the total capital employed in the firm. For example, as Yusuf et al (2014) considered debt-equity ratio and debt-assets ratio, Onoja and Ovayioza (2015) accounted for only debt ratio, Kumar (2015) incorporated debt-equity ratio and debt-assets ratio, and Muraleetharan (2016) presented only debt-equity ratio.

Furthermore, previous studies employed correlation and ordinary least square analysis while neglecting panel data analysis hence this study uniquely employed fixed effect and pooled OLS. Similarly, the previous studies only measured relationship between the capital structure indices and financial performance indicators. However, none of the previous studies considered the causal relationship between the different nature of capital structure and performance of manufacturing firms in Sub-Saharan countries.

From all of these, it can be deduced that this study has identified three major gaps, which it intends to fill. The previous studies were conducted on neglected considered manufacturing companies in Sub-Saharan Africa countries. This research attention also included debt-capital employed ratio as a variable for capital structure indices. Finally, previous research attention is yet to be focused on the causal relationship between capital structure and financial performance.

Based on the gaps identified above, the study examined the effect of the different components of capital structure which comprise long term debt, short term debt, total debt, and control variables such as size and liquidity on the performance of quoted manufacturing firms in Sub-Saharan Africa within the framework of 2006-2016. The study also examined if there is any long run relationship and causal relationship between capital structure and performance of quoted manufacturing firms in Sub-Saharan Africa and also evaluates the cross-sectional performance of each country in relation to capital structure in Sub-Saharan Africa.

CHAPTER THREE

METHODOLOGY

3.1 Theoretical Framework

The theoretical framework for this study was that capital structure which was a fundamental determinant of firms' performance. This was hypothesized by the agency theory propounded by Jensen and Meckling (1976). Therefore, the higher leverage is expected to lower agency cost, reduce managerial inefficiency and thereby enhancing firm and managerial performance.

Furthermore trade-off theory assumed that as a firm leverage ratio rises, tax benefits would eventually be offset by increased bankruptcy cost. This theory postulates that the tax-deductibility of interest payment induces a company to borrow up to the margin where the present value of interest tax shield is just offset by the value loss due to agency cost from issuing risky debt as well as the cost of possible liquidation or re-organization. A firm is regarded as setting a target debt level and gradually moving towards it. The firm's optimal capital structure will involve the tradeoff among the effect of corporate and personal taxes, bankruptcy costs and agency costs. The trade-off theory sought to establish an optimal capital structure where the weighted average cost of capital would be minimised and the firm value maximised.

3.2 Model Specification

The model adopted for this study was based on the statistical model of multiple regression approach in line with that applied by Iorpev and Kwanuum (2009), Ahmade, (2010) and Khalaf (2013). Their studies inferred that financial performance was significantly influenced by capital structure indices.

P = f(LTDTA, STDTA,TDTE)……(3.1)

$P_{it} = \beta o + \beta_1 LTDTA_{it} + \beta_2 STDTA_{it} + \beta_3 TDE_{it}$ ……..(3.2)

Econometrically, it can be written thus:

$P_{it} = \beta o + \beta_1 LTDTA_{it} + \beta_2 STDTA_{it} + \beta_3 TDE_{it} + \mu$…….(3.3)

Where

LTDTA = Long term debt-Total Assets

STDTA = Short term debt-Total Assets

TDTE = Total debt-Equity

μ= Error term

$\beta 0$= Constant

β_1, β_2 , β_3, β_4 and β_5= Slope coefficient

This model is the same as the Iorpev and Kwanuum (2009) but for the inclusion of total debt to total equity. This model states that financial performance (P) is a function of capital structure proxies- long term debt to equity, total debt to total equity and short term debt to total assets.

However, this research work adopted all the above models which had been used for other countries such as Malaysian, Pakistan and Kenya but which no studies had used for the Sub-Saharan African countries selected. More importantly, the study modified the model(s) by incorporating control variables such as size and liquidity in the model. Thus, the model for this study is stated below:

$P = f(TDTE, LTDTA, STDTA, SIZE, LIQ)$…….(3.4)

This signifies that financial performance (P) is a function of proxies of capital structure (total debt-total equity, long term debt-total assets, short term debt-total assets, control variables of SIZE and Liquidity)

In the explicit form, the Model reduces to:

$P_{it} = \beta o + \beta_1 TDTE_{it} + \beta_2 LTDTA_{it} + \beta_3 STDTA_{it} + \beta_4 SIZE_{it} + \beta_5 LIQ_{it} + \mu$……(3.5)

Where:

P = Financial Performance

TDTE = Total debt/Equity o

LTDTA = Long term debt/Total Assets

STDTA = Short term debt/Total Assets

SIZE = Size

LIQ = Liquidity

μ= Error term

$\beta 0$= Constant

β_1, β_2 , β_3, β_4 and β_5= Slope coefficient

For specifics, the model is disaggregated as follows:

$ROA_{it} = \beta o + \beta_1 TDTE_{it} + \beta_2 LTDTA_{it} + \beta_3 STDTA_{it} + \beta_4 SIZE_{it} + \beta_5 LIQ_{it} + \mu_{it}$.....(3.6)

Return on Assets is a function of debt-equity ratio, seeing that they are directly related, as return on assets is the ratio net income to the total assets employed.

Return on Equity (ROE), on the other hand, reflects how effectively a firm management is using shareholders' investment. It tells the shareholders how much the company is earning on the book value of their investment (Goudreau, 1992). In fact, ROE is the most important measurement of firm's returns because it is influenced by how well the firm is performed on all other return categories, and indicates whether a firm can compete for private sources in the economy. ROE is defined as net income divided by average equity (Noraini, 2012). Hence, in order to consider the impact of capital structure on performance of companies in Sub-Sahara, therefore, there is the need to have an equation in a functional form as:

$ROE_{it} = \beta o + \beta_1 TDTE_{it} + \beta_2 LTDTA_{it} + \beta_3 STDTA^{it} + \beta_4 SIZE_{it} + \beta_5 LIQ_{it} + \mu_{it}$……(3.7)

Return on equity is a function of debt-equity ratio, seeing that equity holders are interested in net income, which are the earnings available to equity holders before distribution.

A-priori Expectation

Owing to the theoretical basis of this study, the a-priori expectation can be written as: β_1, β_2, β_3, β_4 and $\beta_5 > 0$.

(i) It is expected that there will be a positive relationship between capital structure and performance of manufacturing companies in Sub-Saharan African countries.
(ii) It is expected that there will be a causal relationship between capital structure and performance of manufacturing companies in Sub-Saharan Africa countries.
(iii) It is expected that there will be a positive relationship between capital structure and performance of manufacturing companies across countries in Sub-Saharan Africa countries.

3.3 Method of Data Analysis

To achieve the objectives, the study employed unit root test, correlation matrix analysis, Granger causality test and panel regression. To achieve objective one, the correlation matrix analysis and panel data was used to determine the relationship between capital structure and performance of manufacturing companies in Sub-Saharan African countries, while Granger causality test was used to examine objective two so as to test for the direction of the causal relationship that existed between the independent and dependent variables. On the objective 3, panel regression was employed to test for the impact of capital structure on performance of manufacturing companies in Sub-Saharan Africa countries in relation to each sampled countries in Sub-Saharan Africa**.**

3.3.1 Unit Root Test

It has become a standard practice in empirical literature involving both time series and panel data to test for unit roots because economic and financial time's series do exhibit

trending behaviour of non-stationarity in their mean which can be removed by differencing. Unit root is equivalent to testing whether a stochastic process is a stationary or non-stationary process. In sum, the presence of a unit root implies that the time series under scrutiny is non-stationary while the absence of a unit root means that the stochastic process is stationary. Maddala (1992) offered an interesting perspective and interpretation on the testing for unit roots. Thus, unit root was conducted to determine whether a variable is stationary or not and to know their order of integration. In this study, Augmented Dickey-Fuller (ADF) (1981) Phillips and Perron's (1988) procedures which compute a residual variance that is robust to auto-correlation were applied to test for unit roots. This enabled the researcher to compare results for the two methods of unit root tests. Dickey-Fuller test had been recognised to be stronger because it adjusts appropriately for the occurrence of serial correlation. The equation is stated thus:

$X_t = b_0 + b_1X_{t-1} + b_2X_{t-2} + b_nX_{t-n} + U$ ----------(3.8)

Where, U is the stationary error term. The null hypothesis that X_t is non-stationary is rejected if b_1 is significantly negative. The number of lag (n) of X_t is usually chosen to ensure that the regression is the most appropriate for the study. It was simply referred to as the Dickey-Fuller test as no such lags were required in which case bi = 0 (i = 1……..n). However, the t-ratio from the regression did not have a limiting normal distribution. An important assumption of the Dickey-Fuller test was that the error terms were independently and identically distributed. The ADF test adjusted the DF test to take care of possible serial correlation in the error term by adding the lag difference terms of the regression. Phillip and Perron used non-parametric methods to take care of the serial correlation in the error term without adding lagged difference terms.

Correlation Analysis Test

Correlation was a bivariate analysis that measures the strength and direction of association between two variables. In terms of the strength of relationship, the value of the correlation coefficient varies between +1 and -1. A value of ± 1 indicates a perfect degree of association between the two variables. As the correlation coefficient value goes towards 0, the relationship between the two variables was assumed weaker. The direction of the relationship was indicated by the sign of the coefficient; a positive sign indicated a positive relationship more in the same direction and a negative sign indicated a negative relationship. Usually, in statistics, four types of correlation measures are used i.e. Pearson's correlation, Kendall rank correlation, Spearman correlation, and the Point-Biserial correlation. Specifically, this study made use of Pearson's correlation.

Granger causality test

Granger causality is a statistical concept of causality that is based on prediction. According to Granger causality, if a signal X_1 "Granger-causes" (or "G-causes") a signal X_2, then past values of X_1 should contain information that helps predict X_2 above and beyond the information contained in past values of X_2 alone. Its mathematical formulation is based on linear regression modeling of stochastic processes (Granger 1969). More complex extensions to nonlinear cases exist, however these extensions are often more difficult to apply in practice. The GC measure is based on the relative change in the model error when new time series are added to improve the prediction of the dependent signal (Granger, 1969). Essentially, GC is the ratio of the variance of the model before and after the addition of the new time series

3.3.2 Panel Data Analysis

Panel data analysis is a statistical method which is widely used in social science and econometrics to analyse two dimensional typically cross-sectional and longitudinal panel data. The data are usually collected over time and over the same individuals and then a regression is run over these two dimensions. A fixed effect model is assumed to vary non-stochastically over or making the fixed effects model analogous to a dummy variable model in one dimension. However, a random effect model is assumed to vary stochastically over or requiring special treatment of the error variance matrix. Panel data analysis has three independent approaches: independently pooled panels; random effects models fixed effects models or first differenced models. The selection between the fixed effect and random effect models depends upon the objective of the analysis, and the problems concerning the exogeneity of the explanatory variables.

3.4 Data Sources Definitions and Measurements

The data used for this study were secondary in nature. The secondary data was obtained from annual reports of some selected quoted manufacturing firms in Sub-Sahara African countries covering 2009 to 2016.

3.4.1 Area of Study

This study concentrated on the effect of capital structure on the performance of quoted manufacturing firms. The analysis was done from Sub-Saharan African countries' perspective as these countries exhibit same features. The study adopted the ex-post-facto research design which was used where the events (variables) being investigated have already taken place without interference from the researcher and also for the fact that data needed for the study already existed. Therefore, it deals with historical facts about capital structure and performance of quoted manufacturing firms in Sub-Sahara African.

The study selected four countries. These are Nigeria, Ghana, Kenya and South African. The justification for these countries was that they make up the list of top 10 countries in Sub-Saharan Africa that have established a well sustainable environmental, social governance (ESG) reporting requirements in their respective stock exchange. Five (5) manufacturing firms were selected from each of these countries making twenty (20) manufacturing companies. These countries were purposively selected because there existed robust stock exchange and capital market development in those countries. These countries had the highest number of manufacturing companies in the region. The countries were also chosen based on the records of their populations, market development economic power in the region and as a result of the fact that they are English speaking countries.

In Nigeria, the following manufacturing companies were selected: Dangote Flour Mill Plc Nigeria, AG Leventis Plc Nigeria, UAC Nigeria Plc, Nestle Nigeria Plc and Nigeria Breweries Plc. In Ghana, AngloGold Ashanti Plc, PZ Cussons Ghana Ltd, Uniliver Ghana Ltd, Guinness Ghana Breweries Ltd, African Champion Industry. In Kenya, Bamburi Cement Limited, Rea Vipingo Plantations Ltd, Williamson Tea Kenya Ltd, Kenya Orchards Limited, and Crown paints Kenya Ltd. In South Africa, the following firms were selected, Central Rand Gold, Datasec South Africa, Comair Limited South Africa, Assore Limited South Africa and Caxtion Limited Africa.

Secondary sources of data were employed and it was sourced from the annual financial reports of these selected manufacturing firms as well as from stock exchange fact books of each country covering the period of eleven years (2006-2016). In measuring the performance of these firms, return on equity (ROE) and return on assets (ROA)were employed while total debt-equity (TDE), long term debt-total assets (LTDTA) short term

debt-total assets (STDTA) control variables such as SIZE and Liquidity were also employed.

3.4.2 Research Design

This study adopted an Expost-Facto method of research design. This is because investigation started after the fact had occurred without interference from the researcher and also for the fact that data needed for the study already existed. The secondary data used in this study were sourced from annual financial statement of several quoted manufacturing companies in four Sub-Saharan African countries over a period of eleven (11) years from 2006 to 2016.

3.4.3 Population and Sample Size for the Study

The population of the study comprised all manufacturing companies in Sub-Saharan Africa. However, the sample size was selected based on the following criteria: The four countries selected in the Sub-Saharan Africa had the most robust stock exchange and capital markets. The countries had the highest number of manufacturing companies in the region and should have established sustainable environmental, social governance (ESG) reporting standards in their respective stock exchange.

The countries were also chosen based on the records of their populations, market development and economic power in the region. Based on these criteria, Kenya, Ghana, Nigeria and South Africa were selected.

3.4.4 Description of Variables

Variables	Description
ROE	ROE is the profit after tax dividend by equity. It measures the performance of firm.
ROA	This is the ratio of net income and total resource (asset) of the company. It measures the efficiency of a firm management in generating profit out of its scarce resource. The higher the amount of return of assets the better the efficiency of the firm's management.
Total debt- Equity	This is an indicator of financial leverage. It shows the percentage of equity and creditors, liabilities, debt. The debt to total equity ratio is calculated by dividing a corporation's total liabilities by its equity.
Long term debt-Total Assets Ratio	This measures the percentage of a corporation's assets financed with loans or other financial obligations lasting more than one year.
Short term debt-Total Assets	This helps to appraise whether a company will be able to meet its short-term debt obligations.
Size	This is measured by the value of total assets of a firm. It also differentiates between a big and small firm.
Liquidity	This is an attempt to measure a company's ability to pay off its short-term debt obligations. This is done by comparing a company's most liquid assets, those that can be easily converted to cash with its short-term liabilities.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION OF RESULTS

4.1 Pooled Data Analysis for All the Countries

4.1.1 Descriptive Statistics

Table 4.1.1 reports summary statistics for the variables. A critical examination of the descriptive statistics for the dependent and explanatory variables reveals several issues. The mean value of the return on assets (ROA) for the sample as a whole is 37.42%, while the mean sample of return on equity (ROE) is 40.29%. Both measure of performance (ROA and ROE) had a low percentage value. The low ratio of ROA and ROE of 37.42% and 40.29% recorded may reflect the impact of a relatively high number of very large firms that control a low percentage of the firm's assets and equity. This is consistent with the study of Salim and Yadav (2012).

Some of these firms maintained a weak control by selecting boards of directors that were dominated by insiders. The low average value of ROA and ROE might also reflect the higher current assets and current liability to which the listed firms were subjected, compared to the liquidity. This was further confirmed by the mean value of liquidity from the Table 4.1.1 which was 2395% and median of 127%. This shows that the average liquidity for the firms fall between 127% and 2395%. The disparity in returns (ROA and ROE) ranged from profitability of 785% and 787% (maximum value) for some firms to a gain of over 0.23% and 0.54% (minimum value) for others. This presents a great disparity between firms on profitability. This result, therefore revealed that the firms under review will mostly likely prefer high debts and less assets and equity, and that this is evidenced by the low percentage value of both ROA and ROE. This outcome is in consonance with the study of Salim and Yadav (2012) that an increase in debt is directly associated with decrease in the performance of the firms.

A quick review of the measures of leverage showed that the first measure of leverage- total debt to total debt (TDTE) has a low mean ratio of 33.1%. This implies that the current liabilities of the firms reviewed on average amount to about 33 percent of total equity. It was therefore, up to the firms to choose a ratio system best suitable for its activities so as to be accurately represented as reported by Subaciene and Villis (2010).

Examining the second measure of leverage- long term debt to total assets (LTDTA); the reported mean value of 56.89% for the selected firms was high based on the high mean value of the long term debt to assets (56.89%). It can be stated that the quoted firms in Sub-Sahara do use much long term debt in their respective capital structure choice. This result also suggested that the large and small firms do not have any particular difficulty in accessing long term finance with high and non-declining leverage ratios. This could also be attributed to the low return on assets and equity recorded because long-term finance is needed for capital projects.

The standard deviation of the second leverage (LTDTA of 1.29) was different from the standard deviation of TDTE of 0.96. This observation predicts that the firms in every stock market do reflect large differences in their long term debt holding.

The mean value of the short term debt to total assets (STDTA) of 4.6% as compared to 56.89% mean value of the long term debt shows that debt financing for the selected firms in the sample corresponds mainly to a long term nature. This revealed a salient fact that the Sub-Sahara firms were financed by long term financing.

The mean value of the size of the listed firms examined was high at 14.06. The firms experienced high growth in size up to the period studied. It could however be noted that this growth in size did not really translate to higher returns as the companies recorded both low average returns (ROA and ROE) for the period.

Looking through the standard deviation (SD) which measured the level of variation of the variables from the mean value, it revealed that the most volatile of the variables examined was liquidity with an SD of 207.40, followed by firm size and LTDTA with SD value of 2.98 and 1.29 respectively; the least volatile i.e. most stable variable is STDTA with an SD of 0.085.

Table 4.1.1: Descriptive Statistics for Dependent and Explanatory Variables

Variables	Obs.	Mean	Median	Std Dev.	Minimum	Maximum
ROA	220	0.374	0.136	0.997	0.002	7.849
ROE	220	0.403	0.230	0.811	0.005	7.867
TDTE	220	0.331	0.039	0.963	4.921	7.954
LTDTA	220	0.568	0.266	1.285	0.001	12.042
STDTA	220	0.045	0.013	0.085	1.921	0.591
SIZE	220	14.063	14.561	2.977	8.883	19.252
LIQUIDITY	220	23.950	1.265	207.398	0.035	2264.803

Note: ROA = return on assets (EBIT/ total assets); ROE = return on equity (EBIT/total equity);TDTE = total debt divided by total equity; LTDTA = long-term debt divided by total assets; STDTA = short term debt divided by total assets; Size = Natural logarithm of total assets; LIQUIDITY = current assets/ current liabilities

Source: Author's Computation 2018

4.1.2 Correlation Matrix

The correlation matrix for the variables was reported in Table 4.1.2 in order to examine the correlation that exists among the variables. The results showed that there was a positive relationship between ROA and the three measures of leverage- total leverage, long term leverage and short term leverage, which ranges from 34.90% to 54.57%. However, ROA was negatively correlated with size of the firms at 49.7% and positively correlated with liquidity at 1.43%. The return on equity (ROE) was negatively correlated

with total leverage at a lower percentage of 6.02%. These results showed the same correlation trend for the accounting performance measures except that the degree of associations were very weak in the case of ROE with lower values which ranged from 6.02% to 7.59% when compared to ROA. These results imply that leverages has a positive influence on the accounting performance of the firms while size and liquidity tend to have a positive influence on the accounting performance of the firms.

The results also showed that size of the firms had a positive relationship only with ROE. This implies that larger firms tend to have a high leverage ratio with lower growth opportunities. It also implies that the firms had high opportunity of growth in size which is consistent with Myers (1977).

The results further showed that liquidity had a positive relationship with the two accounting performance (ROA and ROE). This implies that the Sub-Sahara firms enjoyed liquidity benefits which increased their operating assets. It also implies that there could be an increase in the firms' operating assets even if the profitability of the company basic structure had not changed.

It was however important to point out that the descriptive statistics and correlation analysis only indicated the associate link between variables. They did not necessarily establish a causal relationship even with high co-efficient. Consequently, a more rigorous and advanced econometric techniques were required to adequately capture definite significant relationship between the accounting performance measures and that the explanatory variables. However, it can be seen from Table 4.1.2 that more cross-correlation terms for the independent variables were fairly small. Thus, this gve little cause for concern about the problem of multi-collinearity among the independent variables.

Table 4.1.2: Correlation Matrix of the Variables

	ROA	ROE	TDTE	LTDTA	STDTA	SIZE	LIQUIDITY
ROA	1.000						
ROE	0.739	1.000					
TDTE	0.349	-0.060	1.000				
LTDTA	0.545	0.034	0.747	1.000			
STDTA	0.363	0.076	0.237	0.395	1.000		
SIZE	-0.049	0.001	0.072	-0.074	-0.139	1.000	
LIQUIDITY	0.014	0.013	-0.038	-0.049	-0.059	0.172	1.000

Note: ROA = the return on assets (EBIT/ total assets); ROE = return on equity (EBIT/total equity); TDTE = total debt divided by total equity; LTDTA = long-term debt divided by total assets; STDTA = short term debt divided by total assets; Size = Natural logarithm of total assets; LIQUIDITY = current assets/ current liabilities

Source: Author's Computation, 2018

4.1.3 Pair-wise Granger Causality Test

Granger Causality Test for ROA

The pair-wise granger causality test showed the directional causality between one variable and the others. In line with most of the literature on econometrics, one variable is said to granger cause the other if it helps to make a more accurate prediction of the other variable. From the result below, it was revealed that there was a causal relationship between some variables. There were some variables that granger cause in a two-way direction meaning from both dependent variables to independent variables and vise versa; some were in one way direction i.e. uni-directional from one variable to another; while some were independent i.e no causality. To determine the causal relationship, the decision rule stated that if the F statistics of the granger causality test is less than 3.84, the null hypothesis of no causal relationship should be rejected, meaning no causal

relationship. Conversely, when the F-statistic is greater than 3.84, the alternate hypothesis should be accepted, meaning there was a causal relationship.

More still, the P-value can also be used if it is less than 0.05 level of significance. Therefore, granger causality results revealed that there was a bi-directional causal relationship between ROA-LTDTA, ROA-STDTA, LTDTA-STDTA and SIZE AND LIQ. Secondly, there was a uni-directional causal relationship between ROA-TDTE, ROA-SIZE, TDTE-STDTA, TDTE-SIZE, LTDTA-SIZE, and STDTA-SIZE. Lastly, there was no causal relationship between ROA-LIQ, TDTE-LTDTA, TDTE-LIQ, LTDTA-LIQ, and STDTA-LIQ. The implication of this was that on bi-directional causality, firms should put in consideration the capital structure of the firm as it is an important ingredient to the performance of firms. This meant that the more adequate the capital structure of firms is, the better the performance of the firm. Therefore, in forecasting for the firm, the relationship between them should be put into consideration because of the causal relationship between them.

On the uni-directional causal relationship, SIZE causes ROA, TDTE, LTDTA, and STDTA. The implication was that size of the firm in terms of number of years of existence, goodwill and assets acquired is important in determining its performance and it must be considered when forecasting on capital structure of firms. The higher the size if the firm, the easier will be its easy access to external financing. Lastly, on the no causal relationship, the results showed that liquidly, ROA, TDTE, LTDTA, were independent and no causal relationship existed between them. Therefore, the study concluded that there was a causal relationship between capital structure and manufacturing firms' performance in Sub-Sahara Africa. These results confirmed the earlier co-integration test that depicted long run relationship between the two variables.

Table 4.1.3A: Granger Causality Tests of ROA and the Explanatory Variables

HYPOTHESES	OBS	F-STAT	P-VALUE	DECISION	TYPE OF CAUSALITY
ROA →TDTE	180	3.20	0.04	Reject Ho	Uni-directional
ROA →TDTE	180	26.89	0.01	Reject Ho	Bi-directional
ROA →STDTA	180	29.31	0.00	Reject Ho	Bi-directional
ROA→SIZE	180	0.35	0.70	Reject Ho	Uni-directional
ROA →LIQ	180	1.85	0.16	DNR	No causality
TDTE →LTDTA	180	1.19	0.30	DNR	No causality
TDTE →STDTA	180	0.66	0.51	Reject Ho	Uni-directional
TDTE→SIZE	180	1.12	0.32	Reject Ho	Uni-directional
TDTE→LIQ	180	0.02	0.98	DNR	No causality
LTDTA →STDTA	180	32.48	0.00	Reject Ho	Bi-directional
TDTA→SIZE	180	0.69	0.50	Reject Ho	Uni-directional
LTDTA→LIQ	180	0.03	0.97	DNR	No causality
STDTA→SIZE	180	0.26	0.76	Reject Ho	Uni-directional
STDTA→ LIQ	180	0.00	0.99	DNR	No causality
SIZE→ LIQ	180	4.78	0.00	Reject Ho	Bi-directional

Note: DNR= Do not reject Null Hypothesis; Reject Ho= Null Hypothesis should be rejected. P.VALUE= is an alternative to rejection points to provide the smallest level of significance at which the null hypothesis would be rejected. **F-STAT=** shows the means between two populations are significantly different.

Source: Author's Computation, 2018

Pair -Wise Granger Causality Test for ROE

As said above that granger causality test showed the directional causality between one variable and the others, and that in most of the literature on econometrics, one variable is said to granger cause the other if it helps to make a more accurate prediction of the other variable. From the result below, it was revealed that there is a causal relationship between some variables between dependent variables and independent variables likewise within some independent variables. There were some variables that granger cause in a two-way direction meaning from both dependent variables to independent variables and vise versa; some were in a one way direction i.e. uni-directional from one variable to another; while some were independent i.e. no causality.

Following the decision rules stated above, the granger causality results revealed that there was a bi-directional causal relationship between ROE-LTDTA and SIZE-LIQ. Secondly, there is uni-directional causal relationship between ROE-SIZE, TDTE-SIZE and STDTA-SIZE. Lastly, there was no causal relationship between ROE-TDTE, ROE-STDTA, ROE-SIZE, TDTE-LTDTA, TDTE-STDTA, TDTE-LIQ, LTDTA-STDTA, LTDTA-SIZE, LTDTA-LIQ, and STDTA-LIQ. The implication of this was that on bi-directional causality, return on equity and long term debt to total assets decision has to be side by side. This meant that since both causes each other, the decision of one will affect the other. Therefore, in forecasting, both must be put in consideration. In the same vein, bi-directional causality exists between size and liquidity. The implication of this is that the size of the firms in terms of assets, goodwill and professional staff will determine how easy a firm can access funds. This proved that the higher the size of the firms, the more liquid it becomes. Therefore, the two must be put in consideration while carrying out forecasting in the firm.

On the uni-directional causal relationship, ROE causes LIQ, TDTE causes SIZE, and STDTA causes SIZE. The implication of this was that performance of firm depended on how liquid the firms were. Therefore, liquidity was important for the performance of firms. More so, total debt causes SIZE and short term debt causes SIZE. The implication of these was that access to financing of firms, whether in terms of long term or short term financing, depended on its size. Therefore, firms must put the two in consideration when making decision or forecasting. Lastly, on the no causal relationship, the results show that ROE did not cause TDTE, STDTA, SIZE. Also, TDTE did not cause LTDTA, STDTA, LIQ. In addition, LTDTA did not cause STDTA, SIZE, LIQ. Nevertheless, no causal relationship existed between STDTA and LIQ. The implication was that these variables were independent and no causal relationship exists between them. Therefore in

making decision by firms, consideration on each of them must be considered independently. The study concluded that there was causal relationship between capital structure and manufacturing firms' performance in Sub-Saharan Africa. These results also confirmed the earlier co-integration test that depicted long run relationship between the two variables.

Table 4.1.3B: Granger Causality Tests of ROE and the Explanatory Variables

HYPOTHESES	OBS	F-STAT	P-VALUE	DECISION	TYPE OF CAUSALITY
ROE-TDTE	180	0.29	0.74	DNR	No causality
ROE-LTDTA	180	5.34	0.00	Reject Ho	Bi-directional
ROE-STDTA	180	1.70	0.18	DNR	No causality
ROE-SIZE	180	0.19	0.82	DNR	No causality
ROE-LIQ	180	2.45	0.08	Reject Ho	Uni-directional
TDTE-LTDTA	180	0.82	0.44	DNR	No causality
TDTE-STDTA	180	1.16	0.31	DNR	No causality
TDTE-SIZE	180	2.92	0.05	Reject Ho	Uni-directional
TDTE-LIQ	180	0.00	0.99	DNR	No causality
LTDTA-STDTA	180	0.31	0.72	DNR	No causality
TDTE-SIZE	180	2.05	0.13	DNR	No causality
LTDTAQ-LIQ	180	0.00	0.00	DNR	No causality
STDTA-SIZE	180	2.75	0.06	Reject Ho	Uni-directional
STDTA-LIQ	180	0.12	0.88	DNR	No causality
SIZE-LIQ	180	4.78	0.00	Reject Ho	Bi-directional

Note: DNR= Do not reject Null Hypothesis; Reject Ho= Null Hypothesis should be rejected

P.VALUE= is an alternative to rejection points to provide the smallest level of significance at which the null hypothesis would be rejected. **F-STAT=** shows the means between two populations are significantly different.

Source: Author's Computation

4.1.4 Panel Regression Results

The regression result presented in Table 4.1.4A investigated the impact of capital structure on return on assets of manufacturing companies in Sub-Saharan Africa. The dependent variable was return on asset while the independent variables were Total Debt to Total Equity (TDTE), Long Term Debt to Total Asset (LTDTA), Short Term Debt to Total Asset (STDTA), and Size (SIZE) and Liquidity (LIQUIDITY). The results of both

models show that Total Debt to Total Equity (TDTE) is inversely related to ROA while all other variables were positively related to ROA.

However, only the coefficients of Total Debt to Total Equity (TDTE), Long Term Debt to Total Asset (LTDTA), Short Term Debt to Total Asset (STDTA) and LIQUIDITY were indicated to be statistically significant. This was shown by the standard error, Z-values and the P-values. On the basis of the standard error, co-efficient of a variable was said to be significant when half of the co-efficient is greater than the standard error of the coefficient. In this case, the fixed effect model showed that the co-efficients of Total Debt to Total Equity (TDTE), Long Term Debt to Total Asset (LTDTA), Short Term Debt to Total Asset (STDTA) and LIQUIDITY are -3.3718, 0.0012, 7.5510 and 7.9560 while the standard errors of the co-efficients are -0.1927, 0.1927, 4.8544 and 0.0016, respectively.

Since half of each co-efficient was greater than its standard errors, the variables were statistically significant. Similarly, in the Panel OLS model, Total Debt to Total Equity (TDTE), Long Term Debt to Total Asset (LTDTA), Short Term Debt to Total Asset (STDTA) and LIQUIDITY, with co-efficient -4.7236, 5.5779, 4.4590 and 7.1833 as well as standard errors -0.3559, 0.3308, 7.3187 and 0.0017 respectively were the only significant variables, while size of manufacturing companies are not significant determinant of return on asset for the models. Therefore, Total Debt to Total Equity (TDTE), Long Term Debt to Total Asset (LTDTA), Short Term Debt to Total Asset (STDTA) and LIQUIDITY were the only important determinants of the return on asset in manufacturing companies in Sub-Saharan Africa. In other words, capital structure has enormous impact on the return on asset in manufacturing companies in Sub-Saharan Africa.

By magnitude, fixed effect model indicates that -3.3718 units decreased in the ROA

result from increase in Total Debt to Total Equity (TDTE). On the other hand, 0.0012, 7.5510 and 7.9560 increase in ROA resulted from increase in Long Term Debt to Total Asset (LTDTA), Short Term Debt to Total Asset (STDTA) and LIQUIDITY, respectively. Similarly, in the Panel OLS model, a unit increase in the Total Debt to Total Equity (TDTE) brings about -4.7236 decrease in ROA. Conversely, 5.5779,4.4590 and 7.1833 increase in ROA resulted from increase in Long Term Debt to Total Asset (LTDTA), Short Term Debt to Total Asset (STDTA) and LIQUIDITY, respectively.

The R^2 statistics showed that 81.2% (for fixed effect model) and 60.4% (for Panel OLS model) variation in firms' ROA was explained by the changes in the independent variables. This showed that the model was relatively good and it estimates were valid and consistent for policy inferences.

Having further corroborated the relationships between the significant explanatory variables and the dependent variable ROA, it was found that:

1. There was a significant negative relationship between total leverage of the selected firms and their accounting performance as measured by return on assets;
2. There was a significant positive relationship between long term leverage, short term leverage and the accounting performance of the firms; and,
3. There was a non-significant positive and negative relationship between size and the accounting performance of the firms.

Table 4.1.4A: Estimation Results for ROA for the Sample Firms for the Period 2006-2016

Dependent Variable: ROA		
Independent Variables	Fixed Effects	Panel OLS
Constant	0.248 (3.3712)	0.327 (1.362)
TDTE	-0.192 (-3.343)* *	-0.355 (-4.723)* *
LTDTA	0.192 (0.001)*	0.330 (5.577)*
STDTA	4.854 (7.551)* **	7.318 (4.459)* **
SIZE	-0.033 (-0.456)	0.010 (0.279)
LIQUIDITY	0.001 (7.95)* *	0.001 (7.183)* *
No. of Observations	220	220
R^2	0.812	0.604
F-Statistics	13.441	34.833
Prob.(F-Statistics)	0.000	0.000
D-Watson Statistics	2.518	1.337

Note: ***, ** and * denote 1%, 5% and 10% level of significance respectively and Numbers in parentheses are the asymptotic t-values of the coefficient. ROA = the return on assets (EBIT/ total assets); ROE = return on equity (EBIT/total equity); TDTE = total debt divided by total equity; LTDTA = long-term debt divided by total assets; STDTA = short term debt divided by total assets; Size = Natural logarithm of total assets; LIQUIDITY = current assets/ current liabilities

Source: Author's Computation, 2018

Regression estimates of the co-efficients of both fixed effect and panel OLS models for the evaluation of the impact of capital structure on the return on equity (ROE) of manufacturing companies in Sub-Saharan Africa was presented in table 4.1.4B. The dependent variable was return on equity while the independent variables still remained Total Debt to Total Equity (TDTE), Long Term Debt to Total Asset (LTDTA), Short Term Debt to Total Asset (STDA), Size (SIZE) and Liquidity (LIQUIDITY). Column 1 and 2 contains the fixed effect model and the panel OLS model, respectively. The results of the fixed effect model illustrate that all the variables except Total Debt to Total Equity (TDTE), Short Term Debt to Total Asset (STDTA) and SIZE were positively related to ROE. This meant that increase in those variables brought about increase in ROE and vice versa.

However, the result in column 1 shows that Total Debt to Total Equity (TDTE), Long

Term Debt to Total Asset (LTDTA) and LIQUIDITY were the only significant determinants of the ROE in manufacturing companies in Sub-Saharan Africa. This was given by the standard errors of the co-efficients less than half the coefficients. Thus, the variables had significant impact on ROE.

