CAPITAL STRUCTURE VARIABILITY OF FIRMS LISTED ON THE DAR ES SALAAM STOCK EXCHANGE: ASSESSING THE ROLE OF PRODUCT DIVERSIFICATION

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A THESIS SUBMITTED IN FULFILMENT OF THE REQUIREMENTS OF THE DEGREE OF DOCTOR OF PHILOSOPHY OF THE OPEN UNIVERSITY OF TANZANIA

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CERTIFICATION

We, the undersigned, certify that we have read and hereby recommend the thesis entitled “Capital Structure Variability of Firms Listed on the Dar es Salaam Stock Exchange: Assessing the Role of Product Diversification” for acceptance by the Open University of Tanzania.

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Date

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DECLARATION

I, Saganga Mussa Kapaya, do hereby declare that this thesis is my own original work and it has not been submitted for a similar degree in any other university.

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Date

DEDICATION

This PhD thesis is dedicated to Jesus Christ, the Begotten Son of the Almighty Living God.

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ABSTRACT

This study investigated the capital structure variability of firms listed on the Dar es Salaam Stock Exchange by assessing the role of product diversification. It was led by four objectives and tested ten hypotheses. The objectives were; to assess the levels of capital structure variability, product diversification variability, effect of conventional factors on capital structure variability and effects of product diversification on capital structure variability of firms listed in Tanzania. The study employed an unbalanced panel data of 11 listed campanies from 1997 to 2014, making a total of 128 firm years. It used both static and dynamic regression analyses. The results indicated that capital structures of companies in the sample varied over time and across companies. Product diversification in its various types indicated variability over time and across companies. Both total product diversification and unrelated product diversifications were significantly positively related to capital structure. Related product diversification was significantly negatively related to capital structure. Asset tangibility, growth opportunity and non-debt tax shield were positively and significantly related to capital structure. Company size, risk of bankruptcy and going concern were either positively or negatively related to capital structure depending on the group of analysis involved. Profitability was negatively related to capital structure. Firms in Tanzania need to take into accounts product diversification among other capital structure determinants when planning for capital structure of their firms. The type of product diversification undertaken by a firm matters in capital structure decisions. Thus, managers need to consider their potential effects in managing the firms' capital structure.

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LIST OF ABREVIATIONS, ACRONYMNS AND SYMBOLS

ar(1)	First order autocorrelation
BLUE	Best Linear Unbiased Estimator
CMSA	Capital Market and Securities Authority
CSE	Clustered Standard Errors
dCSE	Dynamic CSE
dCSE	Dynamic CSE
DIVE	Diversification
dLSDV1_b	Dynamic LSDV1_b
dPCSE	Dynamic PCSE
DSE	Dar es salaam Stock Exchange
DV	Dependent variable
EGM	Enterprise Growth Market
FEM	Fixed Effects Model
GEAR	Capital structure ratio or Capital Gearing
GMM	General Methods of Moments
GOCO	Going Concern
GROP	Growth Opportunity of the Company
L.LGEAR	Lagged Long-term Capital Structure Ratio
L.SGEAR	Lagged Short-term Capital structure ratio
L.TGEAR	Lagged Total Capital Structure Ratio
LGEAR_pred~t	Predicted Long-term Capital Structure Ratio
LM	The Breusch-Pagan Lagrange multiplier test
Local_l~d	Local listed companies

longD	Long-term debt
LSDV1	Fixed effects model estimated by the Least Squares Dummy Variable One Strategy
LSDV1_b	LSDV1 strategy used to all companies
LSDV1_c	LSDV1 