The estimates of the coefficients showed that one unit increase in LTDTA led to about 2.1453 units increase in ROE, while one unit increase in LIQUIDITY brought about 1.9474 units increase in ROE. On the other hand, a unit increase in TDTE and STDTA brought about 2.4158 and -0.6288 units decrease in ROE, respectively. Since the independent variables were representing capital structure, the result thus indicated that capital structure significantly affected ROE of manufacturing companies in Sub-Saharan Africa.

In column 2, the panel OLS model established the same nature of relationship between the independent variables and dependent variable as shown by the fixed effect models. Also, it established that TDTE, LTDTA, STDTA and LIQUIDITY were statistically significant. It displayed that a unit increase in TDTA led to 2.9750 decrease ROE while increase in LTDTA, STDTA and LIQUIDITY resulted to 2.4326, 2.2129 and 3.3088 increase in ROE, respectively. In short, the panel OLS model like its counterpart showed that capital structure significantly affected ROE of manufacturing companies in Sub-Saharan Africa.

The R^2 was high for both estimation model with a value of 0.1965 and 0.6630; this indicated that about 19.65% and 66.30% of the variation in ROE was explained by the variation in the explanatory variables of the studied firms. The low R^2 value was consistent with the findings of Tian and Zeitun (2007) on Jordanian firms that R^2 value using this measure in most cases for the panel OLS estimation was less than 0.1%. The F-statistics and Durbin-Watson statistics were also significant, hence the estimated

equation can be relied upon in making valid inference about the influence of the explanatory variables on the accounting performance of the listed firms.

Having further corroborated the relationships between the significant explanatory variables and the dependent variable ROE, it was found that:

1. There was a significant negative relationship between total leverage of the selected firms and their accounting performance as measured by return on equity;
2. There was a significant positive relationship between long term leverage, short term leverage and the accounting performance of the firms except for fixed effects that shows short term leverage being non-significant; and
3. There was a non-significant positive and negative relationship between size and the accounting performance of the firms while liquidity displayed a positive significant relationship.

Table 4.1.4B: Estimation Results for ROE for the Sample Firms for the Period 2006-2016

Dependent Variable: ROE		
Independent Variables	Fixed Effects	Panel OLS
Constant	1.532 (1.947)	0.817 (1.853)
TDTE	-0.306 (-2.415)* *	-0.411 (-2.975)* *
LTDTA	0.213 (2.145)* **	0.264 (2.432)* **
STDTA	-0.697 (-0.629)	2.473 (2.213)
SIZE	-0.084 (-0.670)	0.010 (0.148)
LIQUIDITY	0.001 (1.947)* **	0.001 (3.309)* **
No. of Observations	220	220
R^2	0.663	0.197
F-Statistics	6.106	5.58
Prob.(F-Statistics)	0.000	0.001
D-Watson Statistics	2.624	1.343

Note: ***, ** and * denote 1%, 5% and 10% level of significance respectively and Numbers in parentheses are the asymptotic t-values of the coefficient. ROA = the return on assets (EBIT/ total assets); ROE = return on equity (EBIT/total equity); TDTE = total debt divided by total equity; LTDTA = long-term debt divided by total assets; STDTA = short term debt divided by total assets; Size = Natural logarithm of total assets; LIQUIDITY = current assets/ current liabilities

Source: Author Computation, 2018

4.1.6 Cross-section Performance of the Sampled Firms in Sub-Saharan Africa

Table 4.1.5 shows the different attributes of the sampled countries i.e. Ghana, Kenya, South Africa and Nigeria. The comparisons between these countries were made from the results of the panel regressions, granger causality test, and long run test. From the table, it was revealed that the R2 which showed the extent of variation in dependent variable ROA by the capital structure of STD, LTDTA, TDTE, SIZE and LIQUIDITY were 89% for Ghana, 85% for Kenya, 16% for South Africa and 97% for Nigeria while R^2 for ROE for Ghana was 27%, 63% for Kenya, 21% for South Africa and 68% for Nigeria. A look at these showed that sampled countries performances were actually impacted by the capital structure employed in each countries. However, the R^2 for ROA and ROE of South Africa seems weak compared to others. More importantly, the F-statistics and P-value of the regressions showed that all countries except South Africa had significant F-statistics and p-values.

On the causal relationship between capital structure and manufacturing performance (ROA), it was be revealed that uni-directional causality running from capital structure to firms performance exist for Kenya; Ghana had a bi-directional causal relationship while South Africa and Nigeria had UNI-BI-directional relationship which run from capital structure to bank performance and from bank performance to capital structure. The implication of this is that capital structure employed by firms could influence the firms performance positively. When the firms have attained a level of growth in the industry, its assets, caliber of staff and outlook can influence the categories of capital structure to be employed. On the other hand, causal relationship between capital structure and manufacturing performance (ROE) revealed that Ghana only had a unidirectional causal relationship running from capital structure to manufacturing firms performance (ROE) while Kenya, South Africa and Nigeria actually had UNI-BI-directional causal

relationship. The implication of this also is that capital structure employed by firms can influence the firms performance positively i.e. the return on equity. When the firms had attained a level of growth in the industry, its assets, caliber of staff and its outlook could influence the categories of capital structure to be employed.

Finally, the reports also revealed that the following categories of capital structure were peculiar to each country. In Ghana, it revealed that STDTA and LTDTA significantly related to both return on assets (ROA) and return on equity (ROE). In Kenya, LTDTA, STDTA and LIQUIDITY were significantly related to return on assets (ROA) while only LIQUIDITY was related to return on equity (ROE). In South Africa, none of the categories of capital structure were significantly related to manufacturing firms' performance. Although LTDTA and STDTA were positively signed, they were not statistically significant. In the same vein, in Nigeria, STDTA was related to return on assets (ROA) while STDTA, LIQUIDITY and LTDTA were significantly related to return on equity (ROE).

Table 4.1.5: Summary of the Countries Findings (2006-2016)

		ROA			ROE			
	GHA	KYA	S/A	NIG	GHA	KYA	S/A	NIG
R2	89%	85%	16%	97%	27%	63%	21%	63%
F-STAT	44.22	29.74	1.069	207.9	1.853	8.766	1.292	8.766
P-VALUE	0.000	.000	0.440	0.000	0.000	0.000	0.2689	0.000
CAUSALITY	BI	UNI	UNI-BI	UNI-BI	UNI	UNI-BI	UNI-BI	UNI-BI
LONG RUN	YES	YES	YES	YES	YES	YES	YES	YES
SIGN-CAP	STDTA	LTDTA	NILL	STDTA	STDTA	LIQ	NILL	STDTA
	LTDTA	STDTA			LTDTA			LIQ
		LIQ						LTDTA

Note:. ROA = the return on assets (EBIT/ total assets); ROE = return on equity (EBIT/total equity); TDTE = total debt divided by total equity; LTDTA = long-term debt divided by total assets; STDTA = short term debt divided by total assets; Size = Natural logarithm of total assets; LIQ = current assets/ current liabilities; GHA= Ghana; KYA= Kenya, S/A= South Africa, NIG= Nigeria

Source: Author's Computation 2018

4.2 Descriptive Analysis for Ghana

Table 4.2 reports summary statistics for the variables. A critical examination of the descriptive statistics for the dependent and explanatory variables revealed several issues. The mean value which was the average value of the series showed that mean of return on assets (ROA) for the sample as a whole was 32.96%, while the mean sample of return on equity (ROE) was 35.99%. Both measure of performance (ROA & ROE) had a low percentage value among the variables employed. A quick look at the leverage of the firms revealed that size of the firm had the highest mean 5.72 followed by liquidity 1.18 and LTD/TA of 0.77.

The look at the standard deviation of the variables which measured the degree of dispersion from the mean value revealed that ROE recorded low figure of 0.52% which was the least volatile variable while LTD/TA recorded a higher mean of 1.77%. This indicated that LTD/TA was the most volatile variables followed by size 1.37%. The results also revealed that all the variables examined were positively skewed which indicated that the distribution had a long right tail. The kurtosis statistics measured the degree of peakedness or flatness of the variables. From the results obtained, all the variables were above 3 which indicated that the distribution was peaked i.e leptokurtic relative to normal except size (1.71) that was lower than 3 which indicated that the distribution was flat i.e platykurtic relative to normal. Jarque-Bera statistics of the series were also presented in the table. It actually used to test if the series were normally distributed. The null hypothesis of Jarque-Bera implied that the series were normally distributed. From the results, it was revealed that all the variables were above 5% level of significance which indicated that null the hypothesis was retained i.e. the series were normally distributed.

Table 4.2.1 Descriptive Statistics of Variables used in Ghana

	ROA	ROE	TD_TE	STD_TA	LTD_TA	SIZE	LIQUIDITY
Mean	0.329	0.359	0.449	0.044	0.771	5.721	1.182
Median	0.109	0.221	0.039	0.014	0.297	5.47	0.985
Maximum	5.649	2.945	7.955	0.592	12.042	8.03	9.015
Minimum	0.002	0.005	4.921	0.001	0.004	3.85	0.036
Std. Dev.	0.857	0.525	1.311	0.096	1.777	1.379	1.234
Skewness	4.947	3.395	4.198	4.079	5.013	0.259	4.747
Kurtosis	29.3108	15.569	21.971	21.8189	30.966	1.715	30.860
Jarque-Bera	1810.776	467.649	986.244	964.089	2022.799	4.406	1985.155
Probability	0	0	0	0	0	0.110497	0
Sum	18.130	19.798	24.699	2.428	42.448	314.67	65.016
Sum Sq. Dev.	39.615	14.833	92.765	0.489	170.600	102.558	82.113
Observations	55	55	55	55	55	55	55

Source: Authors Computation 2018

4.2.2 Correlation Matrix

The correlation matrix for the variables was reported in Table 4.2.2 in order to examine the correlation that exists among the variables. The results showed that there was a positive relationship between ROA and the three measures of leverage- total leverage, long term leverage and short term leverage, which ranges from 72.86%, 89.98% and 62.19%, respectively. However, ROA was negatively correlated with size of the firms and Liquidity at -12.33% and -13.69%. The return on equity (ROE) had a positive but not strong correlation with TD/TE, SIZE and LIQUIDITY at -0.73%, -18.94% and -0.6.15%, respectively. These results indicated that leverages had a positive influence on the accounting performance while size and liquidity tend to have a negative influence on the accounting performance of the firms.

The results further showed that TD/TE had a positive correlation relationship with leverage i.e. LTD/TA and STD/TA, ROA and SIZE. This ranges from 79.46%, 39.23%,

72.86%. Although, it had a positive relationship with size, it was very weak at 5% while TD/TE had negative correlation with ROE at -0.73%. In the same vein, LTD/TA had a positive correlation with all other variables except SIZE and LIQUIDITY at -0.67% and -20.71%, respectively. A look at STD/TA revealed that it had a positive relationship with all other variables in the series. Similarly, SIZE was negatively signed with ROA, ROE, and LTD/TA which ranged as follows, -12.33%, -18.94%, and -6.7%, respectively, while it was positively signed but with a very weak relationship with TD/TE and STD/TA at 0.58% and 18.59%. Likewise, LIQUIDITY had a strong negative relationship with ROA, ROE, TD/TE, LTD/TA and a positive but weak relationship with STD/TA and SIZE at 16.01% and 17.32%,, respectively. It also had a positive relationship with the two accounting performance (ROA and ROE).

Table 4.2.2: Correlation Matrix for all Variables in Ghana from 2006-2016

	ROA	*ROE*	*TD/TE*	*LTD/TA*	*STD/TA*	*SIZE*	*LIQUIDITY*
ROA	1						
ROE	0.399	1					
TD/TE	0.728	-0.007	1				
LTD/TA	0.899	0.181	0.794	1			
STD/TA	0.621	0.356	0.392	0.421	1		
SIZE	-0.123	-0.189	0.058	-0.067	-0.185	1	
LIQUIDITY	-0.136	-0.061	-0.259	-0.207	-0.161	0.173	1

Source: Authors Computation 2018

4.2.3 Pair-wise Granger Causality test for Ghana

Pair-wise granger causality test showed the directional causality between one variable and the others. In line with most of the literature on econometrics, one variable is said to granger cause the other if it helps to make a more accurate prediction of the other variable. From the results, it was revealed that there was causal relationship between some variables. There were some variables that granger cause in two ways direction, meaning that from both dependent variables to independent variables and vise versa,

some were in one way direction i.e. uni-directional from one variable to another while some were independent i.e no causality. To determine the causal relationship the decision rule states that if the F statistics of the granger causality test is less than 3.84, the null hypothesis of no causal relationship should be retained meaning no causal relationship; when the F-statistic is greater than 3.84, the alternate hypothesis should be accepted meaning there is a causal relationship. More still, the P-value can also be used if it is less than 0.05 level of significance. Therefore, granger causality results for ROA and ROE revealed that there was a bi-directional causal relationship between LTDTA-ROA, TDTE-ROA and uni-directional causality between STDTA-ROE. The implication of this was that on bi-directional causality, firms should put in consideration the capital structure of the firm as its important ingredients to the performance of firms in Ghana. This meant that the more adequate the capital structure of firms is, the better the performance of the firm. Therefore, in forecasting for the firm, the relationship between them should be put into consideration because of the causal relationship between them. On the uni-directional causal relationship, STD-TA causes ROE. This means that STD-TA was an important ingredient to boost return on equity of shareholder in Ghana.

Table 4.2.3: Summary of Causality between Dependent and Independent Variables for ROA-ROE

HYPOTHESES	OBS	F-STAT	P-VALUE	DECISION	TYPE OF CAUSALITY
LTDTA-ROA	45	17.253	3.15	DNR	Bi-directional
TDTE-ROA	45	13.032	3.05	DNR	Bi-directional
STDTA-ROE	45	2.071	0.137	DNR	Uni-directional

P.VALUE= is an alternative to rejection points to provide the smallest level of significance at which the null hypothesis would be rejected. **F-STAT=** shows the means between two populations are significantly different.

Source: Authors Computation 2018

4.2.4 Panel Regression Analysis for ROA

Regression estimates of the coefficients of both fixed effect and panel OLS models for the evaluation of the impact of capital structure on the return on equity (ROA) of manufacturing companies in Sub-Saharan Africa is presented in Table 4.2.4A. The dependent variable was return on assets while the independent variables still remained Total Debt to Total Equity (TDTE), Long Term Debt to Total Asset (LTDTA), Short Term Debt to Total Asset (STDA), Size (SIZE) and Liquidity (LIQUIDITY). Columns 1 and 2 contained the fixed effect model and the panel OLS model, respectively. The results of the fixed effect model illustrated that all the variables except TDTA were positively related to ROA. This meant that an increase in those variables will bring about increase in ROA and vice versa.

However, the result in column 1 showed that LTDTA and STDTA were the only significant determinants of the ROA in manufacturing companies in Ghana. This was given by the standard errors of the coefficients less than half the coefficients. Thus, the variables had significant impact on ROA.

The estimates of the co-efficients showed that one unit increase in LTDTA and STDTA led to about 0.4354 units increase in ROA, while one unit increase in STDTA brought about 3.011units increase in ROA. On the other hand, a unit increase in TDTE brought about -0.0052units decrease in ROA, respectively. Since the independent variables were representing capital structure, the result thus indicated that capital structure significantly impact ROA of manufacturing companies in Ghana

In column 2, the panel OLS model established the same nature of relationship between the independent variables and the dependent variable as shown by the fixed effect models. Also, it established that LTDTA and STDTA were statistically significant. It displayed that a unit increase in TDTE led to 0.3726 increase in ROA while increase in

STDTA also led to increase in ROA by 2.6559, respectively. In short, the panel OLS model like its counterpart showed that capital structure significantly affected ROA of manufacturing companies in Ghana.

The R^2 was high for both estimation models with a value of 0.8984 and 0.8877; this indicated that about 89.84% and 88.77% of the variation in ROA had been explained by the variation in the explanatory variables of the studied firms. The F-statistics and Durbin-Watson statistics were also significant, hence the estimated equation can be relied upon in making valid inference about the influence of the explanatory variables on the accounting performance of the listed firms.

Having further corroborated the relationships between the significant explanatory variables and the dependent variable ROE, it was found that:

4. There was a significant negative relationship between SIZE of the selected firms and their accounting performance as measured by return on assets;
5. There was a significant positive relationship between TDTE and STDTA and the accounting performance of the firms except for fixed effects that shows short term leverage being non-significant; and
6. There was a non-significant positive relationship between LIQUIDITY, TDTE and the accounting performance of the firms while liquidity displays a positive significant relationship.

Table 4.2.4A: Estimation Results for ROA for the Sample Firms for the Period 2006-2016

Dependent Variable: ROA		
Independent Variables	Fixed Effects	Panel OLS
Constant	-2.524 (-2.007)	-0.036 (-1.959)
TDTE	-0.005(-0.086) **	0.013(0.259) **
LTDTA	0.435 (8.538)*	0.372 (9.502)*
STDTA	3.011 (5.264)	2.655(5.450)*
SIZE	0.405 (1.893)	-0.019 (-0.621)
LIQUIDITY	0.059 (1.487)* **	0.056(1.161)* **
No. of Observations	55	55
R^2	0.898	0.887
F-Statistics	44.22	77.51
Prob.(F-Statistics)	0.000	0.001
D-Watson Statistics	2.239	2.35

Note: ***, ** and * denote 1%, 5% and 10% level of significance respectively and Numbers in parentheses are the asymptotic t-values of the coefficient. ROA = the return on assets (EBIT/ total assets); ROE = return on equity (EBIT/total equity); TDTE = total debt divided by total equity; LTDTA = long-term debt divided by total assets; STDTA = short term debt divided by total assets; Size = Natural logarithm of total assets; LIQUIDITY = current assets/ current liabilities

Source: Author Computation, 2018

4.2.5 Panel Regression Analysis for ROE

Regression estimates of the coefficients of both fixed effect and panel OLS models for the evaluation of the impact of capital structure on the return on equity (ROE) of

manufacturing companies in Sub-Saharan Africa was presented in Table 4.2.4B. The dependent variable was return on equity while the independent variables still remained Total Debt to Total Equity (TDTE), Long Term Debt to Total Asset (LTDTA), Short Term Debt to Total Asset (STDA), Size (SIZE) and Liquidity (LIQUIDITY). Columns 1 and 2 contain the fixed effect model and the panel OLS model, respectively. The results of the fixed effect model illustrated that all the variables except TDTE were positively related to ROE. This meant that increase in those variables brought about increase in ROE and vice versa. However, the result in column 1 showed that only STDTA was statistically significant to ROE in manufacturing companies in Ghana. This was given by the standard errors of the co-efficients less than half the co-efficients. Thus, STDTA significantly impacted on ROE.

In column 2, the panel OLS model established the same nature of relationship between the independent variables and the dependent variable as shown by the fixed effect models. Also, it established that all the variables except TDTE, SIZE and LIQUIDITY were positively related to ROE. This implied that an increase in those variables will bring about increase in ROE and vice versa. However, the result in column 2 showed that TDTE and STDTA were statistically significant to ROE in manufacturing companies in Ghana. This was given by the standard errors of the co-efficients less than half the co-efficients. Thus, these variables significantly impacted on ROE. Although TDTE was statistically significant, it was negatively signed. However, STDTA was positively signed which implies that a unit increase in STDTA led to 1.9693 increase in ROE. Therefore, the study concluded that capital structure such as TDTE and STDTA significantly impacted on ROE of manufacturing companies in Ghana.

The R^2 was high for both estimation models with a value of 0.2704 and 0.2147. This indicated that about 27.04% and 21.47% of the variation in ROE had been explained by

the variation in the explanatory variables of the studied firms. The F-statistics and Durbin-Watson statistics were also significant, hence the estimated equation could be relied upon in making valid inference about the influence of the explanatory variables on the accounting performance of the listed firms.

Having further corroborated the relationships between the significant explanatory variables and the dependent variable ROE, it was found that:

1. There was a significant positive relationship between TDTE and STDTA of the selected firms and their accounting performance as measured by return on equity;
2. There was a significant positive relationship between TDTE and STDTA and the accounting performance of the firms as measured by return on assets except for fixed effects that shows TDTE being negatively signed; and,
3. There was a non-significant positive relationship between TDTE, LTDTA, SIZE and LIQUIDITY and the accounting performance of the firms (ROA) while LTDTA displayed a positive significant relationship but non-significant with ROE.

Table 4.2.5A: Estimation Results for ROE for the Sample Firms for the Period 2006-2016

Dependent Variable: ROE		
Independent Variables	Fixed Effects	Panel OLS
Constant	-1.019 (-0.494)	0.425 (1.404)
TDTE	-0.158 (1.584)* *	-0.182(-2.088)* *
LTDTA	0.102 (1.219)* *	0.112 (1.776)* *
STDTA	2.338 (2.493)	1.969 (2.496)*
SIZE	0.218 (0.621)	-0.024 (-0.484)
LIQUIDITY	0.018 (0.274)*	-0.013(-0.237)*
No. of Observations	55	55
R^2	0.270	0.214
F-Statistics	1.853	2.680
Prob.(F-Statistics)	0.08	0.032
D-Watson Statistics	2.270	2.133

Note: ***, ** and * denote 1%, 5% and 10% level of significance respectively and Numbers in parentheses are the asymptotic t-values of the coefficient. ROA = the return on assets (EBIT/ total assets); ROE = return on equity (EBIT/total equity); TDTE = total debt divided by total equity; LTDTA = long-term debt divided by total assets; STDTA = short term debt divided by total assets; Size = Natural logarithm of total assets; LIQUIDITY = current assets/ current liabilities

Source: Author Computation, 2018

4.3 Descriptive Analysis for Kenya

Table 4.3.1 reports summary statistics for the variables in Kenya from 2006 to 2016. A critical examination of the descriptive statistics for the dependent and explanatory variables revealed several issues. The mean value which was the average value of the series showed that mean of return on assets (ROA) for the sample as a whole was 0.28%, while the mean sample of return on equity (ROE) was 0.27%. Both measures of performance (ROA and ROE) had low percentage value among the variables employed

just like Ghana. A quick look at the leverage of the firms revealed that size of the firm had the highest mean 6.21% followed by liquidity 2.25% and STD/TA of 0.77%.

The look at the standard deviation of the variables which measured the degree of dispersion from the mean value revealed that STD/TD and ROE recorded low figure of 7% and 22.84% which were the least volatile variable while liquidity and size recorded the highest of 220% and 107%, respectively. This indicated that size and liquidity were the most volatile variables. The results also revealed that all the variables examined are positively skewed except size with -0.66% which indicated that the distribution had a long left tail. The kurtosis statistics measured the degree of peakedness or flatness of the variables. From the results obtained, all the variables were above 3 except size (2.35) that was lower than 3 which indicated that the distribution was flat i.e platykurtic relative to normal. Jarque-Bera statistics of the series were also presented in the table. It was actually used to test if the series were normally distributed. The null hypothesis of Jarque-Bera implies that the series are normally distributed. From the results, it was revealed that variables such as ROA, ROE, LTD/TA, STD/TD, LIQUIDITY were below 5% level of significance which indicated that the null hypothesis was retained i.e. the series were normally distributed. However, size was above 5% level of significance. This indicated that size was not normally distributed.

Table 4.3.1: Descriptive Statistics of Variables Used in Kenya

	ROA	ROE	TD_TE	LTD_TA	STD_TA	SIZE	LIQUIDITY
Mean	0.284	0.272	0.273	0.467	0.055	6.216	2.254
Median	0.154	0.232	0.068	0.287	0.022	6.550	1.728
Maximum	4.676	1.218	2.394	3.646	0.338	7.790	12.054
Minimum	0.020	0.0218	0.004	0.008	0.007	4.140	0.336
Std. Dev.	0.631	0.228	0.536	0.610	0.079	1.075	2.206
Skewness	6.331	2.063	2.614	3.023	2.060	-0.663	2.791
Kurtosis	44.303	8.386	9.129	14.787	6.680	2.356	11.489
Jarque-Bera	4276.925	105.517	148.774	402.220	69.952	4.984	236.633
Probability	0.000	0.000	0.0000	0.000000	0.000	0.082	0.000
Sum	15.651	14.961	15.069	25.712	3.030	341.930	123.972
Sum Sq. Dev.	21.511	2.817	15.54098	20.095	0.345	62.435	262.996
Observations	55	55	55	55	55	55	55

Source: Authors Computation 2018

4.3.1 Correlation Matrix for Kenya

The correlation matrix for the variables employed for Kenya was reported in Table 4.3.2. The results show that there was a positive relationship between ROA and the two measures of leverage- long term leverage and short term leverage, which ranged from 64.18% and 47.71%. However, ROA was negatively correlated with size of the firms and TD/TE at -26.03% and -10.15%, respectively. The return on equity (ROE) had a positive but weak correlation with LTD/TA, STD/TA and LIQUIDITY at 3.02%, 16.255% and 18.85%, respectively. These results indicated that leverages had a positive influence on the accounting performance while size and TD/TE seemed to have a negative influence on the accounting performance of the firms.

The results further showed that TD/TE had a positive correlation relationship with accounting performance of ROA and ROE at 64.18% and 3%, respectively. It also revealed that correlation existed between LTD/TA and SIZE at 38.04% and 41.31%,

while TD/TE had a negative correlation with STD/TA and LIQUIDITY at -19.13% and 14.84%. In the same vein, LTD/TA had a positive correlation with all other variables except LIQUIDITY at -0.34.57%. This supported the trend in Ghana. A look at STD/TA also revealed that it had a positive relationship with ROA, ROE, LTD/TA and SIZE but negatively correlated with liquidity at -22.40%. Similarly, SIZE was negatively signed with ROA and ROE which ranged as follows, -26.00%, and -37.52, respectively. This also supported the reports from Ghana while it was positively correlated with all the leverage components i.e TD/TE, LTD/TA and STD/TA at 41.31%, 21.38% and 1.97%. Although, LIQUIDITY had a weak and positive correlation with ROA, ROE and SIZE at 1.70%, 18.8552.80%, it had a strong negative relationship with all the leverage components i.e. TD/TE, LTD/TA and STD/TA at 14.88%, 34.57% and 22.40%, respectively.

Table 4.3.2: Correlation Matrix for all Variables in Kenya from 2006-2016

	ROA	*ROE*	*TD/TE*	*LTD/TA*	*STD/TA*	*SIZE*	*LIQUIDITY*
ROA	1						
ROE	0.535	1					
TD/TE	-0.101	-0.346	1				
LTD/TA	0.641	0.030	0.380	1			
STD/TA	0.477	0.162	-0.191	0.421	1		
SIZE	-0.260	-0.375	0.413	0.214	0.019	1	
LIQUIDITY	0.017	0.188	-0.148	-0.346	-0.224	0.028	1

Source: Authors Computation 2018

4.3.2 Granger Causality Test for ROA and ROE

The study employed pair-wise granger causality test to test for the direction of causality between capital structure and manufacturing performance in Kenya for 2006-2016. As discussed above, in econometrics, one variable is said to granger causes the other if it helps to make a more accurate prediction of the other variable. To determine the causal relationship, the decision rule stated that if the F-statistics of the granger causality test

was less than 3.84, the null hypothesis of no causal relationship should be retained meaning no causal relationship; when the F-statistic is greater than 3.84, the alternate hypothesis should be accepted meaning there was causal relationship. More still, the P-value can also be used if it is less than 0.05 level of significance. Therefore, granger causality results for ROA and ROE revealed that uni-directional causal relationship only existed between LTDTA- ROA, SIZE –ROA, LTDTA-TDTE, SIZE-LTDTA. This implies that causality runs from capital structure to manufacturing firm performance in Kenya. On the other hand, causality between capital structure and ROE revealed that there was also a unidirectional causality between LTDTA- ROE, SIZE–ROE, LTDTA-TDTE, SIZE-LTDTA while bi-direction causal relationship existed between STDTA-ROE. The implication of this was that on bi-directional causality, firms should put in consideration the capital structure of the firm as it was important ingredients to the performance of firms in Kenya. This meant that the more adequate the capital structure of firms is, the better the performance of the firm. Therefore, in forecasting for the firm, the relationship between them should be put into consideration because of the causal relationship between them.

Table 4.3.3A: Summary of Granger Causality for ROA

HYPOTHESES	OBS	F-STAT	P-VALUE	DECISION	TYPE OF CAUSALITY
LTDTA-ROA	45	4.557	0.016	DNR	Uni-directional
SIZE-ROA	45	4.973	0.011	DNR	Uni-directional
LTDTA-TDTE	45	0.266	0.767	DNR	Uni-directional
SIZE-LTDTA	45	3.438	0.042	DNR	Uni-directional

P.VALUE= is an alternative to rejection points to provide the smallest level of significance at which the null hypothesis would be rejected. **F-STAT=** shows the means between two populations are significantly different.

Source: Authors Computation 2018

Table 4.3.3B: Summary of Granger Causality for ROE

HYPOTHESES	OBS	F-STAT	P-VALUE	DECISION	TYPE OF CAUSALITY
LTDTA-ROE	45	23.783	2.007	DNR	Uni-directional
STDTA-ROE	45	6.233	0.004	DNR	Uni-directional
SIZE-ROE	45	7.292	0.002	DNR	Uni-directional
LTDTA-TDTE	45	0.266	0.766	DNR	Bi-directional
SIZE-LTDTA	45	3.439	0.041	DNR	Uni-directional

P.VALUE= is an alternative to rejection points to provide the smallest level of significance at which the null hypothesis would be rejected. **F-STAT=** shows the means between two populations are significantly different.

Source: Authors Computation 2018

4.3.3 A: Panel Regression Analysis for ROA

Regression estimates of the co-efficients of both fixed effect and panel OLS models for the evaluation of the impact of capital structure on the return on equity (ROA) of manufacturing companies in Kenya is presented in Table 4.3.4.A. The dependent variable was return on assets while the independent variables still remained Total Debt to Total Equity (TDTE), Long Term Debt to Total Asset (LTDTA), Short Term Debt to Total Asset (STDA), Size (SIZE) and Liquidity (LIQUIDITY). Columns 1 and 2 contain the fixed effect model and the panel OLS model, respectively. The results of the fixed effect model illustrated that all the variables except SIZE were positively related to ROA. This implied that an increase in those variables brought about increase in ROA and vice versa. However, the result in column 1 shows that LTDTA, STDTA, LIQUIDITY were statistically significant to ROA in manufacturing companies in Kenya. This was given by the standard errors of the co-efficients less than half the co-efficients. Thus, LTDTA, STDTA, LIQUIDITY significantly impact on ROA

In column 2, the panel OLS model established the same nature of relationship between the independent variables and the dependent variable as shown by the fixed effect models. Also, it established that that all the variables except TDTE and SIZE were

positively related to ROA. This meant that an increase in those variables brought about increase in ROA and vice versa. However, the result in column 2 showed that LTDTA, STDTA, SIZE, LIQUIDITY were statistically significant to ROA in manufacturing companies in Kenya. This was given by the standard errors of the co-efficients less than half the co-efficients. Thus, these variables significantly impact on ROA. Although SIZE was statistically significant to ROA, it was negatively signed. Therefore, the study concluded that in Kenya, capital structure such as LTDTA, STDTA and LIQUIDTY significantly impacted on ROA of manufacturing companies in Kenya.

The R^2 was high for both estimation models with a value of 0.8560 and 0.7378. This indicated that about 85.60% and 73.78% of the variation in ROA had been explained by the variation in the explanatory variables of the studied firms. The F-statistics and Durbin-Watson statistics were also significant, hence the estimated equation could be relied upon in making valid inference about the influence of the explanatory variables on the accounting performance of the listed firms.

Having further corroborated the relationships between the significant explanatory variables and the dependent variable ROA, it was found that:

1. There was a significant positive relationship between LTDTA, STDTA, LIQUIDITY of the selected firms and their accounting performance as measured by return on assets.
2. There was a positive relationship between TDTE and the accounting performance of the firms as measured by return on assets but negatively signed both in fixed and panel results.
3. In addition, SIZE had a statistical significant negative relationship with ROA.

Table 4.3.4A: Estimation Results for ROA for the Sample Firms for the Period 2006-2016

Dependent Variable: ROE		
Independent Variables	Fixed Effects	Panel OLS
Constant	-0.311 (-0.204)	1.025 (3.553)
TDTE	0.009 (0.085)*	-0.212 (-1.915)*
LTDTA	0.790 (6.044)* *	0.859 (8.603)* *
STDTA	3.126 (2.732)	1.371 (1.933)*
SIZE	-0.013 (-0.057)	-0.220 (-4.604)
LIQUIDITY	0.061 (3.041)* *	0.093 (4.127)* *
No. of Observations	55	55
R^2	0.856	0.737
F-Statistics	29.744	27.582
Prob.(F-Statistics)	0.000	0.000
D-Watson Statistics	1.541	0.751

Note: ***, ** and * denote 1%, 5% and 10% level of significance respectively and Numbers in parentheses are the asymptotic t-values of the coefficient. ROA = the return on assets (EBIT/ total assets); ROE = return on equity (EBIT/total equity); TDTE = total debt divided by total equity; LTDTA = long-term debt divided by total assets; STDTA = short term debt divided by total assets; Size = Natural logarithm of total assets; LIQUIDITY = current assets/ current liabilities

Source: Author Computation, 2018

Regression estimates of the co-efficients of both fixed effect and panel OLS models for the evaluation of the impact of capital structure on the return on equity (ROE) of manufacturing companies in Kenya is presented in Table 4.3.4.B. The dependent variable is return on equity while the independent variables still remain Total Debt to Total Equity (TDTE), Long Term Debt to Total Asset (LTDTA), Short Term Debt to Total Asset (STDA), Size (SIZE) and Liquidity (LIQUIDITY). Columns 1 and 2 contain the fixed effect model and the panel OLS model, respectively. The results of the fixed effect model illustrated that all the variables except TDTE were positively related to ROE. This meant that an increase in those variables brought about increase in ROE and vice versa. However, the result in column 1 also showed that only LIQUIDITY was statistically significant to ROE in manufacturing companies in Kenya. This was given by the standard errors of the co-efficients which was less than half the co-efficients. Thus,

LIQUIDITY significantly impacted on ROE.

In Column 2, the panel OLS model established the same nature of relationship between the independent variables and the dependent variable as shown by the fixed effect models. Also, it was revealed that all the variables except TDTE and SIZE were positively related to ROE. This meant that an increase in those variables brought about increase in ROE and vice versa. However, the result in Column 2 showed that SIZE and LIQUIDITY were statistically significant to ROE in manufacturing companies in Kenya. This was given by the standard errors of the co-efficients less than half the co-efficients. Thus, these variables significantly impacted on ROE. Although LTDTA and STDTA were non-statistically significant to ROE, it was negatively signed. Therefore, the study concluded that capital structure such as SIZE and LIQUIDTY significantly impacted on ROE of manufacturing companies in Kenya.

The R^2 was high for both estimation models with a value of 0.6367 and 0.28328. This indicated that about 63.67% and 28.32% of the variation in ROE had been explained by the variation in the explanatory variables of the studied firms. The F-statistics and Durbin-Watson statistics were also significant. Hence the estimated equation could be relied upon in making valid inference about the influence of the explanatory variables on the accounting performance of the listed firms.

Having further corroborated the relationships between the significant explanatory variables and the dependent variable ROA, it was found that:

1. There was a statistical significant relationship between SIZE and LIQUIDITY of the selected firms and their accounting performance as measured by return on equity. However, SIZE was negatively signed in PANEL OLS.

2. There was a positive relationship between TDTE and the accounting performance of the firms as measured by return on equity but was negatively signed both in fixed and panel results.
3. In addition SIZE had a statistical significant negative relationship with ROE

Table 4.3.4 B: Estimation Results for ROE for the Sample Firms for the Period 2006-2016

Dependent Variable: ROE		
Independent Variables	Fixed Effects	Panel OLS
Constant	-0.852 (-0.974)	0.625 (3.619)
TDTE	-0.049 (-0.816)* *	-0.108 (-1.631)* *
LTDTA	0.111 (1.487)*	0.097 (1.635)*
STDTA	0.210 (0.320)	0.200 (0.473)*
SIZE	0.162 (1.170)	-0.017 (-2.481)
LIQUIDITY	0.029 (2.545)* *	0.027 (2.035)* *
No. of Observations	55	55
R^2	0.636	0.283
F-Statistics	8.766	3.872
Prob.(F-Statistics)	0.000	0.004
D-Watson Statistics	1.813	1.102

Note: ***, ** and * denote 1%, 5% and 10% level of significance respectively and Numbers in parentheses are the asymptotic t-values of the coefficient. ROA = the return on assets (EBIT/ total assets); ROE = return on equity (EBIT/total equity); TDTE = total debt divided by total equity; LTDTA = long-term debt divided by total assets; STDTA = short term debt divided by total assets; Size = Natural logarithm of total assets; LIQUIDITY = current assets/ current liabilities

Source: Author Computation, 2018

4.4 Descriptive Statistics for South Africa

Table 4.4.1 also summarizes statistics report for the variables in South Africa. The following were revealed from the results. The mean value of the series showed that STD/TA, LTD/TA and TD/TE recorded lowest means for the sample as a whole in the range of 0.9%, 13.01% and 19.048%, respectively. Nevertheless, the mean value of ROA was low and was in line with the results from Ghana and Kenya while the ROE was above 50%. The variables with the highest mean were liquidity (501%) followed by size (67.4%). These also supported the reports from Ghana and Kenya.

The look at the standard deviation of the variables which measured the degree of dispersion from the mean value revealed that STD/TA recorded low figure of 1% which was the least volatile variable while liquidity recorded the highest value of 3057%. This indicates that liquidity was the most volatile variables in South Africa followed by ROE which was 114%. The results also revealed that all the variables examined were positively skewed. This indicated that the distribution had a long right tail. The kurtosis statistics measured the degree of peakedness or flatness of the variables. From the results obtained, all the variables were above 3. This indicated that the distribution was peaked i.e. leptokurtic relative to normal. The results of the Jarque-Bera statistics of the series revealed that all the variables were below 5% level of significance which indicated that the null hypothesis was rejected i.e. the series were not normally distributed.

Table 4.4.1: Descriptive Statistics of Variables used in South Africa

	ROA	ROE	TD_TE	STD_TA	SIZE	LTD_TA	LIQUIDITY
Mean	0.388	0.589	0.131	0.009	6.740	0.190	50.134
Median	0.092	0.173	0.073	0.003	6.580	0.047	1.174
Maximum	7.849	7.868	0.494	0.114	8.360	1.021	2264.803
Minimum	0.004	0.004	0.000	1.920	5.850	0.001	0.000
Std. Dev.	1.071	1.146	0.150	0.0199	0.594	0.250	305.773
Skewness	6.336	4.928	1.211	4.0087	0.848	1.405	7.099
Kurtosis	44.515	30.974	3.218	19.739	3.340	4.575	51.906
Jarque-Bera	4317.773	2016.016	13.563	789.463	6.865	23.807	5943.365
Probability	0.000	0.000	0.001	0.000	0.032	0.000	0.000
Sum	21.371	32.416	7.221	0.527	370.710	10.476	2757.284
Sum Sq. Dev.	61.890	70.918	1.218	0.021	19.069	3.400	504.
Observations	55	55	55	55	55	55	55

Source: Authors Computation 2018

4.4.1 Correlation Matrix for South Africa

The correlation matrix for the variables employed for South Africa was reported in Table 4.4.1. The results showed that there was a strong and positive relationship between ROA and ROE at 94.68% and it also had a very weak positive correlation with STD/TA, SIZE and LIQUIDITY at 9.52%, 13.04% and 1.89%, respectively. The return on equity (ROE) had a positive but weak correlation with STD/TA and SIZE at 9.72% and 12.37% respectively while there was a negative correlation between ROE and TD/TE, LTD/TA and LIQUIDTY at -5.22%, -11.06% and -1.155%, respectively. These results indicated that leverages had a negative influence on the accounting performance of ROE.

The results further showed that TD/TE had a strong negative correlation relationship with the accounting performance of ROA and ROE at -5.75% and 5.22%, respectively. It also revealed that negative correlation existed between LTD/TA, SIZE and LIQUIDITY at -7.18%, 11.06% 44.82% respectively, but had a positive correlation with STD/TA at 13.41%. In the same vein, LTD/TA had a positive correlation with all other variables except LIQUIDITY and SIZE at - 55.48% and -12.16%, respectively. A look at STD/TA also revealed that it had a positive relationship with ROA, ROE, LTD/TA, TD/TE, SIZE and LIQUIDITY, respectively. Similarly, SIZE was positively signed with ROA, ROE and STD/TA which ranged as follows, 3.04%, 12.37% and 35.11%, respectively. This also supported the reports from Ghana and Kenya as it was negatively correlated with the leverage components i.e TD/TE and LTD/TA -47.89% and 55.48%. However, LIQUIDITY had a weak and positive correlation with ROA, STD/TA and SIZE while it had a strong negative relationship with the leverage components such as TD/TE, LTD/TA at -14.05% and 7.77% and was negatively signed with ROA at -1.14%

Table 4.4.2: Correlation Matrix for all Variables in South Africa from 2006-2016

	ROA	*ROE*	*TD/TE*	*LTD/TA*	*STD/TA*	*SIZE*	*LIQUIDITY*
ROA	1						
ROE	0.947	1					
TD/TE	-0.058	-0.052	1				
LTD/TA	-0.072	-0.110	-0.044	1			
STD/TA	0.095	0.097	0.134	0.653	1		
SIZE	0.130	0.123	-0.478	-0.554	-0.351	1	
LIQUIDITY	0.019	-0.011	-0.140	-0.121	-0.078	0.386	1

Source: Authors Computation 2018

4.4.2 Granger Causality Test for ROA and ROE

The study employed pair-wise granger causality test to establish if capital structure granger causes manufacturing firms performance in South Africa for the period of 2006-2016. To determine the causal relationship, the decision rule states that if the F-statistics of the granger causality test is less than 3.84, the null hypothesis of no causal relationship should be retained meaning no causal relationship. Conversely, when the F-statistic is greater than 3.84, the alternate hypothesis should be accepted meaning there was a causal relationship. More still, the P-value can also be used if it was less than 0.05 level of significance. On the other hand, Therefore, granger causality results for ROA and ROE revealed that uni-directional causal relationship only existed between SIZE-ROA while bi-directional causal relationship existed between LIQUIDITY -ROA, LIQUIDITY – SIZE. On the other hand, causality test for ROE revealed that there existed a uni-directional causality between LIQUIDITY-ROE and bi-directional causality between LIQIDITY-SIZE of firms in South Africa. This implies that manufacturing firms in South Africa were large. But owing due to their expansion and number of years in existence, this had actually helped their performance. It also implies that forms performance in South Africa was influenced by liquidity and the size of firms, and this must always be considered while forecasting.

Table 4.4.3A: Summary of Granger Causality Test for ROA

HYPOTHESES	OBS	F-STAT	P-VALUE	DECISION	TYPE OF CAUSALITY
SIZE-ROA	45	4.052	0.133	DNR	Uni-directional
LIQ-ROA	45	386.370	0.017	DNR	Bi-directional
LIQ-SIZE	45	7.786	0.001	DNR	Bi-directional

Source: Authors Computation 2018

P.VALUE= is an alternative to rejection points to provide the smallest level of significance at which the null hypothesis would be rejected. **F-STAT=** shows the means between two populations are significantly different.

Table 4.4.3B: Summary of Granger Causality test for ROE

HYPOTHESES	OBS	F-STAT	P-VALUE	DECISION	TYPE OF CAUSALITY
LIQ-ROE	45	104.909	1.161	DNR	Uni-directional
LIQ-SIZE	45	7.785	0.0014	DNR	Bi-directional

P.VALUE= is an alternative to rejection points to provide the smallest level of significance at which the null hypothesis would be rejected. **F-STAT=** shows the means between two populations are significantly different.

Source: Authors Computation 2018

4.4.3 Panel Regression Analysis

Regression estimates of the co-efficients of both fixed effect and panel OLS models for the evaluation of the impact of capital structure on the return on equity (ROE) of manufacturing companies in South Africa was presented in Table 4.4.4.A. The dependent variable was return on equity while the independent variables still remained Total Debt to Total Equity (TDTE), Long Term Debt to Total Asset (LTDTA), Short Term Debt to Total Asset (STDA), Size (SIZE) and Liquidity (LIQUIDITY). Columns 1 and 2 contain the fixed effect model and the panel OLS model respectively. The results of the fixed effect model illustrated that TDTE and STDTA were positively related to ROE. This meant that an increase in those variables brought about increase in ROE and vice versa though SIZE, LTDTA, LIQUIDITY were negatively signed. However, the result in Column 1 also showed that none of the variables were statistically significant to ROE in manufacturing companies in South Africa. Thus, in South Africa, none of the variables of capital structure significantly impacted on ROA

In Column 2, the panel OLS model established the same nature of relationship between the independent variables and the dependent variable as shown by the fixed effect models. Also, it revealed that STDTA and SIZE were positively related to ROA. This implied that an increase in those variables brought about increase in ROE and vice versa. However, the result in Column 2 showed that STDTA and SIZE were non-statistically

significant to ROE in manufacturing companies in South Africa while TDTE, LTDTA, LIQUIDITY were negatively signed. Therefore, the study concluded that capital structure did not significantly impact on ROA of manufacturing companies in South Africa.

The R^2 was high for both estimation models with a value of 0.1691 and 0.0546. This indicated that about 16.91% and 5.46% of the variation in ROA had been explained by the variation in the explanatory variables of the studied firms. This relationship was low and weak. The F-statistics of both fixed and panel OLS were also insignificant, while durbin Watson showed no serial autocorrelation. Hence, the estimated equation could be relied upon in making valid inference about the influence of the explanatory variables on the accounting performance of the listed firms.

Having further corroborated the relationships between the significant explanatory variables and the dependent variable ROA, it was found that:

1. There was no statistical significant relationship between capital structure LTDTA, STDTA, SIZE, LIQUIDITY of the selected firms and their accounting performance as measured by return on assets.
2. Although, there was a positive relationship between TDTE, STDTA and the accounting performance of the firms as measured by return on assets, SIZE, LTDTA, LIQUIDITY were negatively signed.
3. It also revealed that capital structure had no impact on the return on assets of South Africa either in fixed or panel OLS.

Table 4.4.4 A: Estimation Results for ROA for the Sample Firms for the Period 2006-2016

Dependent Variable: ROA		
Independent Variables	Fixed Effects	Panel OLS
Constant	-0.311 (-0.205)	1.026 (3.554)
TDTE	0.009 (0.085)*	-0.213(-1.916)*
LTDTA	0.790 (6.045)*	0.860 (8.604)*
STDTA	3.126 (2.732)	1.371 (1.933)*
SIZE	-0.014 (-0.057)	-0.220 (-4.604)
LIQUIDITY	0.061 (3.041)*	0.094 (4.128)*
No. of Observations	55	55
R^2	0.856	0.738
F-Statistics	29.745	27.582
Prob.(F-Statistics)	0.000	0.000
D-Watson Statistics	1.541	0.751

Note: ***, ** and * denote 1%, 5% and 10% level of significance respectively and Numbers in parentheses are the asymptotic t-values of the coefficient. ROA = the return on assets (EBIT/ total assets); ROE = return on equity (EBIT/total equity); TDTE = total debt divided by total equity; LTDTA = long-term debt divided by total assets; STDTA = short term debt divided by total assets; Size = Natural logarithm of total assets; LIQUIDITY = current assets/ current liabilities

Source: Author Computation, 2018

Regression estimates of the co-efficients of both fixed effect and panel OLS models for the evaluation of the impact of capital structure on the return on equity (ROE) of manufacturing companies in South Africa was presented in Table 4.4.4.B. The dependent variable was return on equity while the independent variables still remained Total Debt to Total Equity (TDTE), Long Term Debt to Total Asset (LTDTA), Short Term Debt to Total Asset (STDA), Size (SIZE) and Liquidity (LIQUIDITY). Columns 1 and 2 contain the fixed effect model and the panel OLS model, respectively. The results of the fixed effect model illustrated that TDTE and STDTA were positively related to ROE. This meant that increase in those variables will bring about increase in ROE and vice versa, even though SIZE, LTDTA, LIQUIDITY were negatively signed. However, the result in

Columns 1 also showed that none of the variables were statistically significant to ROE in manufacturing companies in South Africa. Thus, in South Africa, none of the variables of capital structure significantly impacted on ROE

In Column 2, the panel OLS model established the same nature of relationship between the independent variables and the dependent variable as shown by the fixed effect models. Also, it revealed that STDTA and SIZE were positively related to ROE. The meant that an increase in those variables brought about an increase in ROE and vice versa. However, the result in Column 2 showed that STDTA and SIZE were non-statistically significant to ROE in manufacturing companies in South Africa while TDTE, LTDTA, LIQUIDITY were negatively signed. Therefore, the study concluded that in South Africa, capital structure did not significantly impact on ROA of manufacturing companies.

The R^2 was high for both estimation models with a value of 0.2053 and 0.0762. This indicated that about 20.53% and 7.62% of the variation in ROE had been explained by the variation in the explanatory variables of the studied firms. This relationship was low and very weak. The F-statistics of both fixed and panel OLS were also insignificant, while Durbin Watson showed no serial autocorrelation. Hence, the estimated equation could be relied upon in making valid inference about the influence of the explanatory variables on the accounting performance of the listed firms.

Having further corroborated the relationships between the significant explanatory variables and the dependent variable ROA, it was found that:

1. There was no statistical significant relationship between capital structure LTDTA. TDTE, STDTA, SIZE, LIQUIDITY of the selected firms and their accounting performance as measured by return on equity.

2. Although there was a positive relationship between TDTE, STDTA and the accounting performance of the firms as measured by return on equity, SIZE, LTDTA, LIQUIDITY were negatively signed using fixed effect.
3. Negative relationship also existed between TDTE, LTDTA and LIQUIDITY while positive relationship existed between STDTA and SIZE using panel OLS.
4. It also revealed that capital structure had no impact on the return on assets in South Africa either in fixed or panel OLS.

Table 4.4.4B: Estimation Results for ROE for the Sample Firms for the Period 2006-2016

Dependent Variable: ROE		
Independent Variables	Fixed Effects	Panel OLS
Constant	3.488 (0.915)	0.625 (3.619)
TDTE	0.047 (1.605)* **	-0.108(-1.631)* *
LTDTA	-0.275 (-1.016)*	0.0978(1.635)*
STDTA	20.605 (1.103)	0.201 (0.474)*
SIZE	-0.413 (-0.756)	-0.017(-2.482)
LIQUIDITY	-0.003 (-0.575)* *	0.026 (2.035)* **
No. of Observations	55	55
R^2	0.637	0.283
F-Statistics	8.766	3.873
Prob.(F-Statistics)	0.000	0.004
D-Watson Statistics	1.814	1.102

Note: ***, ** and * denote 1%, 5% and 10% level of significance respectively and Numbers in parentheses are the asymptotic t-values of the coefficient. ROA = the return on assets (EBIT/ total assets); ROE = return on equity (EBIT/total equity); TDTE = total debt divided by total equity; LTDTA = long-term debt divided by total assets; STDTA = short term debt divided by total assets; Size = Natural logarithm of total assets; LIQUIDITY = current assets/ current liabilities

Source: Author Computation, 2018

4.5 Descriptive Statistic for Nigeria

Table 4.5.1 also summarizes statistics report for the variables in Nigeria. The following were revealed from the results. The mean value of the series showed that ROA, SIZE and ROE recorded highest mean value for the sample as a whole in the range of 1116%, 728% and 319%, respectively. These results seem better than the results recorded in the

other three countries. The least variable with mean value was STD/TA which was 58.9% above 50%.

The look at the standard deviation of the variables which measured the degree of dispersion from the mean value revealed that SIZE recorded low figure of 0.99%, although this is closer to 1 which indicates that all variables were highly volatile. The results also revealed that all the variables examined were positively skewed. This indicates that the distribution had a long right tail. The kurtosis statistics measured the degree of peakedness or flatness of the variables. From the results obtained, all the variables were above 3 which indicated that the distribution was peaked i.e. leptokurtic relative to normal. The results of the Jarque-Bera statistics of the series revealed that all the variables were below 5% level of significance which indicates that the null hypothesis was rejected i.e. the series were not normally distributed. This outcome was in line with that of South Africa.

Table 4.5.1: Descriptive Statistics of all Variables for Nigeria

	ROA	ROE	TD_TE	STD_TA	SIZE	LTD_TA	LIQUIDITY
Mean	11.611	3.197	0.589	0.745	7.284	1.284	1.316
Median	0.194	1.357	0.062	0.028	7.700	0.056	0.983
Maximum	215.793	23.901	9.877	13.753	8.480	27.456	3.852
Minimum	0.0239	0.043	0.000	0.001	4.340	0.000	0.211
Std. Dev.	38.932	4.279	1.603	2.361	0.993	4.346	0.971
Skewness	3.9577	2.625	4.171	4.022	-1.623	4.682	1.407
Kurtosis	18.727	11.791	22.400	19.909	5.031	26.355	3.659
Jarque-Bera	710.454	240.264	1022.064	803.498	33.617	1451.066	19.149
Probability	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sum	638.619	175.818	32.398	40.964	400.620	70.620	72.433
Sum Sq. Dev.	81849.75	988.941	138.797	301.128	53.308	1020.315	51.008
Observations	55	55	55	55	55	55	55

Source: Authors Computation 2018

4.5.1 Correlation Matrix for Nigeria

The correlation matrix for the variables was reported in Table 4.5.2. The results showed that there was a strong positive relationship between ROA and the three measures of leverage- total leverage, long term leverage and short term leverage, which ranges from 95.59% and 90.18% and 98.49%. In addition, it was positively signed with ROE 71.44% as it was negatively correlated with size of the firms and Liquidity at -78.69% and -17.73%. Moreover, the return on equity (ROE) had a strong positive correlation with ROA TD/TE, LTD/TA, and STD/TA at 71.44%, 60,75%, 46.77% and 66.92% but had a negative correlation with SIZE and LIQUIDTY respectively. These results indicate that leverages have positive influence on the accounting performance while size and liquidity tend to have a negative influence on the accounting performance of the firms.

The results further showed that TD/TE had a strong positive relationship with leverage i.e LTD/TA and STD/TA and performance ROA and ROE. This ranged from 96.28%, 98.11%, 95.58% and 60.75 while TD/TE had a negative correlation with SIZE and LIQUIDITY at -0.80.39% and 13.30%. In the same vein, LTD/TA has positive correlation with all other variables except SIZE and LIQUIDITY at -74.00% and -15.16%, respectively. A look at STD/TA revealed that it had a positive relationship with all other variables in the series. This was supported by outcome of Ghana. Similarly, SIZE was negatively signed with ROA, ROE, TD/TE and LTD/TA which ranged as follows, -78.69%%, -54.37%, -80.39-% and -74.00% while it was positively signed with STD/TA at 0.78.89%. Although, LIQUIDITY had a strong negative relationship with ROA, ROE, TD/TE, LTD/TA, it was has positive with STD/TA and SIZE at 14.88% and 22.45%, respectively.

4.5.2 Granger Causality Test for ROA and ROE

The study employed pair-wise granger causality test to establish if capital structure granger causes manufacturing firms performance in Nigeria for the period of 2006-2016. Using the decision rule of P-value of 5% level of significance which states that if p-value of granger test is less than 5% the null hypothesis of no causal relationship should be rejected or using F-statistics 3.84 which states that if the F-statistics of the granger causality test is less than 3.84, the null hypothesis of no causal relationship should be retained. This means that there was no causal relationship. However, when the F-statistic is greater than 3.84, the alternate hypothesis should be accepted, meaning there was a causal relationship. Therefore, granger causality results for ROA revealed that a uni-directional causal relationship exited among LTDTA-ROA, LTDTA-TDTE, SIZE-TDTE, and LTDTA-SIZE while bi-directional causal relationship existed among TDTE-ROA, STDTA-ROA, SIZE-TDTE, STDTA-TDTE, SIZE-STDTA, and LTDTA-STDTA. Moreover, ROE revealed that there existed a uni-directional causal relationship among TDTE-ROE, SIZE-STDTA, LTDTA-SIZE, SIZE-TDTE while bi-directional causal relationship exist between STDTA-ROE, LTDTA-ROE, TDTE-STDTA, LTDTA-STDTA, LTDTA-TDTE. This implies that manufacturing firms' performances in Nigeria were actually being influenced by the components of capital structure because the causality runs from capital structure to firms' performance. Therefore, capital structure of firms must be put into consideration when forecasting as it really matters to the existence of manufacturing firms in Nigeria. In addition, the finding revealed that the manufacturing firms' size also contributed to their performance as revealed from the results below on Table 4.5.3A and B.

Table 4.5.3A: Summary of Granger Causality test for ROE

HYPOTHESES	OBS	F-STAT	P-VALUE	DECISION	TYPE OF CAUSALITY
TDTE-ROA	45	130.948	0.005	DNR	Bi-directional
STDTA-ROA	45	9.279	0.008	DNR	Bi-directional
SIZE-ROA	45	4.833	0.152	DNR	Uni-directional
LTDTA-ROA	45	184.260	0.024	DNR	Bi-directional
STDTA-TDTE	45	6.599	0.145	DNR	Uni-directional
SIZE-TDTE	45	5.155	0.145	DNR	Uni-directional
LTDTA-TDTE	45	26.553	0.006	DNR	Bi-directional
SIZE-STDTA	45	0.208	0.006	DNR	Bi-directional
LTDTA-STDTA	45	68.275	0.031	DNR	Bi-directional
LTDTA-SIZE	45	5.210	0.097	DNR	Uni-directional

P.VALUE= is an alternative to rejection points to provide the smallest level of significance at which the null hypothesis would be rejected. **F-STAT=** shows the means between two populations are significantly different.

Source: Authors Computation 2018

Table 4.5.3B: Summary of Granger Causality test for ROE

HYPOTHESES	OBS	F-STAT	P-VALUE	DECISION	TYPE OF CAUSALITY
STDTA-ROE	55	5.515	0.005	DNR	Bi-directional
TDTE-ROE	55	1.532	0.228	DNR	Uni-directional
LTD/TA-ROE	55	23.390	0.0007	DNR	Bi-directional
TDTE-STDTA	55	6.599	0.003	DNR	Bi-directional
SIZE-STDTA	55	0.208	0.812	DNR	Uni-directional
LTDTA-STDTA	55	68.275	0.031	DNR	Bi-directional
SIZE-TDTE	55	2.022	0.010	DNR	Uni-directional
LTDTA-TDTE	55	26.553	0.012	DNR	Bi-directional
LTDTA-SIZE	55	2.470	0.092	DNR	Uni-directional

P.VALUE= is an alternative to rejection points to provide the smallest level of significance at which the null hypothesis would be rejected. **F-STAT=** shows the means between two populations are significantly different.

Source: Authors Computation 2018

4.5.3 Panel Regression Analysis

Regression estimates of the coefficients of both fixed effect and panel OLS models for the evaluation of the impact of capital structure on the return on equity (ROA) of

manufacturing companies in Nigeria was presented in Table 4.5.4A. The dependent variable was return on assets while the independent variables still remained Total Debt to Total Equity (TDTE), Long Term Debt to Total Asset (LTDTA), Short Term Debt to Total Asset (STDA), Size (SIZE) and Liquidity (LIQUIDITY). Columns 1 and 2 contain the fixed effect model and the panel OLS model, respectively. The results of the fixed effect model illustrate that all the variables except STDTA were negatively related to ROA. This meant that an increase in those variables will bring about decrease in ROA and vice versa. However, the result in Column 1 showed that only STDTA was statistically significant to ROA in manufacturing companies in Nigeria. This was given by the standard errors of the co-efficients less than half the co-efficients. Thus, STDTA significantly impacted on ROA

In Column 2, the panel OLS model established the same nature of relationship between the independent variables and dependent variable as shown by the fixed effect models. Also, it established that that all the variables except STDTA was positively related to ROA. This meant that an increase in those variables brought about decrease in ROA and vice versa. However, the result in Column 2 showed that STDTA was statistically significant to ROA in manufacturing companies in Nigeria just as it was revealed in fixed effects. This was given by the standard errors of the co-efficients less than half the co-efficients. Thus, these variables significantly impacted on ROA. Therefore, the study concluded that capital structure such as STDTA significantly impact on ROA of manufacturing companies in Nigeria.

The R^2 was high for both estimation models with a value of 0.9765 and 0.9765. This indicates that about 97.65% and 97.65% of the variation in ROA had been explained by the variation in the explanatory variables of the studied firms. The F-statistics and Durbin-Watson statistics were also significant, hence the estimated equation can be

relied upon in making valid inference about the influence of the explanatory variables on the accounting performance of the listed firms.

Having further corroborated the relationships between the significant explanatory variables and the dependent variable ROA, it was found that:

1. There was a significant positive relationship between STDTA of the selected firms and their accounting performance as measured by return on assets both at fixed and panel OLS.
2. There was also a negative relationship between LTDTA, TDTE, SIZE and LIQUIDITY and the accounting performance of the firms as measured by return on assets both in fixed and panel results.

Table 4.5.4 A: Estimation Results for ROA for the Sample Firms for the Period 2006-2016

Dependent Variable: ROA		
Independent Variables	Fixed Effects	Panel OLS
Constant	16.572 (1.039)	10.394 (0.894)
TDTE	-3.592(-0.776)*	-3.707(-0.937)*
LTDTA	-1.115 (-1.283)*	-0.097(-1.411)*
STDTA	19.879 (9.395)	20.135(10.362)*
SIZE	-1.575 (-0.777)	-1.198(-0.772)
LIQUIDITY	-3.603(-0.142)*	-1.106(-1.178)*
No. of Observations	55	55
R^2	0.976	0.975
F-Statistics	207.909	389.449
Prob.(F-Statistics)	0.000	0.0000
D-Watson Statistics	3.633	3.630

Note: ***, ** and * denote 1%, 5% and 10% level of significance respectively and Numbers in parentheses are the asymptotic t-values of the coefficient. ROA = the return on assets (EBIT/ total assets); ROE = return on equity (EBIT/total equity); TDTE = total debt divided by total equity; LTDTA = long-term debt divided by total assets; STDTA = short term debt divided by total assets; Size = Natural logarithm of total assets; LIQUIDITY = current assets/ current liabilities

Source: Authors Computation 2018

Regression estimates of the co-efficient of both fixed effect and panel OLS models for

the evaluation of the impact of capital structure on the return on equity (ROA) of manufacturing companies in Kenya was presented in Table 4.4.4.B. The dependent variable was return on assets while the independent variables still remained Total Debt to Total Equity (TDTE), Long Term Debt to Total Asset (LTDTA), Short Term Debt to Total Asset (STDA), Size (SIZE) and Liquidity (LIQUIDITY). Columns 1 and 2 contain the fixed effect model and the panel OLS model, respectively.

The results of the fixed effect model illustrated that all the variables except STDTA and SIZE were negatively related to ROE. This meant that an increase in those variables brought about the decrease in ROE and vice versa. However, the result in Column 1 showed that only STDTA and LTDTA were statistically significant to ROE in manufacturing companies in Nigeria. This was given by the standard errors of the co-efficient less than half of the co-efficient. Thus, STDTA significantly impacted on ROE although LTDTA was negatively signed.

In Column 2, the panel OLS model established the same nature of relationship between the independent variables and dependent variable as shown by the fixed effect models. Also, it established that SIZE, TDTE and STDTA had a positive relationship with ROE. This meant that an increase in those variables brought about an increase in ROE and vice versa, while LIQUIDITY and LTDTA had a negative relationship with ROE. However, the result in Column 2 showed that STDTA, LIQUIDITY and LTDTA were statistically significant to ROE in manufacturing companies in Nigeria. This was given by the standard errors of the co-efficient less than half the co-efficient. Thus, these variables significantly impacted on ROE. Therefore, the study concluded that, in Nigeria, capital structure such as STDTA, LIQUIDITY and LTDTA significantly impacted on ROE of manufacturing companies.

The R^2 was high for both estimation models with a value of 0.9036 and 0.7048. This indicates that about 90.36% and 70.48% of the variation in ROE had been explained by the variation in the explanatory variables of the studied firms. The F-statistics and Durbin-Watson statistics were also significant, hence the estimated equation could be relied upon in making valid inference about the influence of the explanatory variables on the accounting performance of the listed firms.

Having further corroborated the relationships between the significant explanatory variables and the dependent variable ROE, it was found that:

1. There was a significant positive relationship between STDTA, LIQUIDITY and LTDTA of the selected firms and their accounting performance as measured by return on equity using both fixed and panel OLS.
2. There was also a negative relationship between LTDTA, TDTE, SIZE and LIQUIDITY and the accounting performance of the firms as measured by return on equity both in fixed and panel results.
3. It can be concluded that capital structure such as STDTA, LIQUIDITY LTDTA had a impact on accounting performance of the firms as measured by return on equity.

Table 4.5.4B: Estimation Results for ROE for the Sample Firms for the Period 2006-2016

Dependent Variable: ROE		
Independent Variables	Fixed Effects	Panel OLS
Constant	-0.852 (-0.974)	0.625 (3.619)
TDTE	-0.049(-0.816)**	-0.108(-1.631)**
LTDTA	0.111 (1.487)***	0.0977(1.635)***
STDTA	0.210 (0.320)	0.200 (0.473)*
SIZE	0.162 (1.170)	-0.017(-2.481)
LIQUIDITY	0.029 (2.545)***	0.027 (2.035)***
No. of Observations	55	55
R^2	0.636	0.283
F-Statistics	8.766	3.872
Prob.(F-Statistics)	0.000	0.004
D-Watson Statistics	1.813	1.102

Note: ***, ** and * denote 1%, 5% and 10% level of significance respectively and Numbers in parentheses are the asymptotic t-values of the coefficient. ROA = the return on assets (EBIT/ total assets); ROE = return on equity (EBIT/total equity); TDTE = total debt divided by total equity; LTDTA = long-term debt divided by total assets; STDTA = short term debt divided by total assets; Size = Natural logarithm of total assets; LIQUIDITY = current assets/ current liabilities

Source: Author's Computation 2018

4.2 Summary of Findings

Panel data regression analysis was employed to investigate the impact of capital structure on the performance of manufacturing companies in Sub-Sahara countries. The study revealed that capital structure is a significant determinant of performance of manufacturing companies in Sub-Sahara Africa countries. Furthermore, the study revealed that capital structure is a significant determinant of performance of manufacturing companies across selected Sub-Sahara African countries. The finding is consistent with the work of Osuji and Odita (2012) and therefore the first hypothesis that state that there is no significant relationship between the different components of capital structure and the performance of quoted manufacturing firms in Sub-Saharan Africa should be rejected. Similarly, it was revealed from the study that capital structure has causality relationship with performance of companies which is consistent with the study

of Athula, Anura, Khorshed and Anil (2011) and therefore the null hypothesis state that no significant causal relationship exists between capital structure and the performance of listed manufacturing firms in Sub-Sahara Africa should be rejected. This study is consistent with the a-priori expectation and also consistent with the study of Athula, Anura, Khorshed and Anil (2011) and Osuji and Odita (2012). The study supports the pecking order theory which advocates that firms with higher profitability will prefer internal financing to debt and hence a negative relationship is expected between profitability and leverage theory.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

This study examined the impact of capital structure on the manufacturing firms' performance in Sub-Saharan countries of Ghana, Kenya, South Africa and Nigeria in the 2006-2016 periods. Specifically, the study examined the effect of the different components of capital structure on the performance of the quoted manufacturing firms in Sub-Saharan Africa, investigated the direction of causal relationship that existed between capital structure and the performance of listed manufacturing firms in Sub-Saharan Africa and examined the cross-sectional performance of each of the sampled countries in Sub-Saharan Africa.

In order to achieve these objectives, pair-wise granger causality test was employed to test for direction of causality between capital structure and firms performance proxied by ROA and ROE. More importantly, the study employed panel regression of fixed and Panel OLS to establish the extent of determinants of capital structure variation on performance of manufacturing firms in the region

The study revealed that long run relationship existed between capital structure and manufacturing firms' performance in Sub-Saharan Africa. It was also revealed that causal relationship existed between the dependent variable and independent variable in sub-Saharan Africa. In Ghana, Short term-Total Assets (STDTA) and Long term-Total Assets (LTDTA) were relevant to performance proxy by Return to Assets (ROA) and Return on Equity (ROE). In Kenya, Long term-Total Assets (LTDTA), Short term-Total Assets (STDTA) and liquidity (LIQ) were relevant to return on assets (ROA) while only liquidity (LIQ) was relevant to return on equity (ROE). Similarly, in South Africa, it

was revealed that none of the categories of capital structure had a significant relationship with manufacturing performance. Although TDTE and STDTA were positively signed, they were not significant. In Nigeria, STDTA was relevant to ROA and STDTA, while LIQUIDITY and LTDTA were relevant determinants of manufacturing firms' performance.

In looking at the overall results of the impact of capital structure on manufacturing firms' performance in Sub-Saharan Africa, the different hypotheses stated in Chapter One were tested. Hypothesis 1 stated that components of capital structure had no significant effect on quoted manufacturing firms' performance in Sub-Saharan Africa. The study revealed that total leverage, long term leverage and short term leverage had high significant impact on ROA, although TDTE was negatively related to the accounting measure ROA. These results showed that higher level of leverage led to lower return on assets (ROA). Furthermore, it may provide support for the proposition that due to agency conflicts, firms over-leverage themselves, thus affecting their performance negatively. These findings were consistent with the finding of previous studies such as Tian and Zeitun (2007), Salim and Yadav (2012) and Ghasemi and Razak (2016), among others. The negative relationship between TDTE and ROA also suggested that there might be agency issues which may lead Sub-Saharan African firms to use it higher than the appropriate levels of debt in their capital structure thereby producing lower performance.

This was consistent with the findings of Salim and Yadav (2012) that indicated that there existed a significant negative relationship between total leverage and ROA. This findings support the pecking order theory of capital structure which suggested that profitable firms initially rely on less costly internally generated funds before looking out for external finances. It was, therefore, expected that highly profitable Sub-Saharan firms required less debt finance. The study, therefore, rejected the null hypothesis and

concluded that there was significant impact of different nature of capital structure on the performance of quoted manufacturing firms in Sub-Sahara Africa.

More importantly, the hypothesis 2 predicted that there was no causal relationship between accounting performance measures and the leverage. The study revealed that a Granger causality test for short term relationship between accounting performance measure and the leverages. It was also found that a causal relationship existed between ROA-LTDTA, ROA-STDTA, LTDTA-STDTA and SIZE and LIQ on the one hand, and a uni-directional causal relationship existed between ROA-TDTA, ROA-SIZE, TDTE-STDTA, TDTE-SIZE, LTDTA-SIZE, STDTA-SIZEROE-LTDTA and SIZE-LIQ on the other hand. While bi-directional causality existed between ROE-LIQ and SIZE-LIQ on the one hand uni-directional causal relationship existed between ROE-SIZE, TDTE-SIZE and STDTA-SIZE-LIQ on the other hand because their p-values were lesser than 5% significant level, indicating that there was causality. This was not in agreement with the findings of Skopljak and Luo (2012) that the causality of capital structure and leverage runs in only one direction because LIQUIDITY/SIZE and LTDTA/ROE run in a bi-directional effect. From the above observation, the null hypothesis was rejected. This led to the conclusion that there was a causal relationship between accounting performance measure (ROA, ROE) and the leverages (TDTE, LTDTA, STDTA, SIZE and LIQ).

5.2 Conclusion

Based on the empirical findings of the study, the study concluded that capital structure has significant impacts on financial performance of quoted manufacturing firms in Sub-Saharan Africa. More importantly, the study further concluded that causal relationship existed between components of capital structure and firms performance both in bi-directional and uni-directional effects and lastly on cross-sectional performance of each

country. It was concluded that performance of manufacturing forms in Ghana, Kenya and Nigeria was significantly determined by STDTA, LTDTA and LIQUIDITY while that of South Africa was determined by TDTE and STDTA but was not statistically significant.

5.3 Recommendations

The findings of this study revealed that capital structure is a significant determinant of performance of manufacturing companies across the selected Sub-Sahara countries. From the findings of this study, the following recommendations were suggested;

i. Firms (both highly and lowly geared) in selected Sub-Sahara Africa should take into cognizance the amount of leverage incurred because it is a significant determinant of firm's performance.

ii. Financial managers of firms in Sub-Sahara Africa countries should try to finance from retained earnings rather than relying heavily on debt capital in their capital structure and use debt as a last option as supported by the pecking order theory.

iii. Management must match the financing mix to the assets financed as closely as possible in terms of both timing and cash flows as to achieve the overall objective of the firm because value enhanced firm implies happy stakeholders thereby enhancing earnings attributable to shareholders.

iv. Firms in Sub-Sahara Africa should focus on the proportion of debt used and the manner of utilizing the resources while expanding the firms and the amount of investment on fixed asset.

v. In ensuring the survival of firms in Sub-Sahara Africa, management should strive to improve on their companies' financial leverage ratio.

vi. It was also recommended that the firms should build up the size of their operations in terms of good total assets as it will enhance their ability to have easy access to funds which could be employed to take up profitable investment and hence record good profitability position.

5.4 Suggestions for Further Studies

The study laid some groundwork to explore the impact of capital structure on performance of Sub-Saharan Africa firms upon which a more detailed evaluation could be based. Further research works are required to develop new hypotheses and design new variables to reflect the institutional influence. The future studies could be carried out on factors affecting capital structure in Sub-Saharan Africa. In addition, a more detailed work which studies the effects of the geographical location of the firms as well as the ongoing global economic downturn on the capital structure decisions and corporate performance of Sub-Saharan Africa firms could help in resolving some theoretical underpinnings of the results as obtained in this study.

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APPENDIX

Results from the pooled analysis for Sub-Sahara

UNIT ROOT TEST USING AUGUMENTED DICKEY FULLER

Null Hypothesis: LIQUIDITY has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-13.33741	0.0000
Test critical values:	1% level	-3.460173	
	5% level	-2.874556	
	10% level	-2.573784	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LIQUIDITY)
Method: Least Squares
Date: 04/18/18 Time: 12:41
Sample (adjusted): 2007 2225
Included observations: 219 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LIQUIDITY(-1)	-0.900948	0.067550	-13.33741	0.0000
C	12.41594	10.39690	1.194197	0.2337

R-squared	0.450475	Mean dependent var	0.002421
Adjusted R-squared	0.447943	S.D. dependent var	206.2465
S.E. of regression	153.2423	Akaike info criterion	12.91101
Sum squared resid	5095855.	Schwarz criterion	12.94196
Log likelihood	-1411.755	Hannan-Quinn criter.	12.92351
F-statistic	177.8864	Durbin-Watson stat	2.012647
Prob(F-statistic)	0.000000		

Null Hypothesis: LTD_TA has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-10.25007	0.0000
Test critical values:	1% level	-3.460173	
	5% level	-2.874556	
	10% level	-2.573784	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LTD_TA)
Method: Least Squares
Date: 04/18/18 Time: 12:43

Sample (adjusted): 2007 2225
Included observations: 219 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTD_TA(-1)	-0.652471	0.063655	-10.25007	0.0000
C	0.444422	0.158154	2.810066	0.0054

R-squared	0.326221	Mean dependent var	-0.000257
Adjusted R-squared	0.323116	S.D. dependent var	2.735628
S.E. of regression	2.250683	Akaike info criterion	4.469435
Sum squared resid	1099.229	Schwarz criterion	4.500385
Log likelihood	-487.4031	Hannan-Quinn criter.	4.481935
F-statistic	105.0640	Durbin-Watson stat	2.068857
Prob(F-statistic)	0.000000		

Null Hypothesis: SIZE has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.721618	0.0044
Test critical values:	1% level	-3.460173	
	5% level	-2.874556	
	10% level	-2.573784	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SIZE)
Method: Least Squares
Date: 04/18/18 Time: 12:43
Sample (adjusted): 2007 2225
Included observations: 219 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SIZE(-1)	-0.115707	0.031091	-3.721618	0.0003
C	0.770602	0.204862	3.761562	0.0002

R-squared	0.059997	Mean dependent var	0.020639
Adjusted R-squared	0.055666	S.D. dependent var	0.561631
S.E. of regression	0.545775	Akaike info criterion	1.635871
Sum squared resid	64.63787	Schwarz criterion	1.666821
Log likelihood	-177.1278	Hannan-Quinn criter.	1.648371
F-statistic	13.85044	Durbin-Watson stat	1.945918
Prob(F-statistic)	0.000252		

Null Hypothesis: STD_TA has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.258409	0.0000
Test critical values:	1% level	-3.460173	

	5% level	-2.874556
	10% level	-2.573784

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(STD_TA)
Method: Least Squares
Date: 04/18/18 Time: 12:44
Sample (adjusted): 2007 2225
Included observations: 219 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
STD_TA(-1)	-0.390724	0.053830	-7.258409	0.0000
C	0.083679	0.066356	1.261058	0.2086

R-squared	0.195356	Mean dependent var	-8.25E-05
Adjusted R-squared	0.191648	S.D. dependent var	1.075556
S.E. of regression	0.967015	Akaike info criterion	2.779884
Sum squared resid	202.9205	Schwarz criterion	2.810835
Log likelihood	-302.3973	Hannan-Quinn criter.	2.792384
F-statistic	52.68450	Durbin-Watson stat	2.028183
Prob(F-statistic)	0.000000		

Null Hypothesis: TD_TE has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.682200	0.0000
Test critical values:	1% level	-3.460173	
	5% level	-2.874556	
	10% level	-2.573784	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TD_T)E
Method: Least Squares
Date: 04/18/18 Time: 12:52
Sample (adjusted): 2007 2225
Included observations: 219 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TD_TE(-1)	-0.427637	0.055666	-7.682200	0.0000
C	0.154990	0.063343	2.446825	0.0152

R-squared	0.213814	Mean dependent var	-2.62E-05
Adjusted R-squared	0.210191	S.D. dependent var	0.999826
S.E. of regression	0.888557	Akaike info criterion	2.610655
Sum squared resid	171.3289	Schwarz criterion	2.641606
Log likelihood	-283.8667	Hannan-Quinn criter.	2.623155
F-statistic	59.01619	Durbin-Watson stat	2.098128
Prob(F-statistic)	0.000000		

Null Hypothesis: ROE has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.190822	0.0000
Test critical values:	1% level	-3.460173	
	5% level	-2.874556	
	10% level	-2.573784	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ROE)
Method: Least Squares
Date: 04/18/18 Time: 12:53
Sample (adjusted): 2007 2225
Included observations: 219 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROE(-1)	-0.300041	0.048465	-6.190822	0.0000
C	0.333682	0.133825	2.493428	0.0134

R-squared	0.150107	Mean dependent var	0.001203
Adjusted R-squared	0.146190	S.D. dependent var	1.963114
S.E. of regression	1.813953	Akaike info criterion	4.037984
Sum squared resid	714.0222	Schwarz criterion	4.068935
Log likelihood	-440.1593	Hannan-Quinn criter.	4.050484
F-statistic	38.32627	Durbin-Watson stat	1.851396
Prob(F-statistic)	0.000000		

Null Hypothesis: ROA has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.847992	0.0000
Test critical values:	1% level	-3.460173	
	5% level	-2.874556	
	10% level	-2.573784	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ROA)
Method: Least Squares
Date: 04/18/18 Time: 12:53
Sample (adjusted): 2007 2225
Included observations: 219 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

ROA(-1)	-0.355403	0.051899	-6.847992	0.0000
C	1.126140	1.048626	1.073919	0.2841

R-squared	0.177703	Mean dependent var	0.000446
Adjusted R-squared	0.173914	S.D. dependent var	16.86271
S.E. of regression	15.32639	Akaike info criterion	8.306120
Sum squared resid	50972.94	Schwarz criterion	8.337071
Log likelihood	-907.5202	Hannan-Quinn criter.	8.318620
F-statistic	46.89499	Durbin-Watson stat	1.939317
Prob(F-statistic)	0.000000		

UNIT ROOT USING PP TEST

Null Hypothesis: ROA has a unit root
Exogenous: Constant
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-6.903738	0.0000
Test critical values:	1% level	-3.460173	
	5% level	-2.874556	
	10% level	-2.573784	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	232.7531
HAC corrected variance (Bartlett kernel)	238.5811

Phillips-Perron Test Equation
Dependent Variable: D(ROA)
Method: Least Squares
Date: 04/18/18 Time: 12:54
Sample (adjusted): 2007 2225
Included observations: 219 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROA(-1)	-0.355403	0.051899	-6.847992	0.0000
C	1.126140	1.048626	1.073919	0.2841

R-squared	0.177703	Mean dependent var	0.000446
Adjusted R-squared	0.173914	S.D. dependent var	16.86271
S.E. of regression	15.32639	Akaike info criterion	8.306120
Sum squared resid	50972.94	Schwarz criterion	8.337071
Log likelihood	-907.5202	Hannan-Quinn criter.	8.318620
F-statistic	46.89499	Durbin-Watson stat	1.939317
Prob(F-statistic)	0.000000		

Null Hypothesis: ROE has a unit root
Exogenous: Constant
Bandwidth: 6 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-6.038954	0.0000
Test critical values:	1% level	-3.460173	
	5% level	-2.874556	
	10% level	-2.573784	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	3.260375
HAC corrected variance (Bartlett kernel)	3.036271

Phillips-Perron Test Equation
Dependent Variable: D(ROE)
Method: Least Squares
Date: 04/18/18 Time: 12:55
Sample (adjusted): 2007 2225
Included observations: 219 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROE(-1)	-0.300041	0.048465	-6.190822	0.0000
C	0.333682	0.133825	2.493428	0.0134

R-squared	0.150107	Mean dependent var	0.001203
Adjusted R-squared	0.146190	S.D. dependent var	1.963114
S.E. of regression	1.813953	Akaike info criterion	4.037984
Sum squared resid	714.0222	Schwarz criterion	4.068935
Log likelihood	-440.1593	Hannan-Quinn criter.	4.050484
F-statistic	38.32627	Durbin-Watson stat	1.851396
Prob(F-statistic)	0.000000		

Null Hypothesis: LIQUIDITY has a unit root
Exogenous: Constant
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-13.33305	0.0000
Test critical values:	1% level	-3.460173	
	5% level	-2.874556	
	10% level	-2.573784	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	23268.74
HAC corrected variance (Bartlett kernel)	23120.98

Phillips-Perron Test Equation
Dependent Variable: D(LIQUIDITY)
Method: Least Squares
Date: 04/18/18 Time: 12:55

Sample (adjusted): 2007 2225
Included observations: 219 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LIQUIDITY(-1)	-0.900948	0.067550	-13.33741	0.0000
C	12.41594	10.39690	1.194197	0.2337

R-squared	0.450475	Mean dependent var	0.002421
Adjusted R-squared	0.447943	S.D. dependent var	206.2465
S.E. of regression	153.2423	Akaike info criterion	12.91101
Sum squared resid	5095855.	Schwarz criterion	12.94196
Log likelihood	-1411.755	Hannan-Quinn criter.	12.92351
F-statistic	177.8864	Durbin-Watson stat	2.012647
Prob(F-statistic)	0.000000		

Null Hypothesis: LTD_TA has a unit root
Exogenous: Constant
Bandwidth: 8 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-10.84346	0.0000
Test critical values:	1% level	-3.460173	
	5% level	-2.874556	
	10% level	-2.573784	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	5.019311
HAC corrected variance (Bartlett kernel)	6.597940

Phillips-Perron Test Equation
Dependent Variable: D(LTD_TA)
Method: Least Squares
Date: 04/18/18 Time: 12:56
Sample (adjusted): 2007 2225
Included observations: 219 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTD_TA(-1)	-0.652471	0.063655	-10.25007	0.0000
C	0.444422	0.158154	2.810066	0.0054

R-squared	0.326221	Mean dependent var	-0.000257
Adjusted R-squared	0.323116	S.D. dependent var	2.735628
S.E. of regression	2.250683	Akaike info criterion	4.469435
Sum squared resid	1099.229	Schwarz criterion	4.500385
Log likelihood	-487.4031	Hannan-Quinn criter.	4.481935
F-statistic	105.0640	Durbin-Watson stat	2.068857
Prob(F-statistic)	0.000000		

Null Hypothesis: SIZE has a unit root
Exogenous: Constant
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.767574	0.0038
Test critical values:	1% level	-3.460173	
	5% level	-2.874556	
	10% level	-2.573784	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	0.295150
HAC corrected variance (Bartlett kernel)	0.304079

Phillips-Perron Test Equation
Dependent Variable: D(SIZE)
Method: Least Squares
Date: 04/18/18 Time: 12:56
Sample (adjusted): 2007 2225
Included observations: 219 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SIZE(-1)	-0.115707	0.031091	-3.721618	0.0003
C	0.770602	0.204862	3.761562	0.0002

R-squared	0.059997	Mean dependent var	0.020639
Adjusted R-squared	0.055666	S.D. dependent var	0.561631
S.E. of regression	0.545775	Akaike info criterion	1.635871
Sum squared resid	64.63787	Schwarz criterion	1.666821
Log likelihood	-177.1278	Hannan-Quinn criter.	1.648371
F-statistic	13.85044	Durbin-Watson stat	1.945918
Prob(F-statistic)	0.000252		

Null Hypothesis: STD_TA has a unit root
Exogenous: Constant
Bandwidth: 7 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-7.322446	0.0000
Test critical values:	1% level	-3.460173	
	5% level	-2.874556	
	10% level	-2.573784	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	0.926578
HAC corrected variance (Bartlett kernel)	0.953160

Phillips-Perron Test Equation
Dependent Variable: D(STD_TA)
Method: Least Squares
Date: 04/18/18 Time: 12:57
Sample (adjusted): 2007 2225

Included observations: 219 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
STD_TA(-1)	-0.390724	0.053830	-7.258409	0.0000
C	0.083679	0.066356	1.261058	0.2086

R-squared	0.195356	Mean dependent var	-8.25E-05
Adjusted R-squared	0.191648	S.D. dependent var	1.075556
S.E. of regression	0.967015	Akaike info criterion	2.779884
Sum squared resid	202.9205	Schwarz criterion	2.810835
Log likelihood	-302.3973	Hannan-Quinn criter.	2.792384
F-statistic	52.68450	Durbin-Watson stat	2.028183
Prob(F-statistic)	0.000000		

Null Hypothesis: TD_TE has a unit root
Exogenous: Constant
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-7.734745	0.0000
Test critical values:	1% level	-3.460173	
	5% level	-2.874556	
	10% level	-2.573784	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	0.782324
HAC corrected variance (Bartlett kernel)	0.800818

Phillips-Perron Test Equation
Dependent Variable: D(TD_TE)
Method: Least Squares
Date: 04/18/18 Time: 12:58
Sample (adjusted): 2007 2225
Included observations: 219 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TD_TE(-1)	-0.427637	0.055666	-7.682200	0.0000
C	0.154990	0.063343	2.446825	0.0152

R-squared	0.213814	Mean dependent var	-2.62E-05
Adjusted R-squared	0.210191	S.D. dependent var	0.999826
S.E. of regression	0.888557	Akaike info criterion	2.610655
Sum squared resid	171.3289	Schwarz criterion	2.641606
Log likelihood	-283.8667	Hannan-Quinn criter.	2.623155
F-statistic	59.01619	Durbin-Watson stat	2.098128
Prob(F-statistic)	0.000000		

Descriptive Analysis

	ROA	ROE	TDTE	LTDTA	STDTA	SIZE	LIQUIDITY
Mean	0.374248	0.402903	0.331449	0.568920	0.045502	14.06308	23.95043
Median	0.136086	0.230271	0.039348	0.266061	0.013913	14.56000	1.265324
Maximum	7.849333	7.867658	7.954176	12.04273	0.591504	19.25000	2264.803
Minimum	0.002263	0.005434	4.92E-05	0.001158	1.92E-05	8.880000	0.035754
Std. Dev.	0.996735	0.811384	0.962933	1.285467	0.085009	2.977926	207.3982
Skewness	5.608066	7.013144	5.264922	6.513003	3.455557	-0.249803	10.64775
Kurtosis	36.68333	61.94365	36.65054	55.07732	17.97635	1.826993	115.4874
Jarque-Bera	6301.840	18355.46	6216.181	14408.62	1360.273	8.127758	65534.57
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.017182	0.000000
Sum	44.90981	48.34830	39.77383	68.27034	5.460287	1687.570	2874.051
Sum Sq. Dev.	118.2242	78.34297	110.3415	196.6388	0.859952	1055.297	5118669.
Observations	220	220	220	220	220	220	220

Correlation Analysis

	ROA	ROE	TDTE	LTDTA	STDTA	SIZE	LIQUIDITY
ROA	1	0.739945143901652 6	0.349028471212071 9	0.545690528182694 6	0.362919235580714 6	-0.049696380172477 95	0.014317205056105 25
ROE	0.739945143901652 6	1	-0.060154835535819 11	0.034427016682237 22	0.075895114104977 69	-0.001479525377026 49	0.013150515577317 73
TDTE	0.349028471212071 9	-0.060154835535819 11	1	0.747888287528572 5	0.237242663823623 7	-0.072178806014101 4	-0.038755558557334 7
LTDTA	0.545690528182694 6	0.034427016682237 22	0.747888287528572 5	1	0.395246303787749 2	-0.074644163593015 48	-0.049417402656438 84
STDTA	0.362919235580714 6	0.075895114104977 69	0.237242663823623 7	0.395246303787749 2	1	-0.139664450406236	-0.059161860672137 1
SIZE	-0.049696380172477 95	-0.001479525377026 49	-0.072178806014101 4	-0.074644163593015 48	-0.139664450406236	1	0.172748790701771 7
LIQUIDITY	0.014317205056105 25	0.013150515577317 73	-0.038755558557334 7	-0.049417402656438 84	-0.059161860672137 1	0.172748790701771 7	1

Regression Analysis

Dependent Variable: ROA
Method: Panel Least Squares
Date: 02/19/18 Time: 22:13
Sample: 2006 2016
Periods included: 6
Cross-sections included: 20
Total panel (balanced) observations: 220

Variable	Coefficient	Std. Error	t-Statistic	Prob.

TDTE	-0.355888	0.075342	-4.723624	0.0000
LTDTA	0.330775	0.059301	5.577858	0.0000
STDTA	4.458966	0.609257	7.318692	0.0000
SIZE	0.010608	0.037981	0.279293	0.7805
LIQUIDITY	0.001658	0.000231	7.183273	0.0000
C	0.327687	0.240500	1.362523	0.1757

R-squared	0.604397	Mean dependent var	0.705307
Adjusted R-squared	0.587046	S.D. dependent var	0.799261
S.E. of regression	0.513617	Akaike info criterion	1.554028
Sum squared resid	30.07345	Schwarz criterion	1.693403
Log likelihood	-87.24169	Hannan-Quinn criter.	1.610629
F-statistic	34.83356	Durbin-Watson stat	1.337769
Prob(F-statistic)	0.000000		

Dependent Variable: ROA
Method: Panel Least Squares
Date: 02/19/18 Time: 22:14
Sample: 2006 2016
Periods included: 6
Cross-sections included: 20
Total panel (balanced) observations: 220

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TDTE	-0.247890	0.073519	-3.371783	0.0011
LTDTA	0.192716	0.057656	3.342508	0.0012
STDTA	4.854432	0.642883	7.551032	0.0000
SIZE	-0.033148	0.072571	-0.456762	0.6489
LIQUIDITY	0.001626	0.000204	7.956044	0.0000
C	0.620437	0.456115	1.360265	0.1771

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.812418	Mean dependent var	0.705307
Adjusted R-squared	0.751976	S.D. dependent var	0.799261
S.E. of regression	0.398048	Akaike info criterion	1.207831
Sum squared resid	14.25982	Schwarz criterion	1.904704
Log likelihood	-42.46986	Hannan-Quinn criter.	1.490834
F-statistic	13.44108	Durbin-Watson stat	2.518138
Prob(F-statistic)	0.000000		

Dependent Variable: ROE
Method: Panel Least Squares
Date: 02/19/18 Time: 22:18
Sample: 2006 2016
Periods included: 6
Cross-sections included: 20
Total panel (balanced) observations: 220

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TDTE	-0.411191	0.138214	-2.975034	0.0036
LTDTA	0.264634	0.108787	2.432580	0.0165
STDTA	2.473334	1.117673	2.212933	0.0289

SIZE	0.010265	0.069676	0.147330	0.8831
LIQUIDITY	0.001401	0.000424	3.308817	0.0013
C	0.817666	0.441194	1.853304	0.0664

R-squared	0.196475	Mean dependent var	1.040729
Adjusted R-squared	0.161232	S.D. dependent var	1.028803
S.E. of regression	0.942222	Akaike info criterion	2.767555
Sum squared resid	101.2071	Schwarz criterion	2.906929
Log likelihood	-160.0533	Hannan-Quinn criter.	2.824155
F-statistic	5.574960	Durbin-Watson stat	1.343255
Prob(F-statistic)	0.000124		

Dependent Variable: ROE
Method: Panel Least Squares
Date: 02/19/18 Time: 22:19
Sample: 2006 2016
Periods included: 6
Cross-sections included: 20
Total panel (balanced) observations: 220

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TDTE	-0.306420	0.126838	-2.415840	0.0177
LTDTA	0.213389	0.099470	2.145254	0.0346
STDTA	-0.697409	1.109126	-0.628791	0.5311
SIZE	-0.083894	0.125202	-0.670068	0.5045
LIQUIDITY	0.001357	0.000353	3.850910	0.0002
C	1.532445	0.786907	1.947429	0.0546

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.663023	Mean dependent var	1.040729
Adjusted R-squared	0.554442	S.D. dependent var	1.028803
S.E. of regression	0.686728	Akaike info criterion	2.298560
Sum squared resid	42.44355	Schwarz criterion	2.995433
Log likelihood	-107.9136	Hannan-Quinn criter.	2.581564
F-statistic	6.106229	Durbin-Watson stat	2.624066
Prob(F-statistic)	0.000000		

Result from Ghana

DESCRIPTIVE STATISTICS FOR GHANA

	ROA	ROE	TD_TE	LTD_TA	SIZE	LIQUIDITY
Mean	0.329629	0.359968	0.449070	0.771780	5.721273	1.182109
Median	0.109271	0.221222	0.039145	0.297431	5.470000	0.984405
Maximum	5.648704	2.944076	7.954176	12.04273	8.030000	9.014959
Minimum	0.002263	0.005434	4.92E-05	0.004392	3.850000	0.035754
Std. Dev.	0.856513	0.524121	1.310663	1.777433	1.378127	1.233128
Skewness	4.946963	3.394404	4.197686	5.013389	0.259819	4.746276

Kurtosis	29.31097	15.56889	21.97047	30.96676	1.714546	30.85930
Jarque-Bera	1810.776	467.6487	986.2437	2022.799	4.405534	1985.155
Probability	0.000000	0.000000	0.000000	0.000000	0.110497	0.000000
Sum	18.12957	19.79824	24.69883	42.44788	314.6700	65.01601
Sum Sq. Dev.	39.61517	14.83394	92.76325	170.6005	102.5586	82.11264
Observations	55	55	55	55	55	55

CORRELATION

	ROE	ROA	LTD_TA	SIZE	STD_TA	TD_TE	LIQUIDITY
ROE	1	0.966910536940 1359	0.303107116884 0919	0.185770579911 4314	-0.367561237948 964	0.126347820462 2758	0.263194181079 4571
ROA	0.966910536940 1359	1	0.299203854189 5115	0.281305883775 5998	-0.368164603086 8414	0.041574986821 783632	0.427868751877 2323
LTD_TA	0.303107116884 0919	0.299203854189 5115	1	-0.071621175390 4515	-0.606242640347 664	0.427369041622 52703	0.545425433407 118
SIZE	-0.185770579911 4314	-0.281305883775 5998	-0.071621175390 4515	1	0.213580432486 443	-0.146999714341 2343	0.079366957125 0573
STD_TA	-0.367561237948 964	-0.368164603086 8414	-0.606242640347 664	0.213580432486 443	1	-0.015598683931 392982	-0.498810437921 01903
TD_TA	0.126347820462 2758	0.041574986821 783632	0.427369041622 52703	-0.146999714341 2343	-0.015598683931 392982	1	-0.623468228131 81757
LIQUIDITY	0.263194181079 4571	0.427868751877 2323	0.545425433407 118	0.079366957125 0573	-0.498810437921 01903	-0.623468228131 81757	1

	ROA	*ROE*	*TD/TE*	*LTD/TA*	*STD/TA*	*SIZE*	*LIQUIDITY*
ROA	1						
ROE	0.399575	1					
TD/TA	0.728671	-0.00733	1				
LTD/TA	0.899864	0.181689	0.794619	1			
STD/TA	0.621948	0.356982	0.392364	0.421177	1		
SIZE	-0.12339	-0.18946	0.058331	-0.0678	0.18591	1	
LIQUIDITY	-0.13699	-0.06159	-0.25944	-0.20717	-0.16109	0.173217	1

CO-INTEGRATION

ROA-

Date: 05/22/18 Time: 02:37
Sample (adjusted): 2008 2060
Included observations: 53 after adjustments
Trend assumption: Linear deterministic trend
Series: ROA TD_TE LTD_TA SIZE LIQUIDITY STD_TA
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.636858	123.4961	95.75366	0.0002
At most 1	0.449030	69.80918	69.81889	0.0501
At most 2	0.302065	38.21724	47.85613	0.2926
At most 3	0.196517	19.15687	29.79707	0.4817
At most 4	0.130176	7.560483	15.49471	0.5135
At most 5	0.003182	0.168894	3.841466	0.6811

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.636858	53.68692	40.07757	0.0008
At most 1	0.449030	31.59194	33.87687	0.0915
At most 2	0.302065	19.06037	27.58434	0.4099
At most 3	0.196517	11.59639	21.13162	0.5878
At most 4	0.130176	7.391588	14.26460	0.4439
At most 5	0.003182	0.168894	3.841466	0.6811

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

ROA	TD_TE	LTD_TA	SIZE	LIQUIDITY	STD_TA
-6.255201	0.850990	1.102942	-0.009624	0.684071	15.39623
3.936360	-0.229174	-1.974411	0.045735	-0.457497	-11.25088
1.045241	-0.589357	-0.218356	0.121606	0.612100	10.44176
0.436766	-0.176069	0.157998	-0.009849	0.969540	-9.599362
0.489167	-0.533080	0.157742	0.799754	-0.301955	0.114360
0.492367	-2.654328	1.376208	-0.009339	-0.310489	1.971489

Unrestricted Adjustment Coefficients (alpha):

D(ROA)	0.503848	0.170363	-0.149393	0.007349	0.118470	0.000712
D(TD_TA)	0.278345	0.120290	-0.128975	0.060063	0.143329	0.025844
D(LTD_TA)	0.699031	0.559104	-0.072215	-0.026445	0.254484	0.027148
D(SIZE)	-0.028287	-0.094855	-0.005005	0.025597	-0.243808	0.015103
D(LIQUIDITY)	0.124084	0.123156	-0.316473	-0.246762	-0.295054	0.011391
D(STD_TA)	0.012036	0.023774	-0.042581	0.020316	0.011845	-0.000794

1 Cointegrating Equation(s): Log likelihood -170.8047

Normalized cointegrating coefficients (standard error in parentheses)

ROA	TD_TE	LTD_TA	SIZE	LIQUIDITY	STD_TA
1.000000	-0.136045	-0.176324	0.001539	-0.109360	-2.461349
	(0.04831)	(0.03411)	(0.01447)	(0.02331)	(0.28778)

Adjustment coefficients (standard error in parentheses)

D(ROA)	-3.151673
	(0.58347)
D(TD_TE)	-1.741104
	(0.67085)
D(LTD_TA)	-4.372581
	(1.22461)
D(SIZE)	0.176943
	(0.69294)
D(LIQUIDITY)	-0.776170
	(1.10076)
D(STD_TA)	-0.075289
	(0.09654)

2 Cointegrating Equation(s): Log likelihood -155.0087

Normalized cointegrating coefficients (standard error in parentheses)

ROA	TD_TE	LTD_TA	SIZE	LIQUIDITY	STD_TA
1.000000	0.000000	-0.744904	0.019159	-0.121357	-3.155068
		(0.07272)	(0.05904)	(0.09612)	(1.12643)
0.000000	1.000000	-4.179349	0.129522	-0.088184	-5.099180
		(0.57205)	(0.46445)	(0.75615)	(8.86142)

Adjustment coefficients (standard error in parentheses)

D(ROA)	-2.481061	0.389727
	(0.66334)	(0.07910)
D(TD_TE)	-1.267598	0.209301
	(0.78147)	(0.09319)
D(LTD_TA)	-2.171748	0.466736
	(1.30925)	(0.15612)
D(SIZE)	-0.196439	-0.002334
	(0.81203)	(0.09683)
D(LIQUIDITY)	-0.291385	0.077370
	(1.29348)	(0.15424)
D(STD_TA)	0.018293	0.004794
	(0.11102)	(0.01324)

3 Cointegrating Equation(s): Log likelihood -145.4785

Normalized cointegrating coefficients (standard error in parentheses)

ROA	TD_TE	LTD_TA	SIZE	LIQUIDITY	STD_TA
1.000000	0.000000	0.000000	-0.050487	-0.390282	-7.357145
			(0.07694)	(0.12534)	(1.42863)
0.000000	1.000000	0.000000	-0.261236	-1.597009	-28.67529
			(0.39418)	(0.64217)	(7.31945)
0.000000	0.000000	1.000000	-0.093497	-0.361019	-5.641096
			(0.14636)	(0.23843)	(2.71765)

Adjustment coefficients (standard error in parentheses)

D(ROA)	-2.637213	0.477773	0.251969
	(0.64899)	(0.09218)	(0.19755)

D(TD_TE)	-1.402407	0.285313	0.097658
	(0.77608)	(0.11023)	(0.23624)
D(LTD_TA)	-2.247230	0.509297	-0.317141
	(1.31983)	(0.18747)	(0.40175)
D(SIZE)	-0.201671	0.000616	0.157176
	(0.82009)	(0.11648)	(0.24964)
D(LIQUIDITY)	-0.622175	0.263886	-0.037199
	(1.25799)	(0.17868)	(0.38293)
D(STD_TA)	-0.026214	0.029890	-0.024366
	(0.10162)	(0.01443)	(0.03093)

4 Cointegrating Equation(s): Log likelihood -139.6803

Normalized cointegrating coefficients (standard error in parentheses)

ROA	TD_TE	LTD_TA	SIZE	LIQUIDITY	STD_TA
1.000000	0.000000	0.000000	0.000000	-2.821255	20.62872
				(1.03756)	(11.7804)
0.000000	1.000000	0.000000	0.000000	-14.17561	116.1322
				(5.33664)	(60.5921)
0.000000	0.000000	1.000000	0.000000	-4.862941	46.18595
				(1.93922)	(22.0178)
0.000000	0.000000	0.000000	1.000000	-48.15026	554.3156
				(20.5169)	(232.948)

Adjustment coefficients (standard error in parentheses)

D(ROA)	-2.634003	0.476479	0.253130	-0.015297
	(0.65005)	(0.09344)	(0.19801)	(0.01136)
D(TD_TE)	-1.376174	0.274738	0.107148	-0.013453
	(0.77452)	(0.11133)	(0.23593)	(0.01353)
D(LTD_TA)	-2.258780	0.513953	-0.321319	0.010322
	(1.32176)	(0.18999)	(0.40262)	(0.02310)
D(SIZE)	-0.190491	-0.003891	0.161220	-0.004927
	(0.82100)	(0.11801)	(0.25009)	(0.01435)
D(LIQUIDITY)	-0.729952	0.307333	-0.076187	-0.031616
	(1.22976)	(0.17676)	(0.37460)	(0.02149)
D(STD_TA)	-0.017341	0.026313	-0.021156	-0.004407
	(0.09925)	(0.01427)	(0.03023)	(0.00173)

5 Cointegrating Equation(s): Log likelihood -135.9845

Normalized cointegrating coefficients (standard error in parentheses)

ROA	TD_TE	LTD_TA	SIZE	LIQUIDITY	STD_TA
1.000000	0.000000	0.000000	0.000000	0.000000	-13.66579
					(2.90947)
0.000000	1.000000	0.000000	0.000000	0.000000	-56.18320
					(13.6730)
0.000000	0.000000	1.000000	0.000000	0.000000	-12.92680
					(3.86613)
0.000000	0.000000	0.000000	1.000000	0.000000	-30.98746
					(11.5998)
0.000000	0.000000	0.000000	0.000000	1.000000	-12.15576
					(4.98088)

Adjustment coefficients (standard error in parentheses)

D(ROA)	-2.576051	0.413325	0.271818	0.079450	0.146637
	(0.63786)	(0.10212)	(0.19435)	(0.06898)	(0.12286)
D(TD_TE)	-1.306062	0.198332	0.129757	0.101175	0.071385
	(0.75949)	(0.12160)	(0.23141)	(0.08214)	(0.14629)
D(LTD_TA)	-2.134295	0.378292	-0.281176	0.213846	0.075714
	(1.29373)	(0.20713)	(0.39419)	(0.13991)	(0.24920)

D(SIZE)	-0.309754	0.126078	0.122761	-0.199913	0.119417
	(0.77638)	(0.12430)	(0.23656)	(0.08396)	(0.14955)
D(LIQUIDITY)	-0.874283	0.464620	-0.122729	-0.267586	-0.315326
	(1.18751)	(0.19013)	(0.36182)	(0.12843)	(0.22874)
D(STD_TA)	-0.011547	0.019998	-0.019288	0.005066	-0.012586
	(0.09858)	(0.01578)	(0.03004)	(0.01066)	(0.01899)

ROE-

Date: 05/22/18 Time: 02:38
Sample (adjusted): 2008 2060
Included observations: 53 after adjustments
Trend assumption: Linear deterministic trend
Series: ROE TD_TE LTD_TA STD_TA SIZE LIQUIDITY
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.612260	116.8316	95.75366	0.0008
At most 1	0.430212	66.61823	69.81889	0.0877
At most 2	0.298302	36.80624	47.85613	0.3567
At most 3	0.175460	18.03088	29.79707	0.5638
At most 4	0.125665	7.805577	15.49471	0.4864
At most 5	0.012900	0.688130	3.841466	0.4068

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.612260	50.21333	40.07757	0.0026
At most 1	0.430212	29.81199	33.87687	0.1417
At most 2	0.298302	18.77536	27.58434	0.4321
At most 3	0.175460	10.22530	21.13162	0.7232
At most 4	0.125665	7.117447	14.26460	0.4754
At most 5	0.012900	0.688130	3.841466	0.4068

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

ROE	TD_TE	LTD_TA	STD_TA	SIZE	LIQUIDITY
-3.989564	-0.926078	1.134626	14.31961	-0.134228	0.293457
2.122276	0.256257	0.652348	-9.145107	0.080386	-0.115932
1.000830	-0.356493	0.080200	9.401119	0.112488	0.690405
-1.008642	0.121500	0.052876	-6.264978	-0.143251	1.102467
-1.002408	-0.790272	0.474503	3.734450	0.767078	-0.036415
-0.502422	-2.750565	1.577677	2.953546	-0.097346	-0.101227

Unrestricted Adjustment Coefficients (alpha):

D(ROE)	0.122416	-0.187750	-0.137050	-0.011915	0.114059	-0.013951
D(TD_TE)	-0.614537	-0.037570	-0.077249	-0.015297	0.102594	0.059696
D(LTD_TA)	-1.130061	-0.525675	-0.080373	-0.079076	0.236963	0.076687
D(STD_TA)	-0.055328	0.007978	-0.036805	0.013212	0.007523	-0.002029
D(SIZE)	0.247420	-0.009866	-0.017614	0.086432	-0.199408	0.036606
D(LIQUIDITY)	0.202422	-0.282387	-0.389969	-0.105819	-0.246126	0.035095

1 Cointegrating Equation(s): Log likelihood -189.0488

Normalized cointegrating coefficients (standard error in parentheses)

ROE	TD_TE	LTD_TA	STD_TA	SIZE	LIQUIDITY
1.000000	0.232125	-0.284398	-3.589268	0.033645	-0.073556
	(0.08288)	(0.05662)	(0.47479)	(0.02403)	(0.03847)

Adjustment coefficients (standard error in parentheses)

D(ROE)	-0.488385
	(0.31120)
D(TD_TE)	2.451733
	(0.46972)
D(LTD_TA)	4.508450
	(0.92348)
D(STD_TA)	0.220736
	(0.05448)
D(SIZE)	-0.987097
	(0.42176)
D(LIQUIDITY)	-0.807574
	(0.69420)

2 Cointegrating Equation(s): Log likelihood -174.1428

Normalized cointegrating coefficients (standard error in parentheses)

ROE	TD_TE	LTD_TA	STD_TA	SIZE	LIQUIDITY
1.000000	0.000000	0.948935	-5.089486	0.042466	-0.034104
		(0.17092)	(2.59453)	(0.13728)	(0.22098)
0.000000	1.000000	-5.313229	6.462971	-0.038001	-0.169959
		(0.77057)	(11.6973)	(0.61891)	(0.99629)

Adjustment coefficients (standard error in parentheses)

D(ROE)	-0.886842	-0.161479
	(0.32903)	(0.06996)
D(TD_TE)	2.371999	0.559481
	(0.53145)	(0.11300)
D(LTD_TA)	3.392824	0.911816
	(0.98424)	(0.20928)
D(STD_TA)	0.237668	0.053283
	(0.06148)	(0.01307)
D(SIZE)	-1.008037	-0.231658
	(0.47768)	(0.10157)
D(LIQUIDITY)	-1.406876	-0.259822
	(0.76295)	(0.16223)

3 Cointegrating Equation(s): Log likelihood -164.7551

Normalized cointegrating coefficients (standard error in parentheses)

ROE	TD_TE	LTD_TA	STD_TA	SIZE	LIQUIDITY
1.000000	0.000000	0.000000	0.678612	0.061845	0.193871
			(1.21272)	(0.06581)	(0.10586)

0.000000	1.000000	0.000000	-25.83347	-0.146510	-1.446428
			(6.63952)	(0.36031)	(0.57957)
0.000000	0.000000	1.000000	-6.078495	-0.020422	-0.240244
			(2.67300)	(0.14506)	(0.23333)

Adjustment coefficients (standard error in parentheses)

D(ROE)	-1.024006	-0.112621	0.005426
	(0.32346)	(0.07162)	(0.09164)
D(TD_TE)	2.294686	0.587020	-0.727973
	(0.54171)	(0.11995)	(0.15347)
D(LTD_TA)	3.312384	0.940469	-1.631565
	(1.00657)	(0.22289)	(0.28516)
D(STD_TA)	0.200833	0.066403	-0.060524
	(0.05762)	(0.01276)	(0.01632)
D(SIZE)	-1.025666	-0.225379	0.272880
	(0.48910)	(0.10830)	(0.13856)
D(LIQUIDITY)	-1.797169	-0.120801	0.014183
	(0.73366)	(0.16245)	(0.20785)

4 Cointegrating Equation(s): Log likelihood -159.6424

Normalized cointegrating coefficients (standard error in parentheses)

ROE	TD_TE	LTD_TA	STD_TA	SIZE	LIQUIDITY
1.000000	0.000000	0.000000	0.000000	0.042005	0.669612
				(0.12827)	(0.20902)
0.000000	1.000000	0.000000	0.000000	0.608767	-19.55697
				(3.52781)	(5.74843)
0.000000	0.000000	1.000000	0.000000	0.157291	-4.501571
				(0.83276)	(1.35695)
0.000000	0.000000	0.000000	1.000000	0.029236	-0.701050
				(0.13076)	(0.21307)

Adjustment coefficients (standard error in parentheses)

D(ROE)	-1.011988	-0.114069	0.004796	2.256163
	(0.33095)	(0.07210)	(0.09168)	(1.42547)
D(TD_TE)	2.310115	0.585161	-0.728782	-9.086742
	(0.55432)	(0.12077)	(0.15356)	(2.38760)
D(LTD_TA)	3.392144	0.930861	-1.635746	-11.63487
	(1.02868)	(0.22412)	(0.28498)	(4.43079)
D(STD_TA)	0.187506	0.068009	-0.059826	-1.294019
	(0.05823)	(0.01269)	(0.01613)	(0.25080)
D(SIZE)	-1.112844	-0.214878	0.277450	2.926100
	(0.49685)	(0.10825)	(0.13764)	(2.14005)
D(LIQUIDITY)	-1.690435	-0.133658	0.008588	2.477863
	(0.74715)	(0.16278)	(0.20698)	(3.21817)

5 Cointegrating Equation(s): Log likelihood -156.0837

Normalized cointegrating coefficients (standard error in parentheses)

ROE	TD_TE	LTD_TA	STD_TA	SIZE	LIQUIDITY
1.000000	0.000000	0.000000	0.000000	0.000000	1.051771
					(0.31238)
0.000000	1.000000	0.000000	0.000000	0.000000	-14.01847
					(4.12321)
0.000000	0.000000	1.000000	0.000000	0.000000	-3.070553
					(0.94500)
0.000000	0.000000	0.000000	1.000000	0.000000	-0.435060
					(0.13618)
0.000000	0.000000	0.000000	0.000000	1.000000	-9.097915
					(2.66154)

Adjustment coefficients (standard error in parentheses)

D(ROE)	-1.126322	-0.204207	0.058918	2.682111	0.042258
	(0.32810)	(0.08808)	(0.09456)	(1.40558)	(0.05447)
D(TD_TE)	2.207274	0.504084	-0.680101	-8.703611	0.151667
	(0.56173)	(0.15080)	(0.16189)	(2.40644)	(0.09325)
D(LTD_TA)	3.154610	0.743596	-1.523306	-10.74995	0.293484
	(1.03745)	(0.27851)	(0.29900)	(4.44440)	(0.17222)
D(STD_TA)	0.179965	0.062063	-0.056256	-1.265925	0.007806
	(0.05927)	(0.01591)	(0.01708)	(0.25391)	(0.00984)
D(SIZE)	-0.912956	-0.057291	0.182830	2.181421	-0.201328
	(0.48702)	(0.13075)	(0.14036)	(2.08640)	(0.08085)
D(LIQUIDITY)	-1.443716	0.060849	-0.108200	1.558717	-0.267377
	(0.74274)	(0.19940)	(0.21406)	(3.18188)	(0.12330)

GRANGER CAUSALITY

ROE –

Pairwise Granger Causality Tests
Date: 05/22/18 Time: 02:39
Sample: 2006 2060
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
TD_TE does not Granger Cause ROE	53	0.47535	0.6246
ROE does not Granger Cause TD_TE		2.06352	0.1381
LTD_TA does not Granger Cause ROE	53	0.15724	0.8549
ROE does not Granger Cause LTD_TA		2.34365	0.1069
STD_TA does not Granger Cause ROE	53	6.05881	0.0045
ROE does not Granger Cause STD_TA		2.07188	0.1371
SIZE does not Granger Cause ROE	53	0.38719	0.6811
ROE does not Granger Cause SIZE		0.83478	0.4402
LIQUIDITY does not Granger Cause ROE	53	0.19916	0.8201
ROE does not Granger Cause LIQUIDITY		0.28280	0.7549
LTD_TA does not Granger Cause TD_TE	53	0.89397	0.4157
TD_TE does not Granger Cause LTD_TA		1.06839	0.3516
STD_TA does not Granger Cause TD_TE	53	1.43425	0.2483
TD_TE does not Granger Cause STD_TA		0.23192	0.7939
SIZE does not Granger Cause TD_TE	53	0.54044	0.5860
TD_TE does not Granger Cause SIZE		0.73803	0.4834
LIQUIDITY does not Granger Cause TD_TE	53	0.57328	0.5675
TD_TE does not Granger Cause LIQUIDITY		0.43203	0.6517
STD_TA does not Granger Cause LTD_TA	53	0.49955	0.6099
LTD_TA does not Granger Cause STD_TA		0.22103	0.8025
SIZE does not Granger Cause LTD_TA	53	0.63017	0.5368
LTD_TA does not Granger Cause SIZE		0.85789	0.4305

LIQUIDITY does not Granger Cause LTD_TA	53	0.56052	0.5746
LTD_TA does not Granger Cause LIQUIDITY		0.54222	0.5850
SIZE does not Granger Cause STD_TA	53	0.11474	0.8918
STD_TA does not Granger Cause SIZE		0.07141	0.9312
LIQUIDITY does not Granger Cause STD_TA	53	0.39788	0.6739
STD_TA does not Granger Cause LIQUIDITY		0.14358	0.8666
LIQUIDITY does not Granger Cause SIZE	53	0.27395	0.7616
SIZE does not Granger Cause LIQUIDITY		2.59683	0.0849

ROA

Pairwise Granger Causality Tests
Date: 05/22/18 Time: 02:43
Sample: 2006 2060
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LTD_TA does not Granger Cause ROA	53	11.5669	8.E-05
ROA does not Granger Cause LTD_TA		17.2535	2.E-06
TD_TE does not Granger Cause ROA	53	13.5466	2.E-05
ROA does not Granger Cause TD_TE		13.0329	3.E-05
STD_TA does not Granger Cause ROA	53	0.63947	0.5320
ROA does not Granger Cause STD_TA		0.44418	0.6440
SIZE does not Granger Cause ROA	53	1.26152	0.2924
ROA does not Granger Cause SIZE		0.89520	0.4152
LIQUIDITY does not Granger Cause ROA	53	0.71484	0.4944
ROA does not Granger Cause LIQUIDITY		0.37274	0.6908
TD_TE does not Granger Cause LTD_TA	53	1.06839	0.3516
LTD_TA does not Granger Cause TD_TA		0.89397	0.4157
STD_TA does not Granger Cause LTD_TA	53	0.49955	0.6099
LTD_TA does not Granger Cause STD_TA		0.22103	0.8025
SIZE does not Granger Cause LTD_TA	53	0.63017	0.5368
LTD_TA does not Granger Cause SIZE		0.85789	0.4305
LIQUIDITY does not Granger Cause LTD_TA	53	0.56052	0.5746
LTD_TA does not Granger Cause LIQUIDITY		0.54222	0.5850
STD_TA does not Granger Cause TD_TE	53	1.43425	0.2483
TD_TE does not Granger Cause STD_TA		0.23192	0.7939
SIZE does not Granger Cause TD_TE	53	0.54044	0.5860
TD_TE does not Granger Cause SIZE		0.73803	0.4834
LIQUIDITY does not Granger Cause TD_TE	53	0.57328	0.5675
TD_TE does not Granger Cause LIQUIDITY		0.43203	0.6517
SIZE does not Granger Cause STD_TA	53	0.11474	0.8918
STD_TA does not Granger Cause SIZE		0.07141	0.9312

LIQUIDITY does not Granger Cause STD_TA	53	0.39788	0.6739
STD_TA does not Granger Cause LIQUIDITY		0.14358	0.8666
LIQUIDITY does not Granger Cause SIZE	53	0.27395	0.7616
SIZE does not Granger Cause LIQUIDITY		2.59683	0.0849

CO-INTEGRATION

Pedroni Residual Cointegration Test
Series: ROA TD_TE LTD_TA STD_TA SIZE LIQUIDITY
Date: 05/23/18 Time: 03:45
Sample: 2006 2016
Included observations: 55
Cross-sections included: 5
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
Automatic lag length selection based on SIC with a max lag of 0
Newey-West automatic bandwidth selection and Bartlett kernel

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-0.405933	0.6576	-0.564245	0.7137
Panel rho-Statistic	2.130562	0.9834	1.913983	0.9722
Panel PP-Statistic	-3.295929	0.0005	-3.584915	0.0002
Panel ADF-Statistic	-2.010308	0.0222	-2.494559	0.0063

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

	Statistic	Prob.
Group rho-Statistic	2.929220	0.9983
Group PP-Statistic	-4.729294	0.0000
Group ADF-Statistic	-2.602523	0.0046

Cross section specific results

Phillips-Peron results (non-parametric)

Cross ID	AR(1)	Variance	HAC	Bandwidth	Obs
Anglogold Ashanti ($ Million)	-0.272	0.004045	0.001262	4.00	10
PZ Cussons Ghana Limited	-0.477	0.001288	0.000893	3.00	10
Unilever Ghana Limited	-0.252	0.050369	0.030902	3.00	10
Guinness Ghana Breweries	-0.310	0.005120	0.004853	2.00	10
African Champion Industry	-0.106	0.029294	0.007096	8.00	10

Augmented Dickey-Fuller results (parametric)

Cross ID	AR(1)	Variance	Lag	Max lag	Obs
Anglogold Ashanti ($ Million)	-0.272	0.004045	0	0	10
PZ Cussons Ghana Limited	-0.477	0.001288	0	0	10
Unilever Ghana Limited	-0.252	0.050369	0	0	10

Guinness Ghana Breweries	-0.310	0.005120	0	0	10
African Champion Industry	-0.106	0.029294	0	0	10

CO-INTEGRATION FOR ROE

Pedroni Residual Cointegration Test
Series: ROE TD_TE LTD_TA SIZE STD_TA LIQUIDITY
Date: 05/23/18 Time: 03:57
Sample: 2006 2016
Included observations: 55
Cross-sections included: 5
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
Automatic lag length selection based on SIC with a max lag of 0
Newey-West automatic bandwidth selection and Bartlett kernel

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-1.278372	0.8994	-1.443151	0.9255
Panel rho-Statistic	2.042287	0.9794	2.051219	0.9799
Panel PP-Statistic	-1.956209	0.0252	-2.417235	0.0078
Panel ADF-Statistic	-1.480567	0.0694	-1.710388	0.0436

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

	Statistic	Prob.
Group rho-Statistic	2.964835	0.9985
Group PP-Statistic	-3.683114	0.0001
Group ADF-Statistic	-2.113745	0.0173

Cross section specific results

Phillips-Peron results (non-parametric)

Cross ID	AR(1)	Variance	HAC	Bandwidth	Obs
Anglogold Ashanti ($ Million)	-0.318	0.039938	0.022009	3.00	10
PZ Cussons Ghana Limited	-0.484	0.004564	0.003565	2.00	10
Unilever Ghana Limited	-0.218	0.059205	0.062017	1.00	10
Guinness Ghana Breweries	-0.116	0.092506	0.048431	4.00	10
African Champion Industry	-0.194	0.025759	0.004483	9.00	10

Augmented Dickey-Fuller results (parametric)

Cross ID	AR(1)	Variance	Lag	Max lag	Obs
Anglogold Ashanti ($ Million)	-0.318	0.039938	0	0	10
PZ Cussons Ghana Limited	-0.484	0.004564	0	0	10
Unilever Ghana Limited	-0.218	0.059205	0	0	10
Guinness Ghana Breweries	-0.116	0.092506	0	0	10

African Champion Industry	-0.194	0.025759	0	0	10

Dependent Variable: ROA
Method: Panel Least Squares
Date: 05/22/18 Time: 03:52
Sample: 2006 2016
Periods included: 11
Cross-sections included: 5
Total panel (balanced) observations: 55

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.524973	1.257962	-2.007193	0.0508
TD_TE	-0.005254	0.060826	-0.086378	0.9315
LTD_TA	0.435455	0.050999	8.538425	0.0000
STD_TA	3.011373	0.572015	5.264502	0.0000
SIZE	0.405101	0.213993	1.893061	0.0648
LIQUIDITY	0.059423	0.039940	1.487813	0.1438

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.898418	Mean dependent var	0.329629
Adjusted R-squared	0.878102	S.D. dependent var	0.856513
S.E. of regression	0.299043	Akaike info criterion	0.586504
Sum squared resid	4.024191	Schwarz criterion	0.951474
Log likelihood	-6.128861	Hannan-Quinn criter.	0.727641
F-statistic	44.22129	Durbin-Watson stat	2.239704
Prob(F-statistic)	0.000000		

PANEL OLS WITH ROA

Dependent Variable: ROA
Method: Panel Least Squares
Date: 05/22/18 Time: 03:59
Sample: 2006 2016
Periods included: 11
Cross-sections included: 5
Total panel (balanced) observations: 55

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TD_TE	0.013979	0.053941	0.259148	0.7966
LTD_TA	0.372669	0.039218	9.502454	0.0000
STD_TA	2.655985	0.487320	5.450187	0.0000
SIZE	-0.019578	0.031521	-0.621102	0.5374
LIQUIDITY	0.056803	0.035137	1.616634	0.1124
C	-0.036664	0.187085	-0.195974	0.8454

R-squared	0.887760	Mean dependent var	0.329629
Adjusted R-squared	0.876307	S.D. dependent var	0.856513
S.E. of regression	0.301235	Akaike info criterion	0.540820
Sum squared resid	4.446398	Schwarz criterion	0.759802
Log likelihood	-8.872550	Hannan-Quinn criter.	0.625502
F-statistic	77.51308	Durbin-Watson stat	2.350592
Prob(F-statistic)	0.000000		

Dependent Variable: ROE
Method: Panel Least Squares
Date: 05/22/18 Time: 03:56
Sample: 2006 2016
Periods included: 11
Cross-sections included: 5
Total panel (balanced) observations: 55

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.019221	2.062860	-0.494082	0.6237
TD_TE	-0.157985	0.099745	-1.583895	0.1202
LTD_TA	0.101881	0.083631	1.218223	0.2295
STD_TA	2.338070	0.938014	2.492574	0.0164
SIZE	0.217968	0.350914	0.621145	0.5376
LIQUIDITY	0.017957	0.065495	0.274167	0.7852

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.270499	Mean dependent var	0.359968
Adjusted R-squared	0.124598	S.D. dependent var	0.524121
S.E. of regression	0.490383	Akaike info criterion	1.575704
Sum squared resid	10.82138	Schwarz criterion	1.940674
Log likelihood	-33.33186	Hannan-Quinn criter.	1.716841
F-statistic	1.853997	Durbin-Watson stat	2.270968
Prob(F-statistic)	0.084378		

PANEL OLS WITH ROE

Dependent Variable: ROE
Method: Panel Least Squares
Date: 05/22/18 Time: 03:58
Sample: 2006 2016
Periods included: 11
Cross-sections included: 5
Total panel (balanced) observations: 55

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TD_TE	-0.182348	0.087306	-2.088602	0.0420
LTD_TA	0.112763	0.063477	1.776443	0.0819
STD_TA	1.969363	0.788752	2.496808	0.0159
SIZE	-0.024694	0.051018	-0.484030	0.6305
LIQUIDITY	-0.013522	0.056871	-0.237764	0.8131
C	0.425150	0.302806	1.404033	0.1666

R-squared	0.214756	Mean dependent var	0.359968
Adjusted R-squared	0.134629	S.D. dependent var	0.524121
S.E. of regression	0.487565	Akaike info criterion	1.503883
Sum squared resid	11.64826	Schwarz criterion	1.722864
Log likelihood	-35.35677	Hannan-Quinn criter.	1.588565
F-statistic	2.680198	Durbin-Watson stat	2.133014
Prob(F-statistic)	0.032180		

VECTOR ERROR CORRECTION

ROA

Vector Error Correction Estimates
Date: 05/24/18 Time: 07:18
Sample (adjusted): 2009 2016
Included observations: 40 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
ROA(-1)	1.000000
TD_TE(-1)	-0.296059 (0.03181) [-9.30741]
STD_TA(-1)	-0.276341 (0.20984) [-1.31693]
SIZE(-1)	0.019868 (0.00408) [4.86685]
LTD_TA(-1)	-0.218222 (0.01076) [-20.2865]
LIQUIDITY(-1)	-0.035304 (0.01044) [-3.38055]
C	-0.039522

Error Correction:	D(ROA)	D(TD_TE)	D(STD_TA)	D(SIZE)	D(LTD_TA)	D(LIQUIDITY)
CointEq1	-2.283143 (1.05082) [-2.17273]	1.040792 (1.84236) [0.56492]	0.105534 (0.07719) [1.36711]	-1.566348 (0.51254) [-3.05604]	4.310754 (3.00846) [1.43288]	-1.503415 (1.40455) [-1.07039]
D(ROA(-1))	-0.387263 (0.80077) [-0.48362]	-2.159572 (1.40395) [-1.53821]	-0.139200 (0.05883) [-2.36632]	1.234391 (0.39058) [3.16042]	-5.568604 (2.29257) [-2.42898]	0.950900 (1.07033) [0.88842]
D(ROA(-2))	0.635943 (0.32599) [1.95079]	0.218674 (0.57155) [0.38260]	-0.026360 (0.02395) [-1.10074]	0.068861 (0.15901) [0.43307]	0.516472 (0.93331) [0.55338]	0.380673 (0.43573) [0.87364]
D(TD_TE(-1))	0.681546 (0.44721) [1.52400]	1.897269 (0.78407) [2.41976]	0.100974 (0.03285) [3.07355]	-0.733809 (0.21813) [-3.36412]	3.838459 (1.28035) [2.99799]	-0.611478 (0.59775) [-1.02296]
D(TD_TE(-2))	-1.123096 (0.19110) [-5.87714]	-1.014606 (0.33504) [-3.02831]	-0.017055 (0.01404) [-1.21491]	0.057559 (0.09321) [0.61753]	-1.609837 (0.54710) [-2.94248]	-0.048958 (0.25542) [-0.19167]
D(STD_TA(-1))	2.677193 (1.97617)	5.942867 (3.46474)	-0.374508 (0.14517)	-2.511730 (0.96389)	12.33149 (5.65773)	0.783525 (2.64141)

	[1.35474]	[1.71524]	[-2.57974]	[-2.60583]	[2.17958]	[0.29663]
D(STD_TA(-2))	2.870490	4.965333	0.284636	-2.491164	12.29391	-0.877261
	(1.48267)	(2.59949)	(0.10892)	(0.72318)	(4.24483)	(1.98177)
	[1.93603]	[1.91011]	[2.61329]	[-3.44474]	[2.89621]	[-0.44266]
D(SIZE(-1))	-1.224803	-2.127563	-0.064359	0.619313	-3.371497	0.348848
	(0.70252)	(1.23170)	(0.05161)	(0.34266)	(2.01129)	(0.93901)
	[-1.74345]	[-1.72734]	[-1.24708]	[1.80738]	[-1.67629]	[0.37151]
D(SIZE(-2))	-0.563738	0.156756	0.021524	0.285027	-1.178309	-0.584540
	(0.71129)	(1.24707)	(0.05225)	(0.34693)	(2.03639)	(0.95073)
	[-0.79256]	[0.12570]	[0.41192]	[0.82156]	[-0.57863]	[-0.61483]
D(LTD_TA(-1))	-0.397502	-0.375057	0.002381	0.016007	-0.435987	-0.051195
	(0.23326)	(0.40897)	(0.01714)	(0.11378)	(0.66783)	(0.31179)
	[-1.70408]	[-0.91707]	[0.13894]	[0.14069]	[-0.65284]	[-0.16420]
D(LTD_TA(-2))	-0.369567	-0.039348	-0.002974	0.121554	-0.771335	-0.218313
	(0.20253)	(0.35508)	(0.01488)	(0.09878)	(0.57983)	(0.27070)
	[-1.82477]	[-0.11081]	[-0.19987]	[1.23050]	[-1.33028]	[-0.80646]
D(LIQUIDITY(-1))	0.086446	0.197016	0.004907	-0.027627	0.397639	-0.319722
	(0.15508)	(0.27189)	(0.01139)	(0.07564)	(0.44398)	(0.20728)
	[0.55744]	[0.72462]	[0.43070]	[-0.36524]	[0.89562]	[-1.54246]
D(LIQUIDITY(-2))	-0.010375	0.007776	-0.000372	-0.009587	0.018137	-0.010049
	(0.05014)	(0.08790)	(0.00368)	(0.02445)	(0.14354)	(0.06701)
	[-0.20694]	[0.08846]	[-0.10112]	[-0.39202]	[0.12635]	[-0.14995]
C	0.255763	0.217454	-0.005439	0.021097	0.306564	0.079601
	(0.10116)	(0.17736)	(0.00743)	(0.04934)	(0.28961)	(0.13521)
	[2.52836]	[1.22609]	[-0.73187]	[0.42758]	[1.05854]	[0.58872]
R-squared	0.944172	0.802382	0.864449	0.764605	0.874575	0.178065
Adj. R-squared	0.916257	0.703573	0.796674	0.646907	0.811862	-0.232902
Sum sq. resids	3.374169	10.37190	0.018209	0.802733	27.65672	6.028215
S.E. equation	0.360244	0.631601	0.026464	0.175711	1.031368	0.481513
F-statistic	33.82410	8.120526	12.75465	6.496348	13.94573	0.433284
Log likelihood	-7.302935	-29.76197	97.13684	21.41471	-49.37733	-18.90897
Akaike AIC	1.065147	2.188098	-4.156842	-0.370735	3.168866	1.645449
Schwarz SC	1.656255	2.779206	-3.565734	0.220372	3.759974	2.236556
Mean dependent	-0.015784	0.079393	-0.001396	0.042500	-0.007042	-0.016659
S.D. dependent	1.244869	1.160068	0.058689	0.295702	2.377800	0.433654

Determinant resid covariance (dof adj.)	7.96E-10
Determinant resid covariance	6.01E-11
Log likelihood	130.1700
Akaike information criterion	-2.008498
Schwarz criterion	1.791480

Dependent Variable: D(ROA)
Method: Panel Least Squares
Date: 05/24/18 Time: 07:19
Sample (adjusted): 2009 2016
Periods included: 8
Cross-sections included: 5
Total panel (balanced) observations: 40
D(ROA) = C(1)*(ROA(-1) - 0.296058975695*TD_TE(-1) - 0.276341326306
*STD_TA(-1) + 0.0198678967561*SIZE(-1) - 0.218222448749

*LTD_TA(-1) - 0.0353038819699*LIQUIDITY(-1) - 0.0395222961246) + C(2)*D(ROA(-1)) + C(3)*D(ROA(-2)) + C(4)*D(TD_TE(-1)) + C(5) *D(TD_TA(-2)) + C(6)*D(STD_TA(-1)) + C(7)*D(STD_TA(-2)) + C(8) *D(SIZE(-1)) + C(9)*D(SIZE(-2)) + C(10)*D(LTD_TA(-1)) + C(11) *D(LTD_TA(-2)) + C(12)*D(LIQUIDITY(-1)) + C(13)*D(LIQUIDITY(-2)) + C(14)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-2.283143	1.050818	-2.172729	0.0391
C(2)	-0.387263	0.800765	-0.483616	0.6327
C(3)	0.635943	0.325993	1.950786	0.0619
C(4)	0.681546	0.447209	1.524000	0.1396
C(5)	-1.123096	0.191096	-5.877141	0.0000
C(6)	2.677193	1.976173	1.354736	0.1872
C(7)	2.870490	1.482665	1.936034	0.0638
C(8)	-1.224803	0.702518	-1.743447	0.0931
C(9)	-0.563738	0.711287	-0.792561	0.4352
C(10)	-0.397502	0.233264	-1.704084	0.1003
C(11)	-0.369567	0.202528	-1.824770	0.0795
C(12)	0.086446	0.155077	0.557441	0.5820
C(13)	-0.010375	0.050137	-0.206943	0.8377
C(14)	0.255763	0.101158	2.528364	0.0179

R-squared	0.944172	Mean dependent var	-0.015784
Adjusted R-squared	0.916257	S.D. dependent var	1.244869
S.E. of regression	0.360244	Akaike info criterion	1.065147
Sum squared resid	3.374169	Schwarz criterion	1.656255
Log likelihood	-7.302935	Hannan-Quinn criter.	1.278873
F-statistic	33.82410	Durbin-Watson stat	1.655467
Prob(F-statistic)	0.000000		

VECM ROE

Vector Error Correction Estimates
Date: 05/24/18 Time: 07:19
Sample (adjusted): 2009 2016
Included observations: 40 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
ROE(-1)	1.000000
TD_TE(-1)	0.017780 (0.08823) [0.20152]
STD_TA(-1)	-2.181970 (0.59510) [-3.66659]
SIZE(-1)	0.057367 (0.01106) [5.18812]
LTD_TA(-1)	-0.162814 (0.02792) [-5.83225]

LIQUIDITY(-1)	-0.064919 (0.02895) [-2.24237]					
C	-0.359236					

Error Correction:	D(ROE)	D(TD_TE)	D(STD_TA)	D(SIZE)	D(LTD_TA)	D(LIQUIDITY)
CointEq1	-1.242456 (0.50019) [-2.48398]	3.709465 (0.94887) [3.90936]	0.155572 (0.03985) [3.90390]	-0.959944 (0.25452) [-3.77157]	5.680347 (1.79756) [3.16003]	-0.224967 (0.71055) [-0.31661]
D(ROE(-1))	0.133757 (0.40460) [0.33059]	-2.548256 (0.76754) [-3.32003]	-0.120402 (0.03223) [-3.73514]	0.559410 (0.20588) [2.71713]	-4.090390 (1.45405) [-2.81310]	-0.179987 (0.57476) [-0.31315]
D(ROE(-2))	0.163328 (0.17098) [0.95525]	-0.597912 (0.32435) [-1.84341]	-0.030826 (0.01362) [-2.26295]	0.116076 (0.08700) [1.33416]	-0.749447 (0.61446) [-1.21968]	0.020684 (0.24289) [0.08516]
D(TD_TE(-1))	-0.117930 (0.21044) [-0.56040]	1.028879 (0.39921) [2.57731]	0.036437 (0.01677) [2.17328]	-0.072412 (0.10708) [-0.67624]	1.317868 (0.75627) [1.74259]	-0.192722 (0.29894) [-0.64469]
D(TD_TE(-2))	-0.130772 (0.20599) [-0.63484]	-0.251485 (0.39077) [-0.64356]	0.007757 (0.01641) [0.47264]	-0.110602 (0.10482) [-1.05516]	-0.279683 (0.74029) [-0.37780]	0.117428 (0.29262) [0.40129]
D(STD_TA(-1))	0.428455 (1.62141) [0.26425]	7.185435 (3.07585) [2.33608]	-0.358665 (0.12918) [-2.77650]	-1.765296 (0.82506) [-2.13961]	10.56766 (5.82699) [1.81357]	2.034940 (2.30331) [0.88349]
D(STD_TA(-2))	1.470058 (1.15328) [1.27468]	6.424355 (2.18780) [2.93645]	0.304233 (0.09188) [3.31111]	-1.631869 (0.58685) [-2.78074]	12.52940 (4.14462) [3.02305]	1.483390 (1.63830) [0.90544]
D(SIZE(-1))	0.404285 (0.52254) [0.77369]	-3.765187 (0.99128) [-3.79832]	-0.122168 (0.04163) [-2.93452]	0.658873 (0.26590) [2.47793]	-7.024086 (1.87790) [-3.74039]	0.172011 (0.74230) [0.23173]
D(SIZE(-2))	0.239751 (0.57433) [0.41745]	0.634663 (1.08952) [0.58252]	0.004492 (0.04576) [0.09817]	0.422095 (0.29225) [1.44431]	-0.086904 (2.06401) [-0.04210]	-0.073372 (0.81587) [-0.08993]
D(LTD_TA(-1))	-0.076403 (0.17950) [-0.42564]	-0.686203 (0.34051) [-2.01520]	-0.012919 (0.01430) [-0.90341]	0.086868 (0.09134) [0.95106]	-1.411687 (0.64508) [-2.18840]	0.040407 (0.25499) [0.15847]
D(LTD_TA(-2))	-0.161530 (0.14808) [-1.09083]	0.263271 (0.28091) [0.93721]	-0.007085 (0.01180) [-0.60051]	0.114487 (0.07535) [1.51939]	-0.305348 (0.53216) [-0.57379]	-0.122892 (0.21036) [-0.58421]
D(LIQUIDITY(-1))	-0.159721 (0.14114) [-1.13162]	0.302100 (0.26775) [1.12828]	0.007826 (0.01125) [0.69592]	-0.018346 (0.07182) [-0.25544]	0.361579 (0.50724) [0.71284]	-0.254165 (0.20050) [-1.26763]
D(LIQUIDITY(-2))	-0.002208 (0.04666) [-0.04733]	0.055105 (0.08851) [0.62256]	0.000984 (0.00372) [0.26477]	-0.018055 (0.02374) [-0.76045]	0.059948 (0.16768) [0.35751]	-0.012657 (0.06628) [-0.19096]
C	0.058210 (0.07768)	0.179926 (0.14737)	-0.001764 (0.00619)	-0.006207 (0.03953)	0.399314 (0.27918)	0.023880 (0.11036)

	[0.74932]	[1.22092]	[-0.28503]	[-0.15702]	[1.43031]	[0.21639]
R-squared	0.590264	0.804304	0.865141	0.783292	0.832832	0.214703
Adj. R-squared	0.385396	0.706457	0.797712	0.674938	0.749248	-0.177946
Sum sq. resids	2.854089	10.27099	0.018116	0.739007	36.86115	5.759512
S.E. equation	0.331320	0.628521	0.026396	0.168592	1.190687	0.470659
F-statistic	2.881192	8.219958	12.83031	7.229010	9.963997	0.546806
Log likelihood	-3.955007	-29.56643	97.23913	23.06901	-55.12312	-17.99701
Akaike AIC	0.897750	2.178321	-4.161957	-0.453451	3.456156	1.599850
Schwarz SC	1.488858	2.769429	-3.570849	0.137657	4.047264	2.190958
Mean dependent	-0.015466	0.079393	-0.001396	0.042500	-0.007042	-0.016659
S.D. dependent	0.422619	1.160068	0.058689	0.295702	2.377800	0.433654

Determinant resid covariance (dof adj.)	9.59E-09
Determinant resid covariance	7.23E-10
Log likelihood	80.39926
Akaike information criterion	0.480037
Schwarz criterion	4.280016

Dependent Variable: D(ROE)
Method: Panel Least Squares
Date: 05/24/18 Time: 07:20
Sample (adjusted): 2009 2016
Periods included: 8
Cross-sections included: 5
Total panel (balanced) observations: 40
D(ROE) = C(1)*(ROE(-1) + 0.017780331757*TD_TE(-1) - 2.18196975777 *STD_TA(-1) + 0.0573672030951*SIZE(-1) - 0.162813789884 *LTD_TA(-1) - 0.0649186019166*LIQUIDITY(-1) - 0.359236391487) + C(2)*D(ROE(-1)) + C(3)*D(ROE(-2)) + C(4)*D(TD_TE(-1)) + C(5) *D(TD_TE(-2)) + C(6)*D(STD_TA(-1)) + C(7)*D(STD_TA(-2)) + C(8) *D(SIZE(-1)) + C(9)*D(SIZE(-2)) + C(10)*D(LTD_TA(-1)) + C(11) *D(LTD_TA(-2)) + C(12)*D(LIQUIDITY(-1)) + C(13)*D(LIQUIDITY(-2)) + C(14)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-1.242456	0.500188	-2.483977	0.0198
C(2)	0.133757	0.404603	0.330587	0.7436
C(3)	0.163328	0.170979	0.955250	0.3482
C(4)	-0.117930	0.210438	-0.560404	0.5800
C(5)	-0.130772	0.205993	-0.634838	0.5311
C(6)	0.428455	1.621411	0.264248	0.7937
C(7)	1.470058	1.153279	1.274677	0.2137
C(8)	0.404285	0.522543	0.773687	0.4461
C(9)	0.239751	0.574329	0.417445	0.6798
C(10)	-0.076403	0.179499	-0.425645	0.6739
C(11)	-0.161530	0.148080	-1.090831	0.2854
C(12)	-0.159721	0.141144	-1.131616	0.2681
C(13)	-0.002208	0.046659	-0.047328	0.9626
C(14)	0.058210	0.077685	0.749317	0.4604

R-squared	0.590264	Mean dependent var	-0.015466
Adjusted R-squared	0.385396	S.D. dependent var	0.422619
S.E. of regression	0.331320	Akaike info criterion	0.897750
Sum squared resid	2.854089	Schwarz criterion	1.488858
Log likelihood	-3.955007	Hannan-Quinn criter.	1.111476
F-statistic	2.881192	Durbin-Watson stat	2.189907
Prob(F-statistic)	0.010458		

Result for Kenya

DESCRIPTIVE ANALYSIS

	ROA	ROE	TD_TE	LTD_TA	STD_TA	SIZE	LIQUIDITY
Mean	0.284573	0.272027	0.273986	0.467505	0.055101	6.216909	2.254051
Median	0.154372	0.232829	0.068954	0.287126	0.022160	6.550000	1.728607
Maximum	4.676664	1.218802	2.394824	3.646504	0.338968	7.790000	12.05427
Minimum	0.020514	0.021893	0.000456	0.008979	0.000752	4.140000	0.331664
Std. Dev.	0.631163	0.228417	0.536466	0.610034	0.079932	1.075271	2.206876
Skewness	6.331452	2.063855	2.614643	3.023714	2.060048	-0.663551	2.791959
Kurtosis	44.30309	8.385714	9.129796	14.78741	6.680991	2.356589	11.48988
Jarque-Bera	4276.925	105.5173	148.7746	402.2206	69.95287	4.984788	236.6334
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.082712	0.000000
Sum	15.65150	14.96148	15.06921	25.71279	3.030532	341.9300	123.9728
Sum Sq. Dev.	21.51178	2.817413	15.54098	20.09566	0.345011	62.43517	262.9963
Observations	55	55	55	55	55	55	55

	ROA	*ROE*	*TD/TE*	*LTD/TA*	*STD/TA*	*SIZE*	*LIQUIDITY*
ROA	1						
ROE	0.535909	1					
TD/TA	-0.101547	-0.346317	1				
LTD/TA	0.641867	0.030275	0.380415	1			
STD/TA	0.477137	0.162597	-0.191368	0.420658	1		
SIZE	-0.260037	-0.375213	0.413123	0.213892	0.019715	1	
LIQUIDITY	0.017039	0.188543	-0.148443	-0.345753	-0.224024	0.028055	1

COINTEGRATION TEST

Kao Residual Cointegration Test
Series: ROA TD_TE LTD_TA STD_TA SIZE LIQUIDITY
Date: 05/22/18 Time: 05:47
Sample: 2006 2016
Included observations: 55
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
User-specified lag length: 1
Newey-West automatic bandwidth selection and Bartlett kernel

	t-Statistic	Prob.
ADF	-4.390789	0.0000
Residual variance	0.057125	
HAC variance	0.034164	

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID)
Method: Least Squares
Date: 05/22/18 Time: 05:47
Sample (adjusted): 2008 2016
Included observations: 45 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.969727	0.187937	-5.159848	0.0000
D(RESID(-1))	0.246243	0.166472	1.479184	0.1464

R-squared	0.432499	Mean dependent var	0.005165
Adjusted R-squared	0.419301	S.D. dependent var	0.315078
S.E. of regression	0.240101	Akaike info criterion	0.027913
Sum squared resid	2.478886	Schwarz criterion	0.108209
Log likelihood	1.371964	Hannan-Quinn criter.	0.057846
Durbin-Watson stat	1.829032		

Pedroni Residual Cointegration Test
Series: ROA TD_TE STD_TA SIZE LTD_TA LIQUIDITY
Date: 05/23/18 Time: 04:02
Sample: 2006 2016
Included observations: 55
Cross-sections included: 5
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
Automatic lag length selection based on SIC with a max lag of 0
Newey-West automatic bandwidth selection and Bartlett kernel

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-1.172051	0.8794	-1.983411	0.9763
Panel rho-Statistic	1.849995	0.9678	1.865923	0.9690
Panel PP-Statistic	-1.565764	0.0587	-4.629708	0.0000
Panel ADF-Statistic	-1.432934	0.0759	-3.037161	0.0012

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

	Statistic	Prob.
Group rho-Statistic	3.006124	0.9987
Group PP-Statistic	-6.752641	0.0000
Group ADF-Statistic	-2.125726	0.0168

Cross section specific results

Phillips-Peron results (non-parametric)

Cross ID	AR(1)	Variance	HAC	Bandwidth	Obs
Bamburi Cement Limited	-0.444	0.003174	0.000419	9.00	10
Rea Vipingo Plantations	-0.152	0.020504	0.020313	1.00	10
Williamson Tea Kenya Limited	-0.244	0.001336	0.000189	9.00	10
Kenya Orchards Limited	0.171	0.001909	0.001617	2.00	10

Crown Paints Kenya	-0.462	0.000239	0.000239	0.00	10

Augmented Dickey-Fuller results (parametric)

Cross ID	AR(1)	Variance	Lag	Max lag	Obs
Bamburi Cement Limited	-0.444	0.003174	0	0	10
Rea Vipingo Plantations	-0.152	0.020504	0	0	10
Williamson Tea Kenya Limited	-0.244	0.001336	0	0	10
Kenya Orchards Limited	0.171	0.001909	0	0	10
Crown Paints Kenya	-0.462	0.000239	0	0	10

CO-INGRATION TEST FOR ROE

Pedroni Residual Cointegration Test
Series: ROE TD_TE STD_TA SIZE LTD_TA LIQUIDITY
Date: 05/23/18 Time: 04:03
Sample: 2006 2016
Included observations: 55
Cross-sections included: 5
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
Automatic lag length selection based on SIC with a max lag of 0
Newey-West automatic bandwidth selection and Bartlett kernel

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-1.019832	0.8461	-2.264814	0.9882
Panel rho-Statistic	1.815267	0.9653	1.936056	0.9736
Panel PP-Statistic	-1.815078	0.0348	-2.078836	0.0188
Panel ADF-Statistic	-1.649901	0.0495	-1.722318	0.0425

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

	Statistic	Prob.
Group rho-Statistic	3.041520	0.9988
Group PP-Statistic	-3.186588	0.0007
Group ADF-Statistic	-1.536865	0.0622

Cross section specific results

Phillips-Peron results (non-parametric)

Cross ID	AR(1)	Variance	HAC	Bandwidth	Obs
Bamburi Cement Limited	-0.132	0.003261	0.002681	3.00	10
Rea Vipingo Plantations	-0.205	0.043246	0.038120	2.00	10
Williamson Tea Kenya Limited	-0.166	0.003199	0.000421	9.00	10
Kenya Orchards Limited	0.194	0.001472	0.001472	0.00	10

Crown Paints Kenya	-0.518	0.000469	0.000388	2.00	10

Augmented Dickey-Fuller results (parametric)

Cross ID	AR(1)	Variance	Lag	Max lag	Obs
Bamburi Cement Limited	-0.132	0.003261	0	0	10
Rea Vipingo Plantations	-0.205	0.043246	0	0	10
Williamson Tea Kenya Limited	-0.166	0.003199	0	0	10
Kenya Orchards Limited	0.194	0.001472	0	0	10
Crown Paints Kenya	-0.518	0.000469	0	0	10

CAUSAL ROA

Pairwise Granger Causality Tests
Date: 05/22/18 Time: 05:48
Sample: 2006 2016
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
TD_TE does not Granger Cause ROA	45	0.40158	0.6719
ROA does not Granger Cause TD_TE		0.63135	0.5371
LTD_TA does not Granger Cause ROA	45	3.05399	0.0583
ROA does not Granger Cause LTD_TA		4.55767	0.0165
STD_TA does not Granger Cause ROA	45	0.15677	0.8554
ROA does not Granger Cause STD_TA		2.72876	0.0775
SIZE does not Granger Cause ROA	45	0.71839	0.4937
ROA does not Granger Cause SIZE		4.97329	0.0118
LIQUIDITY does not Granger Cause ROA	45	0.65810	0.5233
ROA does not Granger Cause LIQUIDITY		0.03780	0.9629
LTD_TA does not Granger Cause TD_TE	45	5.94266	0.0055
TD_TE does not Granger Cause LTD_TA		0.26644	0.7675
STD_TA does not Granger Cause TD_TE	45	1.19169	0.3143
TD_TE does not Granger Cause STD_TA		0.27809	0.7587
SIZE does not Granger Cause TD_TE	45	1.76401	0.1844
TD_TE does not Granger Cause SIZE		0.19214	0.8259
LIQUIDITY does not Granger Cause TD_TE	45	0.75207	0.4779
TD_TE does not Granger Cause LIQUIDITY		0.15696	0.8553
STD_TA does not Granger Cause LTD_TA	45	0.58018	0.5644
LTD_TA does not Granger Cause STD_TA		1.51265	0.2327
SIZE does not Granger Cause LTD_TA	45	0.66292	0.5209
LTD_TA does not Granger Cause SIZE		3.43870	0.0419

LIQUIDITY does not Granger Cause LTD_TA	45	1.44227	0.2484
LTD_TA does not Granger Cause LIQUIDITY		0.83242	0.4424
SIZE does not Granger Cause STD_TA	45	0.24118	0.7868
STD_TA does not Granger Cause SIZE		1.90357	0.1623
LIQUIDITY does not Granger Cause STD_TA	45	0.27609	0.7602
STD_TA does not Granger Cause LIQUIDITY		0.26847	0.7659
LIQUIDITY does not Granger Cause SIZE	45	0.02294	0.9773
SIZE does not Granger Cause LIQUIDITY		0.12496	0.8829

COINTEGRATION ROE

Kao Residual Cointegration Test
Series: ROE TD_TE LTD_TA STD_TA SIZE LIQUIDITY
Date: 05/22/18 Time: 05:49
Sample: 2006 2016
Included observations: 55
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
User-specified lag length: 1
Newey-West automatic bandwidth selection and Bartlett kernel

	t-Statistic	Prob.
ADF	-1.673999	0.0471
Residual variance	0.026840	
HAC variance	0.020083	

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID)
Method: Least Squares
Date: 05/22/18 Time: 05:49
Sample (adjusted): 2008 2016
Included observations: 45 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.905190	0.225082	-4.021612	0.0002
D(RESID(-1))	-0.098970	0.172271	-0.574505	0.5686

R-squared	0.461482	Mean dependent var	0.003758
Adjusted R-squared	0.448959	S.D. dependent var	0.195560
S.E. of regression	0.145169	Akaike info criterion	-0.978415
Sum squared resid	0.906179	Schwarz criterion	-0.898119
Log likelihood	24.01434	Hannan-Quinn criter.	-0.948481
Durbin-Watson stat	2.003989		

Pairwise Granger Causality Tests
Date: 05/22/18 Time: 05:50

Sample: 2006 2016
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
TD_TE does not Granger Cause ROE	45	0.80345	0.4549
ROE does not Granger Cause TD_TE		1.67281	0.2006
LTD_TA does not Granger Cause ROE	45	0.58001	0.5645
ROE does not Granger Cause LTD_TA		23.7828	2.E-07
STD_TA does not Granger Cause ROE	45	0.75871	0.4749
ROE does not Granger Cause STD_TA		6.23289	0.0044
SIZE does not Granger Cause ROE	45	0.16714	0.8467
ROE does not Granger Cause SIZE		7.29241	0.0020
LIQUIDITY does not Granger Cause ROE	45	0.39337	0.6774
ROE does not Granger Cause LIQUIDITY		0.96586	0.3894
LTD_TA does not Granger Cause TD_TE	45	5.94266	0.0055
TD_TE does not Granger Cause LTD_TA		0.26644	0.7675
STD_TA does not Granger Cause TD_TE	45	1.19169	0.3143
TD_TE does not Granger Cause STD_TA		0.27809	0.7587
SIZE does not Granger Cause TD_TE	45	1.76401	0.1844
TD_TE does not Granger Cause SIZE		0.19214	0.8259
LIQUIDITY does not Granger Cause TD_TE	45	0.75207	0.4779
TD_TE does not Granger Cause LIQUIDITY		0.15696	0.8553
STD_TA does not Granger Cause LTD_TA	45	0.58018	0.5644
LTD_TA does not Granger Cause STD_TA		1.51265	0.2327
SIZE does not Granger Cause LTD_TA	45	0.66292	0.5209
LTD_TA does not Granger Cause SIZE		3.43870	0.0419
LIQUIDITY does not Granger Cause LTD_TA	45	1.44227	0.2484
LTD_TA does not Granger Cause LIQUIDITY		0.83242	0.4424
SIZE does not Granger Cause STD_TA	45	0.24118	0.7868
STD_TA does not Granger Cause SIZE		1.90357	0.1623
LIQUIDITY does not Granger Cause STD_TA	45	0.27609	0.7602
STD_TA does not Granger Cause LIQUIDITY		0.26847	0.7659
LIQUIDITY does not Granger Cause SIZE	45	0.02294	0.9773
SIZE does not Granger Cause LIQUIDITY		0.12496	0.8829

REGRESSION

Dependent Variable: ROA
Method: Panel Least Squares
Date: 05/22/18 Time: 05:56
Sample: 2006 2016
Periods included: 11

Cross-sections included: 5
Total panel (balanced) observations: 55

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TD_TE	0.009079	0.106543	0.085211	0.9325
LTD_TA	0.790123	0.130712	6.044757	0.0000
STD_TA	3.126175	1.144157	2.732295	0.0090
SIZE	-0.013840	0.240749	-0.057486	0.9544
LIQUIDITY	0.061129	0.020099	3.041448	0.0039
C	-0.311304	1.520903	-0.204683	0.8387

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.856093	Mean dependent var	0.284573
Adjusted R-squared	0.827312	S.D. dependent var	0.631163
S.E. of regression	0.262284	Akaike info criterion	0.324190
Sum squared resid	3.095686	Schwarz criterion	0.689159
Log likelihood	1.084785	Hannan-Quinn criter.	0.465326
F-statistic	29.74478	Durbin-Watson stat	1.541323
Prob(F-statistic)	0.000000		

PANEL OLS

Dependent Variable: ROA
Method: Panel Least Squares
Date: 05/22/18 Time: 05:57
Sample: 2006 2016
Periods included: 11
Cross-sections included: 5
Total panel (balanced) observations: 55

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TD_TE	-0.212534	0.110943	-1.915699	0.0612
LTD_TA	0.859722	0.099923	8.603812	0.0000
STD_TA	1.371441	0.709251	1.933646	0.0589
SIZE	-0.220548	0.047900	-4.604345	0.0000
LIQUIDITY	0.093513	0.022655	4.127755	0.0001
C	1.025654	0.288603	3.553860	0.0009

R-squared	0.737842	Mean dependent var	0.284573
Adjusted R-squared	0.711091	S.D. dependent var	0.631163
S.E. of regression	0.339252	Akaike info criterion	0.778519
Sum squared resid	5.639488	Schwarz criterion	0.997501
Log likelihood	-15.40927	Hannan-Quinn criter.	0.863201
F-statistic	27.58202	Durbin-Watson stat	0.751170
Prob(F-statistic)	0.000000		

REGRESSION FOR ROE

Dependent Variable: ROE
Method: Panel Least Squares
Date: 05/22/18 Time: 05:58
Sample: 2006 2016

Periods included: 11
Cross-sections included: 5
Total panel (balanced) observations: 55

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TD_TE	-0.049997	0.061256	-0.816208	0.4187
LTD_TA	0.111775	0.075152	1.487324	0.1439
STD_TA	0.210761	0.657822	0.320392	0.7502
SIZE	0.162077	0.138416	1.170937	0.2478
LIQUIDITY	0.029418	0.011556	2.545800	0.0144
C	-0.852068	0.874429	-0.974428	0.3351

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.636795	Mean dependent var	0.272027
Adjusted R-squared	0.564154	S.D. dependent var	0.228417
S.E. of regression	0.150798	Akaike info criterion	-0.782787
Sum squared resid	1.023300	Schwarz criterion	-0.417818
Log likelihood	31.52665	Hannan-Quinn criter.	-0.641651
F-statistic	8.766315	Durbin-Watson stat	1.813722
Prob(F-statistic)	0.000000		

Dependent Variable: ROE
Method: Panel Least Squares
Date: 05/22/18 Time: 05:59
Sample: 2006 2016
Periods included: 11
Cross-sections included: 5
Total panel (balanced) observations: 55

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TD_TE	-0.108287	0.066388	-1.631125	0.1093
LTD_TA	0.097764	0.059794	1.635012	0.1085
STD_TA	0.200993	0.424414	0.473578	0.6379
SIZE	-0.071131	0.028663	-2.481605	0.0166
LIQUIDITY	0.027554	0.013557	2.032522	0.0475
C	0.625021	0.172699	3.619133	0.0007

R-squared	0.283248	Mean dependent var	0.272027
Adjusted R-squared	0.210110	S.D. dependent var	0.228417
S.E. of regression	0.203007	Akaike info criterion	-0.248481
Sum squared resid	2.019385	Schwarz criterion	-0.029499
Log likelihood	12.83323	Hannan-Quinn criter.	-0.163799
F-statistic	3.872796	Durbin-Watson stat	1.102169
Prob(F-statistic)	0.004899		

VECTOR ERROR CORRECTION

Vector Error Correction Estimates
Date: 05/24/18 Time: 07:08
Sample (adjusted): 2009 2016
Included observations: 40 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
ROA(-1)	1.000000
TD_TE(-1)	1.623530 (0.10655) [15.2370]
STD_TA(-1)	3.867117 (0.65433) [5.91004]
SIZE(-1)	-0.026707 (0.04228) [-0.63166]
LTD_TA(-1)	-1.222292 (0.09884) [-12.3663]
LIQUIDITY(-1)	0.039528 (0.04611) [0.85731]
C	-0.386234

Error Correction:	D(ROA)	D(TD_TE)	D(STD_TA)	D(SIZE)	D(LTD_TA)	D(LIQUIDITY)
CointEq1	-0.491899 (0.40766) [-1.20663]	-0.504771 (0.07710) [-6.54656]	-0.026025 (0.03249) [-0.80092]	0.192043 (0.11510) [1.66853]	-0.681206 (0.32330) [-2.10707]	-0.684813 (0.90606) [-0.75581]
D(ROA(-1))	1.127312 (0.67552) [1.66880]	0.616538 (0.12777) [4.82548]	0.117967 (0.05385) [2.19087]	-0.392865 (0.19072) [-2.05987]	0.997827 (0.53572) [1.86259]	0.371744 (1.50139) [0.24760]
D(ROA(-2))	-0.128732 (1.00308) [-0.12834]	0.552211 (0.18972) [2.91065]	0.010323 (0.07995) [0.12911]	-0.269776 (0.28320) [-0.95258]	0.867328 (0.79549) [1.09031]	0.967124 (2.22941) [0.43380]
D(TD_TE(-1))	0.187993 (0.59128) [0.31794]	0.430263 (0.11183) [3.84732]	0.021710 (0.04713) [0.46064]	-0.008074 (0.16694) [-0.04837]	-0.079980 (0.46891) [-0.17056]	-0.169559 (1.31417) [-0.12902]
D(TD_TE(-2))	0.489692 (0.79137) [0.61879]	0.266002 (0.14968) [1.77715]	0.026887 (0.06308) [0.42624]	-0.219765 (0.22343) [-0.98359]	0.904881 (0.62759) [1.44183]	1.193789 (1.75888) [0.67872]
D(STD_TA(-1))	6.958421 (4.68273) [1.48597]	1.350787 (0.88569) [1.52513]	-0.338667 (0.37326) [-0.90733]	0.147894 (1.32210) [0.11186]	3.432469 (3.71362) [0.92429]	22.47666 (10.4077) [2.15962]
D(STD_TA(-2))	-0.085534 (5.57409) [-0.01534]	1.510273 (1.05428) [1.43252]	-0.540684 (0.44430) [-1.21692]	0.970950 (1.57376) [0.61696]	1.403301 (4.42051) [0.31745]	-2.002914 (12.3888) [-0.16167]
D(SIZE(-1))	1.293067 (1.69348) [0.76356]	-0.469461 (0.32030) [-1.46568]	0.041642 (0.13499) [0.30849]	-0.097056 (0.47813) [-0.20299]	0.346507 (1.34301) [0.25801]	8.521584 (3.76388) [2.26404]
D(SIZE(-2))	-0.445880 (1.75315)	0.132424 (0.33159)	-0.017772 (0.13974)	0.244991 (0.49497)	-0.340364 (1.39033)	-3.384384 (3.89650)

	[-0.25433]	[0.39936]	[-0.12718]	[0.49496]	[-0.24481]	[-0.86857]
D(LTD_TA(-1))	-2.267701	-1.021894	-0.157868	0.600805	-1.982415	0.065633
	(0.95543)	(0.18071)	(0.07616)	(0.26975)	(0.75770)	(2.12351)
	[-2.37349]	[-5.65493]	[-2.07295]	[2.22726]	[-2.61637]	[0.03091]
D(LTD_TA(-2))	-0.352259	-0.736643	-0.005480	0.410633	-1.684003	-2.370997
	(1.57212)	(0.29735)	(0.12531)	(0.44386)	(1.24676)	(3.49414)
	[-0.22407]	[-2.47737]	[-0.04373]	[0.92513]	[-1.35070]	[-0.67856]
D(LIQUIDITY(-1))	-0.009063	-0.000972	-0.000885	0.010703	-0.027372	0.271485
	(0.13502)	(0.02554)	(0.01076)	(0.03812)	(0.10708)	(0.30009)
	[-0.06712]	[-0.03806]	[-0.08224]	[0.28077]	[-0.25563]	[0.90468]
D(LIQUIDITY(-2))	-0.036158	0.005721	0.000986	0.001601	-0.022026	-0.893434
	(0.14331)	(0.02711)	(0.01142)	(0.04046)	(0.11365)	(0.31851)
	[-0.25231]	[0.21107]	[0.08633]	[0.03957]	[-0.19380]	[-2.80501]
C	-0.102866	-0.050320	-0.007509	0.038979	-0.143596	0.228210
	(0.17712)	(0.03350)	(0.01412)	(0.05001)	(0.14047)	(0.39367)
	[-0.58076]	[-1.50205]	[-0.53189]	[0.77946]	[-1.02228]	[0.57970]
R-squared	0.442491	0.812754	0.516484	0.430938	0.464909	0.334081
Adj. R-squared	0.163737	0.719131	0.274725	0.146407	0.197364	0.001121
Sum sq. resids	19.85534	0.710296	0.126151	1.582730	12.48746	98.08205
S.E. equation	0.873880	0.165285	0.069656	0.246727	0.693027	1.942263
F-statistic	1.587387	8.681130	2.136364	1.514556	1.737685	1.003367
Log likelihood	-42.74942	23.86153	58.42554	7.837019	-33.47446	-74.69604
Akaike AIC	2.837471	-0.493077	-2.221277	0.308149	2.373723	4.434802
Schwarz SC	3.428579	0.098031	-1.630169	0.899257	2.964831	5.025910
Mean dependent	0.023675	0.013302	-0.003571	0.017750	-0.027458	0.429929
S.D. dependent	0.955610	0.311875	0.081791	0.267049	0.773555	1.943353

Determinant resid covariance (dof adj.)	7.56E-09
Determinant resid covariance	5.70E-10
Log likelihood	85.15132
Akaike information criterion	0.242434
Schwarz criterion	4.042413

Dependent Variable: D(ROA)
Method: Panel Least Squares
Date: 05/24/18 Time: 07:08
Sample (adjusted): 2009 2016
Periods included: 8
Cross-sections included: 5
Total panel (balanced) observations: 40
D(ROA) = C(1)*(ROA(-1) + 1.62353038425*TD_TE(-1) + 3.86711745889 *STD_TA(-1) - 0.0267074569045*SIZE(-1) - 1.22229226939*LTD_TA(-1) + 0.0395280147234*LIQUIDITY(-1) - 0.386233809619) + C(2) *D(ROA(-1)) + C(3)*D(ROA(-2)) + C(4)*D(TD_TE(-1)) + C(5)*D(TD_TE(-2)) + C(6)*D(STD_TA(-1)) + C(7)*D(STD_TA(-2)) + C(8)*D(SIZE(-1)) + C(9)*D(SIZE(-2)) + C(10)*D(LTD_TA(-1)) + C(11)*D(LTD_TA(-2)) + C(12)*D(LIQUIDITY(-1)) + C(13)*D(LIQUIDITY(-2)) + C(14)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.491899	0.407662	-1.206633	0.2384
C(2)	1.127312	0.675521	1.668805	0.1072
C(3)	-0.128732	1.003078	-0.128337	0.8989
C(4)	0.187993	0.591282	0.317941	0.7531

C(5)	0.489692	0.791370	0.618791	0.5414
C(6)	6.958421	4.682733	1.485974	0.1493
C(7)	-0.085534	5.574094	-0.015345	0.9879
C(8)	1.293067	1.693481	0.763556	0.4520
C(9)	-0.445880	1.753146	-0.254331	0.8012
C(10)	-2.267701	0.955428	-2.373493	0.0253
C(11)	-0.352259	1.572116	-0.224067	0.8245
C(12)	-0.009063	0.135019	-0.067124	0.9470
C(13)	-0.036158	0.143308	-0.252307	0.8028
C(14)	-0.102866	0.177123	-0.580762	0.5664

R-squared	0.442491	Mean dependent var	0.023675
Adjusted R-squared	0.163737	S.D. dependent var	0.955610
S.E. of regression	0.873880	Akaike info criterion	2.837471
Sum squared resid	19.85534	Schwarz criterion	3.428579
Log likelihood	-42.74942	Hannan-Quinn criter.	3.051197
F-statistic	1.587387	Durbin-Watson stat	2.397447
Prob(F-statistic)	0.153006		

VECM FOR ROE

Vector Error Correction Estimates
Date: 05/24/18 Time: 07:09
Sample (adjusted): 2009 2016
Included observations: 40 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
ROE(-1)	1.000000
TD_TE(-1)	0.551141 (0.05559) [9.91369]
STD_TA(-1)	1.845491 (0.36047) [5.11966]
SIZE(-1)	0.014217 (0.02454) [0.57925]
LTD_TA(-1)	-0.513650 (0.06578) [-7.80853]
LIQUIDITY(-1)	0.068563 (0.02749) [2.49390]
C	-0.552059

Error Correction:	D(ROE)	D(TD_TE)	D(STD_TA)	D(SIZE)	D(LTD_TA)	D(LIQUIDITY)
CointEq1	-0.159716 (0.19478) [-0.81996]	-1.238632 (0.17654) [-7.01632]	-0.005059 (0.04830) [-0.10475]	-0.056327 (0.17722) [-0.31784]	0.142494 (0.41509) [0.34329]	0.064686 (1.80691) [0.03580]
D(ROE(-1))	-0.540582	0.990336	0.312747	-0.918015	3.265586	-3.289616

	(0.24126)	(0.21865)	(0.05982)	(0.21950)	(0.51412)	(2.23802)
	[-2.24069]	[4.52922]	[5.22798]	[-4.18236]	[6.35175]	[-1.46988]
D(ROE(-2))	-0.922031	-0.106293	-0.043507	0.603006	-0.967654	-5.960383
	(0.34272)	(0.31061)	(0.08498)	(0.31180)	(0.73033)	(3.17920)
	[-2.69037]	[-0.34221]	[-0.51197]	[1.93392]	[-1.32495]	[-1.87481]
D(TD_TE(-1))	-0.018339	0.362308	0.013148	-0.087851	0.191519	0.430530
	(0.11992)	(0.10869)	(0.02974)	(0.10911)	(0.25556)	(1.11247)
	[-0.15292]	[3.33346]	[0.44215]	[-0.80519]	[0.74941]	[0.38700]
D(TD_TE(-2))	-0.065097	0.073904	0.010850	0.075165	-0.015217	-0.451498
	(0.13294)	(0.12049)	(0.03296)	(0.12095)	(0.28331)	(1.23326)
	[-0.48966]	[0.61336]	[0.32912]	[0.62144]	[-0.05371]	[-0.36610]
D(STD_TA(-1))	1.434784	0.422641	-0.771513	2.123767	-2.326149	18.42663
	(1.04527)	(0.94734)	(0.25918)	(0.95099)	(2.22749)	(9.69644)
	[1.37265]	[0.44613]	[-2.97670]	[2.23321]	[-1.04429]	[1.90035]
D(STD_TA(-2))	-0.329275	0.366188	-0.654024	2.156825	-2.760467	-5.468439
	(1.12105)	(1.01603)	(0.27797)	(1.01994)	(2.38898)	(10.3994)
	[-0.29372]	[0.36041]	[-2.35282]	[2.11466]	[-1.15550]	[-0.52584]
D(SIZE(-1))	0.586593	-0.311899	0.011744	-0.159456	0.490753	9.980542
	(0.37583)	(0.34062)	(0.09319)	(0.34194)	(0.80091)	(3.48642)
	[1.56078]	[-0.91567]	[0.12602]	[-0.46634]	[0.61275]	[2.86269]
D(SIZE(-2))	-0.182439	0.073173	0.045867	0.035819	0.505408	-4.071013
	(0.39519)	(0.35816)	(0.09799)	(0.35954)	(0.84215)	(3.66595)
	[-0.46165]	[0.20430]	[0.46808]	[0.09962]	[0.60014]	[-1.11049]
D(LTD_TA(-1))	0.191947	-0.411402	0.022047	-0.186977	-0.013346	2.241564
	(0.15446)	(0.13999)	(0.03830)	(0.14053)	(0.32915)	(1.43283)
	[1.24272]	[-2.93885]	[0.57565]	[-1.33055]	[-0.04055]	[1.56443]
D(LTD_TA(-2))	0.030656	-0.098683	0.034025	-0.142707	0.128956	-0.554074
	(0.11940)	(0.10821)	(0.02961)	(0.10863)	(0.25444)	(1.10760)
	[0.25675]	[-0.91194]	[1.14925]	[-1.31370]	[0.50682]	[-0.50025]
D(LIQUIDITY(-1))	0.003065	0.088414	0.003261	0.005507	-0.004364	0.213074
	(0.03231)	(0.02928)	(0.00801)	(0.02940)	(0.06885)	(0.29973)
	[0.09487]	[3.01925]	[0.40706]	[0.18733]	[-0.06339]	[0.71089]
D(LIQUIDITY(-2))	-0.010840	0.080246	0.008258	-0.019796	0.051211	-0.962284
	(0.03392)	(0.03074)	(0.00841)	(0.03086)	(0.07229)	(0.31467)
	[-0.31957]	[2.61017]	[0.98177]	[-0.64144]	[0.70843]	[-3.05805]
C	0.017844	-0.044121	-0.002263	-0.001635	-0.046359	0.431003
	(0.03901)	(0.03535)	(0.00967)	(0.03549)	(0.08313)	(0.36187)
	[0.45743]	[-1.24796]	[-0.23394]	[-0.04607]	[-0.55768]	[1.19105]
R-squared	0.394256	0.785678	0.766754	0.705434	0.807397	0.421725
Adj. R-squared	0.091384	0.678517	0.650131	0.558150	0.711096	0.132588
Sum sq. resids	0.989768	0.813005	0.060855	0.819277	4.494789	85.17300
S.E. equation	0.195110	0.176832	0.048379	0.177512	0.415784	1.809941
F-statistic	1.301726	7.331754	6.574631	4.789641	8.384070	1.458565
Log likelihood	17.22574	21.16042	73.00536	21.00671	-13.03833	-71.87364
Akaike AIC	-0.161287	-0.358021	-2.950268	-0.350336	1.351916	4.293682
Schwarz SC	0.429821	0.233087	-2.359160	0.240772	1.943024	4.884790
Mean dependent	0.018287	0.013302	-0.003571	0.017750	-0.027458	0.429929
S.D. dependent	0.204687	0.311875	0.081791	0.267049	0.773555	1.943353

Determinant resid covariance (dof adj.)	2.53E-09
Determinant resid covariance	1.91E-10
Log likelihood	107.0304
Akaike information criterion	-0.851521
Schwarz criterion	2.948458

Dependent Variable: D(ROE)
Method: Panel Least Squares
Date: 05/24/18 Time: 07:10
Sample (adjusted): 2009 2016
Periods included: 8
Cross-sections included: 5
Total panel (balanced) observations: 40
D(ROE) = C(1)*(ROE(-1) + 0.551141283134*TD_TE(-1) + 1.84549102091 *STD_TA(-1) + 0.014216506693*SIZE(-1) - 0.513649549853*LTD_TA(-1) + 0.0685625659537*LIQUIDITY(-1) - 0.552059102982) + C(2) *D(ROE(-1)) + C(3)*D(ROE(-2)) + C(4)*D(TD_TE(-1)) + C(5)*D(TD_TE(-2)) + C(6)*D(STD_TA(-1)) + C(7)*D(STD_TA(-2)) + C(8)*D(SIZE(-1)) + C(9)*D(SIZE(-2)) + C(10)*D(LTD_TA(-1)) + C(11)*D(LTD_TA(-2)) + C(12)*D(LIQUIDITY(-1)) + C(13)*D(LIQUIDITY(-2)) + C(14)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.159716	0.194784	-0.819965	0.4197
C(2)	-0.540582	0.241257	-2.240692	0.0338
C(3)	-0.922031	0.342715	-2.690370	0.0123
C(4)	-0.018339	0.119923	-0.152924	0.8796
C(5)	-0.065097	0.132944	-0.489659	0.6285
C(6)	1.434784	1.045269	1.372647	0.1816
C(7)	-0.329275	1.121050	-0.293720	0.7713
C(8)	0.586593	0.375833	1.560781	0.1307
C(9)	-0.182439	0.395187	-0.461654	0.6482
C(10)	0.191947	0.154458	1.242718	0.2251
C(11)	0.030656	0.119398	0.256754	0.7994
C(12)	0.003065	0.032310	0.094868	0.9251
C(13)	-0.010840	0.033921	-0.319571	0.7518
C(14)	0.017844	0.039009	0.457429	0.6512

R-squared	0.394256	Mean dependent var	0.018287
Adjusted R-squared	0.091384	S.D. dependent var	0.204687
S.E. of regression	0.195110	Akaike info criterion	-0.161287
Sum squared resid	0.989768	Schwarz criterion	0.429821
Log likelihood	17.22574	Hannan-Quinn criter.	0.052439
F-statistic	1.301726	Durbin-Watson stat	2.125495
Prob(F-statistic)	0.273380		

Result for South Africa

DESCRIPTIVE ANALYSIS

	ROA	ROE	TD_TE	STD_TA	SIZE	LTD_TA	LIQUIDITY
Mean	0.388566	0.589395	0.131292	0.009589	6.740182	0.190486	50.13243
Median	0.092940	0.173332	0.073642	0.003052	6.580000	0.047871	1.174807

Maximum	7.849333	7.867658	0.494689	0.114596	8.360000	1.021611	2264.803
Minimum	0.003935	0.004308	0.000124	1.92E-05	5.850000	0.000195	0.000109
Std. Dev.	1.070568	1.145990	0.150237	0.019919	0.594249	0.250927	305.7735
Skewness	6.335541	4.928178	1.211495	4.008784	0.848516	1.405909	7.099162
Kurtosis	44.51581	30.97442	3.218428	19.73952	3.340437	4.575500	51.90681
Jarque-Bera	4317.773	2016.016	13.56344	789.4630	6.865404	23.80702	5943.365
Probability	0.000000	0.000000	0.001134	0.000000	0.032300	0.000007	0.000000
Sum	21.37111	32.41673	7.221034	0.527376	370.7100	10.47674	2757.284
Sum Sq. Dev.	61.89020	70.91777	1.218843	0.021425	19.06910	3.400083	5048860.
Observations	55	55	55	55	55	55	55

CORRELATION

	ROA	ROE	TD_TE	STD_TA	SIZE	LTD_TA	LIQUIDITY
ROA	1	0.9468391060291415	-0.05752094173123386	0.09526802201671934	-0.13045005015940613	-0.07185134092311855	-0.01896133489437918
ROE	0.9468391060291415	1	-0.05225886740593482	0.09723994294144226	-0.12377209863530096	-0.11060327699370093	-0.01145387606944618
TD_TE	-0.05752094173123386	-0.05225886740593482	1	0.13416878141830051	-0.47895152778900693	-0.04481597868921366	-0.14052467146301511
STD_TA	0.09526802201671934	0.09723994294144226	0.13416878141830051	1	-0.35114262061571341	-0.65269117835202351	-0.07784288913840767
SIZE	-0.13045005015940613	-0.12377209863530096	-0.47895152778900693	-0.35114262061571341	1	0.55483018640314721	0.38593280372260948
LTD_TA	-0.07185134092311855	-0.11060327699370093	0.04481597868921366	0.65269117835202351	-0.55483018640314721	1	0.12168868788061611
LIQUIDITY	-0.01896133489437918	-0.01145387606944618	0.14052467146301511	0.07784288913840767	0.38593280372260948	0.12168868788061611	1

	ROA	*ROE*	*TD/TE*	*LTD/TA*	*STD/TA*	*SIZE*	*LIQUIDITY*
ROA	1						
ROE	0.94683	1					
TD/TE	-0.05752	-0.05226	1				
LTD/TA	-0.07185	-0.1106	-0.04482	1			
STD/TA	0.09526	0.09724	0.13416	0.65269	1		
SIZE	0.13045	0.12377	-0.47895	-0.55483	0.35114	1	
LIQUIDITY	0.01896	-0.01145	-0.14052	-0.12169	0.07784	0.38593	1

CO-INTERGRATION TEST

Pedroni Residual Cointegration Test
Series: ROA TD_TE STD_TA LTD_TA SIZE LIQUIDITY
Date: 05/22/18 Time: 06:17
Sample: 2006 2016
Included observations: 55
Cross-sections included: 5
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
User-specified lag length: 1
Newey-West automatic bandwidth selection and Bartlett kernel

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-1.199786	0.8849	-0.714131	0.7624
Panel rho-Statistic	1.485600	0.9313	2.064752	0.9805
Panel PP-Statistic	-5.218932	0.0000	-5.027658	0.0000
Panel ADF-Statistic	-0.823641	0.2051	-2.503839	0.0061

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

	Statistic	Prob.
Group rho-Statistic	2.942855	0.9984
Group PP-Statistic	-5.570297	0.0000
Group ADF-Statistic	-2.128299	0.0167

Cross section specific results

Phillips-Peron results (non-parametric)

Cross ID	AR(1)	Variance	HAC	Bandwidth	Obs
Central Rand Gold SA	-0.405	2.460827	1.634896	5.00	10
Datatec South Africa	-0.227	6.88E-05	1.41E-05	8.00	10
Comair Limited South Africa	-0.312	0.022255	0.005513	9.00	10
Assore Limited South Africa	-0.368	0.004052	0.001052	9.00	10
Caxtion Limited South Africa	-0.921	0.003870	0.002764	6.00	10

Augmented Dickey-Fuller results (parametric)

Cross ID	AR(1)	Variance	Lag	Max lag	Obs
Central Rand Gold SA	-0.924	2.380004	1	--	9
Datatec South Africa	-0.972	4.77E-05	1	--	9
Comair Limited South Africa	-1.175	0.011216	1	--	9
Assore Limited South Africa	-0.935	0.003812	1	--	9
Caxtion Limited South Africa	-1.518	0.003670	1	--	9

Kao Residual Cointegration Test
Series: ROA TD_TE STD_TA LTD_TA SIZE LIQUIDITY
Date: 05/22/18 Time: 06:19
Sample: 2006 2016
Included observations: 55
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
User-specified lag length: 1
Newey-West automatic bandwidth selection and Bartlett kernel

	t-Statistic	Prob.
ADF	1.362415	0.0865
Residual variance	1.870184	
HAC variance	0.227545	

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID)
Method: Least Squares
Date: 05/22/18 Time: 06:19
Sample (adjusted): 2008 2016
Included observations: 45 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-1.223070	0.227018	-5.387552	0.0000
D(RESID(-1))	0.130505	0.154181	0.846440	0.4020

R-squared	0.544213	Mean dependent var	0.006700
Adjusted R-squared	0.533613	S.D. dependent var	1.568647
S.E. of regression	1.071268	Akaike info criterion	3.018990
Sum squared resid	49.34748	Schwarz criterion	3.099286
Log likelihood	-65.92728	Hannan-Quinn criter.	3.048924
Durbin-Watson stat	2.209884		

CO-INTEGRATION FOR ROE

Pedroni Residual Cointegration Test
Series: ROE TD_TE STD_TA SIZE LTD_TA LIQUIDITY
Date: 05/22/18 Time: 06:23
Sample: 2006 2016
Included observations: 55
Cross-sections included: 5
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
User-specified lag length: 1
Newey-West automatic bandwidth selection and Bartlett kernel

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-0.483200	0.6855	-0.814923	0.7924
Panel rho-Statistic	1.771758	0.9618	2.320938	0.9899
Panel PP-Statistic	-7.982198	0.0000	-4.689912	0.0000
Panel ADF-Statistic	-2.543436	0.0055	-2.856883	0.0021

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

	Statistic	Prob.
Group rho-Statistic	3.258234	0.9994
Group PP-Statistic	-4.067959	0.0000
Group ADF-Statistic	-2.799147	0.0026

Cross section specific results

Phillips-Peron results (non-parametric)

Cross ID	AR(1)	Variance	HAC	Bandwidth	Obs
Central Rand Gold SA	-0.451	2.174007	0.811616	9.00	10
Datatec South Africa	-0.332	0.000497	0.000106	7.00	10
Comair Limited South Africa	-0.191	0.337704	0.063488	9.00	10
Assore Limited South Africa	0.085	0.025745	0.005748	9.00	10
Caxtion Limited South Africa	-0.988	0.019127	0.014155	3.00	10

Augmented Dickey-Fuller results (parametric)

Cross ID	AR(1)	Variance	Lag	Max lag	Obs
Central Rand Gold SA	-1.141	1.869423	1	--	9
Datatec South Africa	-1.157	0.000340	1	--	9
Comair Limited South Africa	-1.115	0.125151	1	--	9
Assore Limited South Africa	-0.393	0.020465	1	--	9
Caxtion Limited South Africa	-1.278	0.018545	1	--	9

GRANGER AUSALITY ROA

Pairwise Granger Causality Tests
Date: 05/22/18 Time: 06:20
Sample: 2006 2016
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
TD_TE does not Granger Cause ROA	45	0.38797	0.6810
ROA does not Granger Cause TD_TE		1.08616	0.3473
STD_TA does not Granger Cause ROA	45	0.17015	0.8441
ROA does not Granger Cause STD_TA		0.11563	0.8911
LTD_TA does not Granger Cause ROA	45	0.60615	0.5504
ROA does not Granger Cause LTD_TA		0.50349	0.6082
SIZE does not Granger Cause ROA	45	4.08222	0.0244
ROA does not Granger Cause SIZE		2.12079	0.1332

LIQUIDITY does not Granger Cause ROA	45	386.370	7.E-27
ROA does not Granger Cause LIQUIDITY		0.08601	0.9178
STD_TA does not Granger Cause TD_TE	45	1.26321	0.2938
TD_TA does not Granger Cause STD_TA		1.60069	0.2144
LTD_TA does not Granger Cause TD_TA	45	0.30331	0.7401
TD_TE does not Granger Cause LTD_TA		0.86484	0.4288
SIZE does not Granger Cause TD_TE	45	0.13841	0.8712
TD_TE does not Granger Cause SIZE		0.62680	0.5395
LIQUIDITY does not Granger Cause TD_TE	45	0.10820	0.8977
TD_TE does not Granger Cause LIQUIDITY		0.41617	0.6624
LTD_TA does not Granger Cause STD_TA	45	1.86662	0.1679
STD_TA does not Granger Cause LTD_TA		1.67624	0.1999
SIZE does not Granger Cause STD_TA	45	0.48173	0.6212
STD_TA does not Granger Cause SIZE		1.06302	0.3550
LIQUIDITY does not Granger Cause STD_TA	45	0.07223	0.9304
STD_TA does not Granger Cause LIQUIDITY		0.11543	0.8913
SIZE does not Granger Cause LTD_TA	45	1.15022	0.3268
LTD_TA does not Granger Cause SIZE		0.18446	0.8323
LIQUIDITY does not Granger Cause LTD_TA	45	0.09524	0.9094
LTD_TA does not Granger Cause LIQUIDITY		0.23387	0.7925
LIQUIDITY does not Granger Cause SIZE	45	7.78580	0.0014
SIZE does not Granger Cause LIQUIDITY		18.4877	2.E-06

GRANGER CAUSALITY ROE

Pairwise Granger Causality Tests
Date: 05/22/18 Time: 06:24
Sample: 2006 2016
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
TD_TE does not Granger Cause ROE	45	0.30366	0.7398
ROE does not Granger Cause TD_TE		1.34976	0.2709
STD_TA does not Granger Cause ROE	45	0.11168	0.8946
ROE does not Granger Cause STD_TA		0.01847	0.9817
SIZE does not Granger Cause ROE	45	3.25915	0.0488
ROE does not Granger Cause SIZE		2.26575	0.1169
LTD_TA does not Granger Cause ROE	45	0.41063	0.6660
ROE does not Granger Cause LTD_TA		0.32864	0.7218
LIQUIDITY does not Granger Cause ROE	45	104.909	1.E-16

ROE does not Granger Cause LIQUIDITY		0.15894	0.8536
STD_TA does not Granger Cause TD_TA	45	1.26321	0.2938
TD_TA does not Granger Cause STD_TA		1.60069	0.2144
SIZE does not Granger Cause TD_TE	45	0.13841	0.8712
TD_TE does not Granger Cause SIZE		0.62680	0.5395
LTD_TA does not Granger Cause TD_TE	45	0.30331	0.7401
TD_TE does not Granger Cause LTD_TA		0.86484	0.4288
LIQUIDITY does not Granger Cause TD_TE	45	0.10820	0.8977
TD_TE does not Granger Cause LIQUIDITY		0.41617	0.6624
SIZE does not Granger Cause STD_TA	45	0.48173	0.6212
STD_TA does not Granger Cause SIZE		1.06302	0.3550
LTD_TA does not Granger Cause STD_TA	45	1.86662	0.1679
STD_TA does not Granger Cause LTD_TA		1.67624	0.1999
LIQUIDITY does not Granger Cause STD_TA	45	0.07223	0.9304
STD_TA does not Granger Cause LIQUIDITY		0.11543	0.8913
LTD_TA does not Granger Cause SIZE	45	0.18446	0.8323
SIZE does not Granger Cause LTD_TA		1.15022	0.3268
LIQUIDITY does not Granger Cause SIZE	45	7.78580	0.0014
SIZE does not Granger Cause LIQUIDITY		18.4877	2.E-06
LIQUIDITY does not Granger Cause LTD_TA	45	0.09524	0.9094
LTD_TA does not Granger Cause LIQUIDITY		0.23387	0.7925

REGRESSION ROA

Dependent Variable: ROA
Method: Panel Least Squares
Date: 05/22/18 Time: 06:31
Sample: 2006 2016
Periods included: 11
Cross-sections included: 5
Total panel (balanced) observations: 55

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TD_TE	0.411267	1.654435	0.248584	0.8048
STD_TA	11.11023	17.83929	0.622795	0.5366
SIZE	-0.466654	0.521239	-0.895277	0.3754
LTD_TA	-0.475504	2.138968	-0.222305	0.8251
LIQUIDITY	-0.000154	0.000532	-0.289936	0.7732
C	3.471684	3.636161	0.954766	0.3448

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.169174	Mean dependent var	0.388566
Adjusted R-squared	0.003008	S.D. dependent var	1.070568

S.E. of regression	1.068956	Akaike info criterion	3.134208
Sum squared resid	51.42002	Schwarz criterion	3.499177
Log likelihood	-76.19071	Hannan-Quinn criter.	3.275345
F-statistic	1.018104	Durbin-Watson stat	2.277332
Prob(F-statistic)	0.440380		

PANEL OLS ROA

Dependent Variable: ROA
Method: Panel Least Squares
Date: 05/22/18 Time: 06:32
Sample: 2006 2016
Periods included: 11
Cross-sections included: 5
Total panel (balanced) observations: 55

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TD_TE	-0.420224	1.309767	-0.320839	0.7497
STD_TA	14.11806	10.28948	1.372086	0.1763
SIZE	0.176107	0.416002	0.423333	0.6739
LTD_TA	-0.833674	1.025381	-0.813039	0.4201
LIQUIDITY	-0.000106	0.000535	-0.198761	0.8433
C	-0.714494	3.013281	-0.237115	0.8136

R-squared	0.054633	Mean dependent var	0.388566
Adjusted R-squared	-0.041833	S.D. dependent var	1.070568
S.E. of regression	1.092731	Akaike info criterion	3.117906
Sum squared resid	58.50897	Schwarz criterion	3.336888
Log likelihood	-79.74241	Hannan-Quinn criter.	3.202588
F-statistic	0.566341	Durbin-Watson stat	2.212879
Prob(F-statistic)	0.725281		

FIXED FOR ROE

Dependent Variable: ROE
Method: Panel Least Squares
Date: 05/22/18 Time: 06:34
Sample: 2006 2016
Periods included: 11
Cross-sections included: 5
Total panel (balanced) observations: 55

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TD_TE	1.048649	1.731972	0.605465	0.5479
STD_TA	20.60459	18.67535	1.103304	0.2758
SIZE	-0.412621	0.545668	-0.756177	0.4535
LTD_TA	-2.275488	2.239213	-1.016200	0.3150
LIQUIDITY	-0.000321	0.000557	-0.575241	0.5680
C	3.484810	3.806574	0.915472	0.3648

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.205380	Mean dependent var	0.589395
Adjusted R-squared	0.046456	S.D. dependent var	1.145990
S.E. of regression	1.119054	Akaike info criterion	3.225810
Sum squared resid	56.35266	Schwarz criterion	3.590779
Log likelihood	-78.70976	Hannan-Quinn criter.	3.366946
F-statistic	1.292318	Durbin-Watson stat	2.109652
Prob(F-statistic)	0.267633		

Dependent Variable: ROE
Method: Panel Least Squares
Date: 05/22/18 Time: 06:35
Sample: 2006 2016
Periods included: 11
Cross-sections included: 5
Total panel (balanced) observations: 55

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TD_TE	-0.756862	1.385937	-0.546101	0.5875
STD_TA	18.57534	10.88787	1.706058	0.0943
SIZE	0.071234	0.440194	0.161825	0.8721
LTD_TA	-1.423393	1.085012	-1.311868	0.1957
LIQUIDITY	-0.000197	0.000566	-0.347090	0.7300
C	0.311511	3.188520	0.097698	0.9226

R-squared	0.076225	Mean dependent var	0.589395
Adjusted R-squared	-0.018038	S.D. dependent var	1.145990
S.E. of regression	1.156279	Akaike info criterion	3.230960
Sum squared resid	65.51208	Schwarz criterion	3.449942
Log likelihood	-82.85141	Hannan-Quinn criter.	3.315642
F-statistic	0.808640	Durbin-Watson stat	1.904047
Prob(F-statistic)	0.549157		

VECTOR ERROR CORRECTION

ROA

Vector Error Correction Estimates
Date: 05/24/18 Time: 07:13
Sample (adjusted): 2009 2016
Included observations: 40 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
ROA(-1)	1.000000
TD_TE(-1)	-0.161457 (0.35718) [-0.45203]
STD_TA(-1)	-6.669689 (1.96702) [-3.39075]
SIZE(-1)	-0.777487 (0.13492)

	[-5.76261]
LTD_TA(-1)	-0.229912 (0.26994) [-0.85172]
LIQUIDITY(-1)	0.212219 (0.00023) [938.618]
C	-8.346602

Error Correction:	D(ROA)	D(TD_TE)	D(STD_TA)	D(SIZE)	D(LTD_TA)	D(LIQUIDITY)
CointEq1	0.001391 (0.00113) [1.23516]	-0.000211 (0.00048) [-0.43716]	3.88E-05 (7.6E-05) [0.51043]	-0.001677 (0.00048) [-3.46587]	9.22E-05 (0.00064) [0.14438]	-4.312351 (0.00396) [-1088.67]
D(ROA(-1))	-0.064869 (0.05012) [-1.29438]	0.002949 (0.02150) [0.13720]	-0.001266 (0.00338) [-0.37448]	0.013262 (0.02153) [0.61599]	-0.012190 (0.02842) [-0.42891]	1.660232 (0.17622) [9.42124]
D(ROA(-2))	-0.121372 (0.02828) [-4.29203]	0.002705 (0.01213) [0.22304]	9.35E-06 (0.00191) [0.00490]	0.012974 (0.01215) [1.06798]	0.000525 (0.01604) [0.03276]	0.422852 (0.09944) [4.25254]
D(TD_TE(-1))	0.601431 (0.47518) [1.26570]	-0.537303 (0.20381) [-2.63625]	0.040721 (0.03206) [1.27016]	0.022216 (0.20413) [0.10883]	-0.034595 (0.26947) [-0.12838]	1.551903 (1.67086) [0.92881]
D(TD_TE(-2))	0.419881 (0.48923) [0.85825]	-0.083623 (0.20984) [-0.39851]	-0.008472 (0.03301) [-0.25668]	0.217047 (0.21017) [1.03273]	-0.246163 (0.27744) [-0.88727]	0.855116 (1.72028) [0.49708]
D(STD_TA(-1))	-0.186080 (5.04340) [-0.03690]	-0.834701 (2.16321) [-0.38586]	0.119837 (0.34028) [0.35218]	0.199332 (2.16658) [0.09200]	5.606669 (2.86006) [1.96033]	17.15849 (17.7340) [0.96755]
D(STD_TA(-2))	7.213464 (4.84497) [1.48885]	4.334650 (2.07810) [2.08587]	0.913164 (0.32689) [2.79351]	-7.287453 (2.08134) [-3.50133]	10.41137 (2.74754) [3.78935]	13.69679 (17.0363) [0.80398]
D(SIZE(-1))	0.144634 (0.29905) [0.48365]	-0.050536 (0.12827) [-0.39399]	0.022734 (0.02018) [1.12674]	-0.017030 (0.12847) [-0.13257]	0.042765 (0.16959) [0.25217]	2.563919 (1.05153) [2.43828]
D(SIZE(-2))	0.110762 (0.29597) [0.37424]	0.003975 (0.12695) [0.03132]	0.007222 (0.01997) [0.36166]	0.046424 (0.12714) [0.36513]	0.066554 (0.16784) [0.39653]	1.580737 (1.04071) [1.51891]
D(LTD_TA(-1))	0.321066 (0.48380) [0.66364]	0.127750 (0.20751) [0.61563]	0.022739 (0.03264) [0.69663]	-0.179591 (0.20783) [-0.86411]	-0.181682 (0.27436) [-0.66221]	-0.368710 (1.70117) [-0.21674]
D(LTD_TA(-2))	-1.640675 (0.49702) [-3.30101]	-0.687892 (0.21318) [-3.22677]	-0.136537 (0.03353) [-4.07162]	1.083701 (0.21351) [5.07554]	-1.497931 (0.28186) [-5.31451]	1.200642 (1.74767) [0.68700]
D(LIQUIDITY(-1))	-0.000560 (0.00023) [-2.41054]	3.50E-05 (0.00010) [0.35137]	-1.11E-05 (1.6E-05) [-0.70805]	0.000428 (0.00010) [4.28773]	-5.76E-05 (0.00013) [-0.43698]	-0.067283 (0.00082) [-82.3557]

D(LIQUIDITY(-2))	0.003051	3.35E-05	-1.32E-05	3.66E-05	-5.95E-05	-0.006895
	(0.00022)	(9.5E-05)	(1.5E-05)	(9.5E-05)	(0.00013)	(0.00078)
	[13.8418]	[0.35394]	[-0.88792]	[0.38651]	[-0.47612]	[-8.89556]
C	0.000940	0.007566	-0.001070	0.000957	-0.010574	-57.02469
	(0.04121)	(0.01767)	(0.00278)	(0.01770)	(0.02337)	(0.14489)
	[0.02281]	[0.42808]	[-0.38492]	[0.05404]	[-0.45251]	[-393.561]
R-squared	0.988877	0.523324	0.541260	0.837522	0.615805	0.999997
Adj. R-squared	0.983315	0.284985	0.311890	0.756283	0.423708	0.999995
Sum sq. resids	1.282701	0.235981	0.005839	0.236716	0.412505	15.85960
S.E. equation	0.222114	0.095269	0.014986	0.095417	0.125959	0.781015
F-statistic	177.8064	2.195718	2.359767	10.30937	3.205695	601326.9
Log likelihood	12.04068	45.90012	119.8839	45.83796	34.73018	-38.25545
Akaike AIC	0.097966	-1.595006	-5.294194	-1.591898	-1.036509	2.612773
Schwarz SC	0.689074	-1.003898	-4.703087	-1.000790	-0.445401	3.203880
Mean dependent	0.014292	0.006571	-1.32E-05	0.001500	-0.003691	-56.59017
S.D. dependent	1.719563	0.112666	0.018066	0.193279	0.165923	349.6672

Determinant resid covariance (dof adj.)	3.23E-13
Determinant resid covariance	2.44E-14
Log likelihood	286.3422
Akaike information criterion	-9.817108
Schwarz criterion	-6.017129

Dependent Variable: D(ROA)
Method: Panel Least Squares
Date: 05/24/18 Time: 07:13
Sample (adjusted): 2009 2016
Periods included: 8
Cross-sections included: 5
Total panel (balanced) observations: 40
D(ROA) = C(1)*(ROA(-1) - 0.161457382179*TD_TE(-1) - 6.66968864267 *STD_TA(-1) - 0.777487268282*SIZE(-1) - 0.229911915155*LTD_TA(-1) + 0.212219476617*LIQUIDITY(-1) - 8.34660170527) + C(2) *D(ROA(-1)) + C(3)*D(ROA(-2)) + C(4)*D(TD_TE(-1)) + C(5)*D(TD_TE(-2)) + C(6)*D(STD_TA(-1)) + C(7)*D(STD_TA(-2)) + C(8)*D(SIZE(-1)) + C(9)*D(SIZE(-2)) + C(10)*D(LTD_TA(-1)) + C(11)*D(LTD_TA(-2)) + C(12)*D(LIQUIDITY(-1)) + C(13)*D(LIQUIDITY(-2)) + C(14)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.001391	0.001127	1.235164	0.2278
C(2)	-0.064869	0.050116	-1.294377	0.2069
C(3)	-0.121372	0.028278	-4.292034	0.0002
C(4)	0.601431	0.475177	1.265699	0.2168
C(5)	0.419881	0.489232	0.858245	0.3986
C(6)	-0.186080	5.043400	-0.036896	0.9708
C(7)	7.213464	4.844974	1.488855	0.1486
C(8)	0.144634	0.299045	0.483653	0.6327
C(9)	0.110762	0.295968	0.374238	0.7113
C(10)	0.321066	0.483799	0.663636	0.5128
C(11)	-1.640675	0.497023	-3.301006	0.0028
C(12)	-0.000560	0.000232	-2.410537	0.0233
C(13)	0.003051	0.000220	13.84176	0.0000
C(14)	0.000940	0.041207	0.022810	0.9820

R-squared	0.988877	Mean dependent var	0.014292
Adjusted R-squared	0.983315	S.D. dependent var	1.719563
S.E. of regression	0.222114	Akaike info criterion	0.097966

Sum squared resid	1.282701	Schwarz criterion	0.689074
Log likelihood	12.04068	Hannan-Quinn criter.	0.311692
F-statistic	177.8064	Durbin-Watson stat	3.149064
Prob(F-statistic)	0.000000		

VECM ROE

Vector Error Correction Estimates
Date: 05/24/18 Time: 07:14
Sample (adjusted): 2009 2016
Included observations: 40 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
ROE(-1)	1.000000
TD_TE(-1)	0.352880 (0.81822) [0.43128]
STD_TA(-1)	-5.426727 (4.50170) [-1.20549]
SIZE(-1)	-1.666553 (0.30740) [-5.42149]
LTD_TA(-1)	-0.494508 (0.61604) [-0.80272]
LIQUIDITY(-1)	0.501370 (0.00055) [904.788]
C	-20.71450

Error Correction:	D(ROE)	D(TD_TE)	D(STD_TA)	D(SIZE)	D(LTD_TA)	D(LIQUIDITY)
CointEq1	0.001580 (0.00092) [1.72289]	-0.000126 (0.00022) [-0.57210]	1.66E-05 (3.5E-05) [0.48080]	-0.000739 (0.00022) [-3.33121]	3.02E-05 (0.00029) [0.10379]	-1.839997 (0.00171) [-1074.21]
D(ROE(-1))	-0.148254 (0.09172) [-1.61631]	0.009190 (0.02200) [0.41768]	-0.001535 (0.00346) [-0.44311]	0.016482 (0.02219) [0.74277]	-0.011868 (0.02914) [-0.40733]	1.360091 (0.17136) [7.93688]
D(ROE(-2))	-0.180069 (0.05413) [-3.32691]	0.005164 (0.01298) [0.39774]	0.000291 (0.00204) [0.14230]	0.011713 (0.01309) [0.89453]	0.003707 (0.01719) [0.21561]	0.165595 (0.10112) [1.63761]
D(TD_TE(-1))	1.277025	-0.545219	0.040530	0.014794	-0.039056	2.880891

	(0.84827)	(0.20347)	(0.03203)	(0.20522)	(0.26945)	(1.58480)
	[1.50544]	[-2.67955]	[1.26543]	[0.07209]	[-0.14495]	[1.81783]
D(TD_TE(-2))	1.542524	-0.099025	-0.006705	0.204800	-0.240580	2.005424
	(0.85204)	(0.20438)	(0.03217)	(0.20613)	(0.27064)	(1.59184)
	[1.81038]	[-0.48452]	[-0.20842]	[0.99353]	[-0.88892]	[1.25982]
D(STD_TA(-1))	7.013837	-0.906971	0.125175	0.138242	5.651940	10.26427
	(8.97885)	(2.15374)	(0.33902)	(2.17225)	(2.85205)	(16.7748)
	[0.78115]	[-0.42111]	[0.36923]	[0.06364]	[1.98171]	[0.61189]
D(STD_TA(-2))	-5.570198	4.109840	0.938324	-7.527181	10.54861	16.30152
	(8.88967)	(2.13235)	(0.33565)	(2.15068)	(2.82372)	(16.6082)
	[-0.62659]	[1.92738]	[2.79554]	[-3.49991]	[3.73572]	[0.98153]
D(SIZE(-1))	0.021070	-0.053641	0.022593	-0.021462	0.041927	2.722961
	(0.53337)	(0.12794)	(0.02014)	(0.12904)	(0.16942)	(0.99647)
	[0.03950]	[-0.41928]	[1.12187]	[-0.16633]	[0.24748]	[2.73262]
D(SIZE(-2))	0.358330	-0.006619	0.008908	0.035608	0.073302	2.134192
	(0.50044)	(0.12004)	(0.01890)	(0.12107)	(0.15896)	(0.93496)
	[0.71603]	[-0.05514]	[0.47145]	[0.29410]	[0.46113]	[2.28267]
D(LTD_TA(-1))	-0.973460	0.130072	0.021846	-0.176154	-0.190900	0.436218
	(0.85628)	(0.20539)	(0.03233)	(0.20716)	(0.27199)	(1.59975)
	[-1.13685]	[0.63328]	[0.67569]	[-0.85033]	[-0.70187]	[0.27268]
D(LTD_TA(-2))	-1.306294	-0.668196	-0.138932	1.112439	-1.513615	0.640806
	(0.90847)	(0.21791)	(0.03430)	(0.21979)	(0.28857)	(1.69726)
	[-1.43790]	[-3.06633]	[-4.05032]	[5.06144]	[-5.24527]	[0.37755]
D(LIQUIDITY(-1))	-0.001171	5.74E-05	-1.21E-05	0.000444	-5.71E-05	-0.060276
	(0.00043)	(0.00010)	(1.6E-05)	(0.00010)	(0.00014)	(0.00080)
	[-2.71745]	[0.55578]	[-0.74486]	[4.25847]	[-0.41695]	[-74.8953]
D(LIQUIDITY(-2))	0.002432	5.62E-05	-1.42E-05	5.29E-05	-5.86E-05	0.000608
	(0.00042)	(0.00010)	(1.6E-05)	(0.00010)	(0.00013)	(0.00078)
	[5.85567]	[0.56378]	[-0.90276]	[0.52643]	[-0.44431]	[0.78299]
C	0.023642	0.008790	-0.001217	0.001988	-0.011184	-57.01900
	(0.07319)	(0.01756)	(0.00276)	(0.01771)	(0.02325)	(0.13674)
	[0.32301]	[0.50065]	[-0.44043]	[0.11225]	[-0.48105]	[-416.986]
R-squared	0.963464	0.526692	0.543878	0.836394	0.617312	0.999997
Adj. R-squared	0.945195	0.290037	0.315817	0.754592	0.425968	0.999996
Sum sq. resids	4.072412	0.234314	0.005806	0.238359	0.410888	14.21432
S.E. equation	0.395767	0.094932	0.014943	0.095748	0.125711	0.739395
F-statistic	52.73994	2.225574	2.384790	10.22452	3.226188	670929.7
Log likelihood	-11.06466	46.04193	119.9984	45.69962	34.80876	-36.06495
Akaike AIC	1.253233	-1.602097	-5.299918	-1.584981	-1.040438	2.503247
Schwarz SC	1.844341	-1.010989	-4.708810	-0.993873	-0.449330	3.094355
Mean dependent	0.055826	0.006571	-1.32E-05	0.001500	-0.003691	-56.59017
S.D. dependent	1.690560	0.112666	0.018066	0.193279	0.165923	349.6672

Determinant resid covariance (dof adj.)	1.48E-12
Determinant resid covariance	1.12E-13
Log likelihood	255.9058
Akaike information criterion	-8.295291
Schwarz criterion	-4.495312

Dependent Variable: D(ROE)
Method: Panel Least Squares
Date: 05/24/18 Time: 07:15
Sample (adjusted): 2009 2016
Periods included: 8
Cross-sections included: 5
Total panel (balanced) observations: 40
D(ROE) = C(1)*(ROE(-1) + 0.352879959562*TD_TE(-1) - 5.42672727442 *STD_TA(-1) - 1.66655250161*SIZE(-1) - 0.494507890001*LTD_TA(-1) + 0.501369576306*LIQUIDITY(-1) - 20.7145048095) + C(2)*D(ROE(-1)) + C(3)*D(ROE(-2)) + C(4)*D(TD_TE(-1)) + C(5)*D(TD_TE(-2)) + C(6)*D(STD_TA(-1)) + C(7)*D(STD_TA(-2)) + C(8)*D(SIZE(-1)) + C(9) *D(SIZE(-2)) + C(10)*D(LTD_TA(-1)) + C(11)*D(LTD_TA(-2)) + C(12) *D(LIQUIDITY(-1)) + C(13)*D(LIQUIDITY(-2)) + C(14)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.001580	0.000917	1.722887	0.0968
C(2)	-0.148254	0.091724	-1.616309	0.1181
C(3)	-0.180069	0.054125	-3.326914	0.0026
C(4)	1.277025	0.848274	1.505439	0.1443
C(5)	1.542524	0.852044	1.810381	0.0818
C(6)	7.013837	8.978849	0.781151	0.4418
C(7)	-5.570198	8.889669	-0.626592	0.5364
C(8)	0.021070	0.533366	0.039504	0.9688
C(9)	0.358330	0.500442	0.716028	0.4804
C(10)	-0.973460	0.856281	-1.136847	0.2660
C(11)	-1.306294	0.908474	-1.437899	0.1624
C(12)	-0.001171	0.000431	-2.717447	0.0115
C(13)	0.002432	0.000415	5.855674	0.0000
C(14)	0.023642	0.073192	0.323013	0.7493

R-squared	0.963464	Mean dependent var	0.055826
Adjusted R-squared	0.945195	S.D. dependent var	1.690560
S.E. of regression	0.395767	Akaike info criterion	1.253233
Sum squared resid	4.072412	Schwarz criterion	1.844341
Log likelihood	-11.06466	Hannan-Quinn criter.	1.466959
F-statistic	52.73994	Durbin-Watson stat	1.753431
Prob(F-statistic)	0.000000		

Result for Nigeria

	ROA	*ROE*	*TD/TE*	*LTD/TA*	*STD/TA*	*SIZE*	*LIQUIDITY*
ROA	1						
ROE	0.71448 4	1					
TD/TE	0.95587 5	0.60756 8	1				
LTD/TA	0.90186 7	0.46770 1	0.96286 9	1			
STD/TA	0.98494	0.66920 5	0.98112 3	0.93716 6	1		
SIZE	-0.78694	-0.54372	-0.80395	-0.74001	- 0.78895	1	
LIQUIDIT	-0.17735	-0.28292	-0.13301	-0.15168	-	0.22450	1

Y	0.14883	8

DESCRIPTIVES STATISTICS

	ROA	ROE	TD_TE	STD_TA	SIZE	LTD_TA	LIQUIDITY
Mean	11.61126	3.196706	0.589055	0.744792	7.284000	1.284010	1.316965
Median	0.193642	1.356863	0.062420	0.028041	7.700000	0.056504	0.983018
Maximum	215.7936	23.90127	9.877338	13.75311	8.480000	27.45671	3.852770
Minimum	0.023994	0.043444	0.000860	0.001029	4.340000	0.000583	0.211048
Std. Dev.	38.93246	4.279454	1.603222	2.361451	0.993577	4.346806	0.971902
Skewness	3.957708	2.625071	4.171236	4.022237	-1.623514	4.682820	1.407175
Kurtosis	18.72777	11.79082	22.40089	19.90869	5.031337	26.35545	3.659940
Jarque-Bera	710.4549	240.2642	1022.064	803.4978	33.61766	1451.066	19.14936
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000069
Sum	638.6192	175.8189	32.39802	40.96355	400.6200	70.62057	72.43308
Sum Sq. Dev.	81849.75	988.9411	138.7973	301.1284	53.30852	1020.315	51.00802
Observations	55	55	55	55	55	55	55

CO-INTEGRATION TEST

Pedroni Residual Cointegration Test
Series: ROA TD_TE STD_TA SIZE LTD_TA LIQUIDITY
Date: 05/22/18 Time: 06:51
Sample: 2006 2016
Included observations: 55
Cross-sections included: 5
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
User-specified lag length: 1
Newey-West automatic bandwidth selection and Bartlett kernel

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-0.490546	0.6881	-1.779516	0.9624
Panel rho-Statistic	0.954237	0.8300	2.260268	0.9881
Panel PP-Statistic	-15.59695	0.0000	-4.999175	0.0000
Panel ADF-Statistic	-0.741339	0.2292	-0.124831	0.4503

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

	Statistic	Prob.
Group rho-Statistic	2.982432	0.9986
Group PP-Statistic	-13.24560	0.0000
Group ADF-Statistic	-1.868824	0.0308

Cross section specific results

Phillips-Peron results (non-parametric)

Cross ID	AR(1)	Variance	HAC	Bandwidth	Obs
Julius Berger Plc Nigeria	-0.739	0.000698	0.000122	9.00	10
AG. Leventis Plc	0.011	0.000109	9.56E-05	2.00	10

Nigeria					
UAC Nigeria Plc	-0.658	88.44251	38.87513	4.00	10
Nestle Nigeria Plc	-0.026	0.003344	0.000559	9.00	10
Nigeria Breweries Plc	-0.191	0.005861	0.001118	8.00	10

Augmented Dickey-Fuller results (parametric)

Cross ID	AR(1)	Variance	Lag	Max lag	Obs
Julius Berger Plc Nigeria	-1.633	0.000235	1	--	9
AG. Leventis Plc Nigeria	-0.204	0.000116	1	--	9
UAC Nigeria Plc	-0.938	77.42812	1	--	9
Nestle Nigeria Plc	-0.532	0.002489	1	--	9
Nigeria Breweries Plc	-0.550	0.005895	1	--	9

Pedroni Residual Cointegration Test
Series: ROE TD_TE STD_TA SIZE LTD_TA LIQUIDITY
Date: 05/23/18 Time: 04:30
Sample: 2006 2016
Included observations: 55
Cross-sections included: 5
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
Automatic lag length selection based on SIC with a max lag of 0
Newey-West automatic bandwidth selection and Bartlett kernel

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-0.757765	0.7757	-0.965904	0.8330
Panel rho-Statistic	2.279352	0.9887	2.397696	0.9918
Panel PP-Statistic	-8.852895	0.0000	-6.972379	0.0000
Panel ADF-Statistic	-2.598670	0.0047	-2.078995	0.0188

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

	Statistic	Prob.
Group rho-Statistic	3.395833	0.9997
Group PP-Statistic	-8.682736	0.0000
Group ADF-Statistic	-2.278555	0.0113

Cross section specific results

Phillips-Peron results (non-parametric)

Cross ID	AR(1)	Variance	HAC	Bandwidth	Obs
Julius Berger Plc Nigeria	-0.135	0.102004	0.020093	9.00	10
AG. Leventis Plc Nigeria	-0.183	0.000143	2.81E-05	9.00	10
UAC Nigeria Plc	-0.331	6.365428	1.107078	9.00	10
Nestle Nigeria Plc	-0.474	0.522624	0.120452	9.00	10
Nigeria Breweries Plc	-0.447	0.075711	0.015280	7.00	10

Augmented Dickey-Fuller results (parametric)

Cross ID	AR(1)	Variance	Lag	Max lag	Obs
Julius Berger Plc Nigeria	-0.135	0.102004	0	0	10
AG. Leventis Plc Nigeria	-0.183	0.000143	0	0	10
UAC Nigeria Plc	-0.331	6.365428	0	0	10
Nestle Nigeria Plc	-0.474	0.522624	0	0	10
Nigeria Breweries Plc	-0.447	0.075711	0	0	10

Kao Residual Cointegration Test
Series: ROA TD_TE STD_TA SIZE LTD_TA LIQUIDITY
Date: 05/22/18 Time: 06:52
Sample: 2006 2016
Included observations: 55
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
User-specified lag length: 1
Newey-West automatic bandwidth selection and Bartlett kernel

	t-Statistic	Prob.
ADF	-4.245271	0.0000
Residual variance	106.4823	
HAC variance	16.64561	

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID)
Method: Least Squares
Date: 05/22/18 Time: 06:52
Sample (adjusted): 2008 2016
Included observations: 45 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-1.867101	0.250235	-7.461393	0.0000
D(RESID(-1))	0.082710	0.135449	0.610634	0.5447

R-squared	0.879842	Mean dependent var	-0.140808
Adjusted R-squared	0.877048	S.D. dependent var	12.08002
S.E. of regression	4.235807	Akaike info criterion	5.768451
Sum squared resid	771.5087	Schwarz criterion	5.848747
Log likelihood	-127.7902	Hannan-Quinn criter.	5.798385
Durbin-Watson stat	1.964007		

Kao Residual Cointegration Test
Series: ROE STD_TA TD_TE SIZE LTD_TA LIQUIDITY
Date: 05/22/18 Time: 06:53
Sample: 2006 2016
Included observations: 55
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
User-specified lag length: 1

Newey-West automatic bandwidth selection and Bartlett kernel

	t-Statistic	Prob.
ADF	-6.410534	0.0000
Residual variance	3.664807	
HAC variance	1.999153	

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID)
Method: Least Squares
Date: 05/22/18 Time: 06:53
Sample (adjusted): 2008 2016
Included observations: 45 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-1.743505	0.225857	-7.719508	0.0000
D(RESID(-1))	0.369392	0.140828	2.622999	0.0120

R-squared	0.675832	Mean dependent var	-0.108705
Adjusted R-squared	0.668294	S.D. dependent var	2.182163
S.E. of regression	1.256794	Akaike info criterion	3.338432
Sum squared resid	67.91987	Schwarz criterion	3.418728
Log likelihood	-73.11472	Hannan-Quinn criter.	3.368366
Durbin-Watson stat	2.016787		

GRANGER CAUSAL RELATIONSHIP

Pairwise Granger Causality Tests
Date: 05/22/18 Time: 06:53
Sample: 2006 2016
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
STD_TA does not Granger Cause ROE	45	5.51544	0.0077
ROE does not Granger Cause STD_TA		12.8981	5.E-05
TD_TE does not Granger Cause ROE	45	1.53224	0.2285
ROE does not Granger Cause TD_TA		7.15422	0.0022
SIZE does not Granger Cause ROE	45	0.28195	0.7558
ROE does not Granger Cause SIZE		1.95332	0.1551
LTD_TA does not Granger Cause ROE	45	3.09690	0.0562
ROE does not Granger Cause LTD_TA		23.3907	2.E-07
LIQUIDITY does not Granger Cause ROE	45	0.63655	0.5344
ROE does not Granger Cause LIQUIDITY		0.76566	0.4717
TD_TE does not Granger Cause STD_TA	45	9.59054	0.0004
STD_TA does not Granger Cause TD_TE		6.59933	0.0033
SIZE does not Granger Cause STD_TA	45	0.20891	0.8123
STD_TA does not Granger Cause SIZE		17.5771	3.E-06

LTD_TA does not Granger Cause STD_TA	45	68.2759	1.E-13
STD_TA does not Granger Cause LTD_TA		645.892	4.E-31
LIQUIDITY does not Granger Cause STD_TA	45	1.70375	0.1949
STD_TA does not Granger Cause LIQUIDITY		1.65154	0.2046
SIZE does not Granger Cause TD_TE	45	2.02226	0.1457
TD_TE does not Granger Cause SIZE		5.15551	0.0102
LTD_TA does not Granger Cause TD_TE	45	26.5532	5.E-08
TD_TE does not Granger Cause LTD_TA		55.5079	3.E-12
LIQUIDITY does not Granger Cause TD_TE	45	1.32757	0.2765
TD_TE does not Granger Cause LIQUIDITY		0.76248	0.4732
LTD_TA does not Granger Cause SIZE	45	2.47065	0.0973
SIZE does not Granger Cause LTD_TA		3.21017	0.0509
LIQUIDITY does not Granger Cause SIZE	45	0.07367	0.9291
SIZE does not Granger Cause LIQUIDITY		0.24699	0.7823
LIQUIDITY does not Granger Cause LTD_TA	45	1.19809	0.3124
LTD_TA does not Granger Cause LIQUIDITY		1.23449	0.3018

Kao Residual Cointegration Test
Series: ROA TD_TE STD_TA SIZE LTD_TA LIQUIDITY
Date: 05/22/18 Time: 06:54
Sample: 2006 2016
Included observations: 55
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
User-specified lag length: 1
Newey-West automatic bandwidth selection and Bartlett kernel

	t-Statistic	Prob.
ADF	-4.245271	0.0000
Residual variance	106.4823	
HAC variance	16.64561	

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID)
Method: Least Squares
Date: 05/22/18 Time: 06:54
Sample (adjusted): 2008 2016
Included observations: 45 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-1.867101	0.250235	-7.461393	0.0000
D(RESID(-1))	0.082710	0.135449	0.610634	0.5447

R-squared	0.879842	Mean dependent var	-0.140808
Adjusted R-squared	0.877048	S.D. dependent var	12.08002

S.E. of regression	4.235807	Akaike info criterion	5.768451
Sum squared resid	771.5087	Schwarz criterion	5.848747
Log likelihood	-127.7902	Hannan-Quinn criter.	5.798385
Durbin-Watson stat	1.964007		

Pairwise Granger Causality Tests
Date: 05/22/18 Time: 06:54
Sample: 2006 2016
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
TD_TE does not Granger Cause ROA	45	130.948	3.E-18
ROA does not Granger Cause TD_TE		13.8339	3.E-05
STD_TA does not Granger Cause ROA	45	9.27971	0.0005
ROA does not Granger Cause STD_TA		5.36703	0.0086
SIZE does not Granger Cause ROA	45	4.83303	0.0132
ROA does not Granger Cause SIZE		1.97346	0.1523
LTD_TA does not Granger Cause ROA	45	184.260	7.E-21
ROA does not Granger Cause LTD_TA		275.185	4.E-24
LIQUIDITY does not Granger Cause ROA	45	0.01077	0.9893
ROA does not Granger Cause LIQUIDITY		2.07438	0.1389
STD_TA does not Granger Cause TD_TA	45	6.59933	0.0033
TD_TA does not Granger Cause STD_TA		9.59054	0.0004
SIZE does not Granger Cause TD_TE	45	2.02226	0.1457
TD_TE does not Granger Cause SIZE		5.15551	0.0102
LTD_TA does not Granger Cause TD_TE	45	26.5532	5.E-08
TD_TE does not Granger Cause LTD_TA		55.5079	3.E-12
LIQUIDITY does not Granger Cause TD_TE	45	1.32757	0.2765
TD_TE does not Granger Cause LIQUIDITY		0.76248	0.4732
SIZE does not Granger Cause STD_TA	45	0.20891	0.8123
STD_TA does not Granger Cause SIZE		17.5771	3.E-06
LTD_TA does not Granger Cause STD_TA	45	68.2759	1.E-13
STD_TA does not Granger Cause LTD_TA		645.892	4.E-31
LIQUIDITY does not Granger Cause STD_TA	45	1.70375	0.1949
STD_TA does not Granger Cause LIQUIDITY		1.65154	0.2046
LTD_TA does not Granger Cause SIZE	45	2.47065	0.0973

SIZE does not Granger Cause LTD_TA		3.21017	0.0509
LIQUIDITY does not Granger Cause SIZE	45	0.07367	0.9291
SIZE does not Granger Cause LIQUIDITY		0.24699	0.7823
LIQUIDITY does not Granger Cause LTD_TA	45	1.19809	0.3124
LTD_TA does not Granger Cause LIQUIDITY		1.23449	0.3018

REGRESSION ROE

Dependent Variable: ROE
Method: Panel Least Squares
Date: 05/22/18 Time: 06:59
Sample: 2006 2016
Periods included: 11
Cross-sections included: 5
Total panel (balanced) observations: 55

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SIZE	0.092371	0.451101	0.204767	0.8387
STD_TA	3.279896	0.471031	6.963232	0.0000
TD_TE	-0.955645	1.030594	-0.927276	0.3587
LIQUIDITY	-0.343905	0.702190	-0.489761	0.6267
LTD_TA	-1.082045	0.193580	-5.589641	0.0000
C	2.486236	3.548887	0.700568	0.4872

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.903679	Mean dependent var	3.196706
Adjusted R-squared	0.884415	S.D. dependent var	4.279454
S.E. of regression	1.454920	Akaike info criterion	3.750745
Sum squared resid	95.25571	Schwarz criterion	4.115715
Log likelihood	-93.14549	Hannan-Quinn criter.	3.891882
F-statistic	46.90981	Durbin-Watson stat	2.407863
Prob(F-statistic)	0.000000		

Dependent Variable: ROE
Method: Panel Least Squares
Date: 05/22/18 Time: 07:00
Sample: 2006 2016
Periods included: 11
Cross-sections included: 5
Total panel (balanced) observations: 55

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SIZE	0.295075	0.591134	0.499167	0.6199
STD_TA	2.777980	0.740587	3.751054	0.0005
TD_TE	1.672798	1.507023	1.110002	0.2724
LIQUIDITY	-0.980729	0.357737	-2.741481	0.0085
LTD_TA	-1.531301	0.296293	-5.168193	0.0000
C	1.250788	4.429463	0.282379	0.7788

R-squared	0.704896	Mean dependent var	3.196706
Adjusted R-squared	0.674784	S.D. dependent var	4.279454
S.E. of regression	2.440476	Akaike info criterion	4.724932
Sum squared resid	291.8403	Schwarz criterion	4.943914
Log likelihood	-123.9356	Hannan-Quinn criter.	4.809614
F-statistic	23.40866	Durbin-Watson stat	0.808524
Prob(F-statistic)	0.000000		

REGRESSION ROA

Dependent Variable: ROA
Method: Panel Least Squares
Date: 05/22/18 Time: 07:01
Sample: 2006 2016
Periods included: 11
Cross-sections included: 5
Total panel (balanced) observations: 55

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TD_TE	-3.592858	4.629546	-0.776071	0.4418
STD_TA	19.87982	2.115923	9.395340	0.0000
SIZE	-1.575027	2.026395	-0.777256	0.4411
LTD_TA	-1.115950	0.869585	-1.283313	0.2060
LIQUIDITY	-3.603837	3.154318	-1.142509	0.2593
C	16.57285	15.94200	1.039571	0.3041

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.976516	Mean dependent var	11.61126
Adjusted R-squared	0.971819	S.D. dependent var	38.93246
S.E. of regression	6.535667	Akaike info criterion	6.755392
Sum squared resid	1922.172	Schwarz criterion	7.120361
Log likelihood	-175.7733	Hannan-Quinn criter.	6.896528
F-statistic	207.9095	Durbin-Watson stat	3.633945
Prob(F-statistic)	0.000000		

Dependent Variable: ROA
Method: Panel Least Squares
Date: 05/22/18 Time: 07:02
Sample: 2006 2016
Periods included: 11
Cross-sections included: 5
Total panel (balanced) observations: 55

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TD_TE	-3.707692	3.954091	-0.937685	0.3530
STD_TA	20.13584	1.943134	10.36256	0.0000
SIZE	-1.198547	1.551005	-0.772755	0.4434
LTD_TA	-1.097561	0.777408	-1.411822	0.1643
LIQUIDITY	-1.106019	0.938622	-1.178343	0.2444
C	10.39437	11.62192	0.894377	0.3755

R-squared	0.975454	Mean dependent var	11.61126
Adjusted R-squared	0.972949	S.D. dependent var	38.93246

S.E. of regression	6.403265	Akaike info criterion	6.654162
Sum squared resid	2009.088	Schwarz criterion	6.873144
Log likelihood	-176.9895	Hannan-Quinn criter.	6.738844
F-statistic	389.4495	Durbin-Watson stat	3.630120
Prob(F-statistic)	0.000000		

VECTOR ERROR CORRECTION MODEL

Vector Error Correction Estimates
Date: 05/24/18 Time: 06:14
Sample (adjusted): 2009 2016
Included observations: 40 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
ROA(-1)	1.000000
TD_TE(-1)	23.59206 (1.63614) [14.4193]
STD_TA(-1)	-38.37835 (2.61372) [-14.6834]
SIZE(-1)	1.819676 (0.23581) [7.71671]
LTD_TA(-1)	8.304809 (0.63784) [13.0202]
LIQUIDITY(-1)	0.042938 (0.07280) [0.58976]
C	-19.46316

Error Correction:	D(ROA)	D(TD_TE)	D(STD_TA)	D(SIZE)	D(LTD_TA)	D(LIQUIDITY)
CointEq1	-0.645641 (0.07018) [-9.19999]	-0.047100 (0.00709) [-6.63927]	-0.041259 (0.00527) [-7.82735]	0.018316 (0.01682) [1.08920]	-0.169368 (0.01963) [-8.62654]	-0.074488 (0.05938) [-1.25435]
D(ROA(-1))	-0.079485 (0.03770) [-2.10812]	0.018088 (0.00381) [4.74560]	0.059644 (0.00283) [21.0606]	0.028399 (0.00903) [3.14320]	0.071472 (0.01055) [6.77564]	0.046417 (0.03190) [1.45484]
D(ROA(-2))	0.127797 (0.04473) [2.85727]	-0.016066 (0.00452) [-3.55343]	0.000235 (0.00336) [0.07007]	0.026968 (0.01072) [2.51625]	0.003568 (0.01251) [0.28516]	0.017502 (0.03785) [0.46243]
D(TD_TE(-1))	1.398552 (1.46867) [0.95226]	0.588218 (0.14846) [3.96204]	0.598540 (0.11031) [5.42583]	0.403519 (0.35193) [1.14658]	0.817777 (0.41088) [1.99030]	3.321137 (1.24276) [2.67238]
D(TD_TE(-2))	1.492223	0.139850	0.232421	-0.262203	0.623141	-0.292514

	(0.76194)	(0.07702)	(0.05723)	(0.18258)	(0.21316)	(0.64474)
	[1.95845]	[1.81570]	[4.06118]	[-1.43610]	[2.92330]	[-0.45369]
D(STD_TA(-1))	-9.692314	-0.787451	-1.143461	-0.721916	-4.586604	-3.770543
	(2.58762)	(0.26157)	(0.19436)	(0.62006)	(0.72392)	(2.18960)
	[-3.74565]	[-3.01043]	[-5.88327]	[-1.16427]	[-6.33577]	[-1.72202]
D(STD_TA(-2))	-1.734051	-0.302653	-0.471780	-0.264856	-1.280930	-1.663811
	(1.43408)	(0.14497)	(0.10772)	(0.34364)	(0.40120)	(1.21350)
	[-1.20917]	[-2.08774]	[-4.37989]	[-0.77073]	[-3.19271]	[-1.37109]
D(SIZE(-1))	-0.988482	0.179442	0.062504	0.048247	-0.525943	1.074915
	(0.78744)	(0.07960)	(0.05915)	(0.18869)	(0.22030)	(0.66632)
	[-1.25531]	[2.25430]	[1.05679]	[0.25570]	[-2.38743]	[1.61321]
D(SIZE(-2))	1.845223	-0.189173	-0.046439	0.221212	0.023193	0.149877
	(0.64718)	(0.06542)	(0.04861)	(0.15508)	(0.18106)	(0.54763)
	[2.85118]	[-2.89162]	[-0.95534]	[1.42644]	[0.12810]	[0.27368]
D(LTD_TA(-1))	4.543626	0.139835	0.155882	-0.120639	1.101672	0.325946
	(0.55952)	(0.05656)	(0.04203)	(0.13408)	(0.15653)	(0.47346)
	[8.12055]	[2.47232]	[3.70917]	[-0.89978]	[7.03792]	[0.68844]
D(LTD_TA(-2))	0.176959	0.083435	-0.051671	0.076609	0.108009	0.802920
	(0.47216)	(0.04773)	(0.03546)	(0.11314)	(0.13209)	(0.39953)
	[0.37479]	[1.74811]	[-1.45698]	[0.67711]	[0.81768]	[2.00966]
D(LIQUIDITY(-1))	0.311027	-0.011184	0.003555	-0.082510	0.086140	-0.534141
	(0.23707)	(0.02396)	(0.01781)	(0.05681)	(0.06632)	(0.20060)
	[1.31199]	[-0.46671]	[0.19965]	[-1.45247]	[1.29882]	[-2.66271]
D(LIQUIDITY(-2))	-0.262728	0.096812	0.041873	-0.169219	0.076389	-0.393790
	(0.24682)	(0.02495)	(0.01854)	(0.05914)	(0.06905)	(0.20886)
	[-1.06444]	[3.88017]	[2.25863]	[-2.86109]	[1.10626]	[-1.88546]
C	-2.875106	-0.209121	-0.185310	0.106217	-0.722748	-0.410501
	(0.33590)	(0.03396)	(0.02523)	(0.08049)	(0.09397)	(0.28423)
	[-8.55938]	[-6.15874]	[-7.34489]	[1.31963]	[-7.69103]	[-1.44424]
R-squared	0.998593	0.991987	0.998601	0.957753	0.997652	0.441794
Adj. R-squared	0.997890	0.987981	0.997901	0.936630	0.996477	0.162691
Sum sq. resids	4.770994	0.048753	0.026916	0.273952	0.373414	3.416148
S.E. equation	0.428369	0.043302	0.032175	0.102648	0.119842	0.362478
F-statistic	1419.716	247.6053	1427.405	45.34077	849.6319	1.582906
Log likelihood	-14.23104	77.43997	89.32061	42.91613	36.72139	-7.550227
Akaike AIC	1.411552	-3.171998	-3.766031	-1.445807	-1.136069	1.077511
Schwarz SC	2.002660	-2.580890	-3.174923	-0.854699	-0.544962	1.668619
Mean dependent	-1.720932	-0.113302	-0.132156	0.136250	-0.145938	-0.027569
S.D. dependent	9.325315	0.394983	0.702323	0.407762	2.019175	0.396131

Determinant resid covariance (dof adj.)	4.41E-13
Determinant resid covariance	3.33E-14
Log likelihood	280.1246
Akaike information criterion	-9.506229
Schwarz criterion	-5.706251

Dependent Variable: D(ROA)
Method: Panel Least Squares
Date: 05/24/18 Time: 06:31
Sample (adjusted): 2009 2016

Periods included: 8
Cross-sections included: 5
Total panel (balanced) observations: 40
D(ROA) = C(1)*(ROA(-1) + 23.592055034*TD_TE(-1) - 38.3783545389 *STD_TA(-1) + 1.81967639169*SIZE(-1) + 8.3048086542*LTD_TA(-1) + 0.0429375736818*LIQUIDITY(-1) - 19.4631644741) + C(2)*D(ROA(-1)) + C(3)*D(ROA(-2)) + C(4)*D(TD_TE(-1)) + C(5)*D(TD_TE(-2)) + C(6)*D(STD_TA(-1)) + C(7)*D(STD_TA(-2)) + C(8)*D(SIZE(-1)) + C(9) *D(SIZE(-2)) + C(10)*D(LTD_TA(-1)) + C(11)*D(LTD_TA(-2)) + C(12) *D(LIQUIDITY(-1)) + C(13)*D(LIQUIDITY(-2)) + C(14)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.645641	0.070178	-9.199993	0.0000
C(2)	-0.079485	0.037705	-2.108116	0.0448
C(3)	0.127797	0.044727	2.857267	0.0083
C(4)	1.398552	1.468672	0.952256	0.3497
C(5)	1.492223	0.761941	1.958449	0.0610
C(6)	-9.692314	2.587620	-3.745648	0.0009
C(7)	-1.734051	1.434083	-1.209170	0.2375
C(8)	-0.988482	0.787441	-1.255309	0.2205
C(9)	1.845223	0.647178	2.851181	0.0084
C(10)	4.543626	0.559522	8.120547	0.0000
C(11)	0.176959	0.472157	0.374789	0.7109
C(12)	0.311027	0.237065	1.311988	0.2010
C(13)	-0.262728	0.246822	-1.064441	0.2969
C(14)	-2.875106	0.335901	-8.559384	0.0000

R-squared	0.998593	Mean dependent var	-1.720932
Adjusted R-squared	0.997890	S.D. dependent var	9.325315
S.E. of regression	0.428369	Akaike info criterion	1.411552
Sum squared resid	4.770994	Schwarz criterion	2.002660
Log likelihood	-14.23104	Hannan-Quinn criter.	1.625278
F-statistic	1419.716	Durbin-Watson stat	2.013918
Prob(F-statistic)	0.000000		

ROE

Vector Error Correction Estimates
Date: 05/24/18 Time: 07:04
Sample (adjusted): 2009 2016
Included observations: 40 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
ROE(-1)	1.000000
TD_TE(-1)	472.2130
	(153.582)
	[3.07466]
STD_TA(-1)	-1548.512
	(193.211)
	[-8.01462]
SIZE(-1)	18.46114
	(29.8825)
	[0.61779]

LTD_TA(-1)	35.51327 (78.2024) [0.45412]
LIQUIDITY(-1)	3.577643 (8.70271) [0.41110]
C	309.8902

Error Correction:	D(ROE)	D(TD_TE)	D(STD_TA)	D(SIZE)	D(LTD_TA)	D(LIQUIDITY)
CointEq1	0.000364 (0.00048) [0.75450]	0.000186 (4.6E-05) [4.08548]	0.000494 (3.0E-05) [16.4099]	0.000146 (6.8E-05) [2.14297]	0.000427 (0.00013) [3.19824]	0.000220 (0.00020) [1.09689]
D(ROE(-1))	-0.779872 (0.09245) [-8.43541]	-0.003284 (0.00873) [-0.37611]	-0.001605 (0.00577) [-0.27795]	0.003225 (0.01307) [0.24681]	-0.000916 (0.02557) [-0.03580]	0.069100 (0.03846) [1.79648]
D(ROE(-2))	-0.813174 (0.12368) [-6.57465]	-0.005707 (0.01168) [-0.48859]	-0.002508 (0.00772) [-0.32465]	-0.003054 (0.01748) [-0.17470]	-0.008228 (0.03421) [-0.24048]	0.023980 (0.05146) [0.46602]
D(TD_TE(-1))	-5.232698 (2.68431) [-1.94936]	0.172252 (0.25350) [0.67951]	-0.084089 (0.16765) [-0.50157]	0.297811 (0.37941) [0.78493]	-0.607646 (0.74254) [-0.81833]	2.591410 (1.11679) [2.32042]
D(TD_TE(-2))	-1.597933 (1.15997) [-1.37756]	-0.025254 (0.10954) [-0.23054]	0.114865 (0.07245) [1.58550]	-0.223729 (0.16395) [-1.36458]	-0.271106 (0.32087) [-0.84490]	-0.739440 (0.48260) [-1.53221]
D(STD_TA(-1))	4.365141 (1.19312) [3.65859]	0.053065 (0.11267) [0.47096]	-0.557795 (0.07452) [-7.48546]	-0.868282 (0.16864) [-5.14874]	0.170040 (0.33004) [0.51521]	-1.438591 (0.49639) [-2.89812]
D(STD_TA(-2))	2.144791 (1.07509) [1.99499]	0.121001 (0.10153) [1.19181]	-0.039743 (0.06715) [-0.59190]	-0.193340 (0.15196) [-1.27233]	1.235129 (0.29739) [4.15317]	-0.429083 (0.44728) [-0.95931]
D(SIZE(-1))	-0.311025 (1.57274) [-0.19776]	-0.012740 (0.14852) [-0.08578]	-0.203853 (0.09823) [-2.07533]	0.132356 (0.22230) [0.59540]	-0.720431 (0.43506) [-1.65595]	1.034149 (0.65433) [1.58048]
D(SIZE(-2))	1.335999 (0.64411) [2.07417]	-0.046985 (0.06083) [-0.77243]	-0.006513 (0.04023) [-0.16191]	-0.038976 (0.09104) [-0.42812]	-0.243847 (0.17818) [-1.36858]	-0.141295 (0.26798) [-0.52727]
D(LTD_TA(-1))	-0.564926 (0.34070) [-1.65815]	0.071652 (0.03217) [2.22703]	0.331586 (0.02128) [15.5832]	0.019078 (0.04816) [0.39617]	0.415417 (0.09424) [4.40789]	0.068937 (0.14174) [0.48635]
D(LTD_TA(-2))	-0.406524 (0.41978) [-0.96841]	-0.097743 (0.03964) [-2.46561]	-0.068564 (0.02622) [-2.61515]	0.209860 (0.05933) [3.53694]	-0.752576 (0.11612) [-6.48094]	0.432542 (0.17465) [2.47666]
D(LIQUIDITY(-1))	0.104396 (0.49342) [0.21158]	0.008903 (0.04660) [0.19107]	0.023844 (0.03082) [0.77373]	-0.084377 (0.06974) [-1.20986]	0.125012 (0.13649) [0.91590]	-0.451434 (0.20528) [-2.19909]
D(LIQUIDITY(-2))	0.607758	0.076776	0.021637	-0.150302	0.074892	-0.346478

	(0.48013)	(0.04534)	(0.02999)	(0.06786)	(0.13281)	(0.19975)
	[1.26582]	[1.69327]	[0.72156]	[-2.21478]	[0.56388]	[-1.73453]
C	-0.518858	-0.092291	-0.216554	-0.014734	-0.142458	-0.159003
	(0.22185)	(0.02095)	(0.01386)	(0.03136)	(0.06137)	(0.09230)
	[-2.33874]	[-4.40512]	[-15.6289]	[-0.46987]	[-2.32131]	[-1.72267]
R-squared	0.916690	0.973092	0.996278	0.943442	0.991165	0.480777
Adj. R-squared	0.875035	0.959639	0.994416	0.915163	0.986748	0.221166
Sum sq. resids	18.35783	0.163718	0.071609	0.366753	1.404740	3.177575
S.E. equation	0.840280	0.079353	0.052480	0.118768	0.232440	0.349592
F-statistic	22.00663	72.32858	535.2816	33.36187	224.3845	1.851912
Log likelihood	-41.18108	53.21226	69.75079	37.08138	10.22300	-6.102318
Akaike AIC	2.759054	-1.960613	-2.787540	-1.154069	0.188850	1.005116
Schwarz SC	3.350162	-1.369505	-2.196432	-0.562961	0.779958	1.596224
Mean dependent	-0.162065	-0.113302	-0.132156	0.136250	-0.145938	-0.027569
S.D. dependent	2.376999	0.394983	0.702323	0.407762	2.019175	0.396131

Determinant resid covariance (dof adj.)	2.45E-11
Determinant resid covariance	1.84E-12
Log likelihood	199.8280
Akaike information criterion	-5.491402
Schwarz criterion	-1.691423

Dependent Variable: D(ROE)
Method: Panel Least Squares
Date: 05/24/18 Time: 07:06
Sample (adjusted): 2009 2016
Periods included: 8
Cross-sections included: 5
Total panel (balanced) observations: 40
D(ROE) = C(1)*(ROE(-1) + 472.212960834*TD_TE(-1) - 1548.51165041 *STD_TA(-1) + 18.461140371*SIZE(-1) + 35.5132732708*LTD_TA(-1) + 3.57764309468*LIQUIDITY(-1) + 309.890248489) + C(2)*D(ROE(-1)) + C(3)*D(ROE(-2)) + C(4)*D(TD_TE(-1)) + C(5)*D(TD_TE(-2)) + C(6)*D(STD_TA(-1)) + C(7)*D(STD_TA(-2)) + C(8)*D(SIZE(-1)) + C(9) *D(SIZE(-2)) + C(10)*D(LTD_TA(-1)) + C(11)*D(LTD_TA(-2)) + C(12) *D(LIQUIDITY(-1)) + C(13)*D(LIQUIDITY(-2)) + C(14)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.000364	0.000482	0.754504	0.4573
C(2)	-0.779872	0.092452	-8.435409	0.0000
C(3)	-0.813174	0.123683	-6.574649	0.0000
C(4)	-5.232698	2.684311	-1.949363	0.0621
C(5)	-1.597933	1.159972	-1.377562	0.1801
C(6)	4.365141	1.193120	3.658594	0.0011
C(7)	2.144791	1.075091	1.994985	0.0566
C(8)	-0.311025	1.572744	-0.197760	0.8448
C(9)	1.335999	0.644112	2.074171	0.0481
C(10)	-0.564926	0.340696	-1.658154	0.1093
C(11)	-0.406524	0.419783	-0.968415	0.3418
C(12)	0.104396	0.493416	0.211579	0.8341
C(13)	0.607758	0.480129	1.265821	0.2168
C(14)	-0.518858	0.221854	-2.338739	0.0273

R-squared	0.916690	Mean dependent var	-0.162065
Adjusted R-squared	0.875035	S.D. dependent var	2.376999
S.E. of regression	0.840280	Akaike info criterion	2.759054
Sum squared resid	18.35783	Schwarz criterion	3.350162

Log likelihood	-41.18108	Hannan-Quinn criter.	2.972780
F-statistic	22.00663	Durbin-Watson stat	2.445554
Prob(F-statistic)	0.000000		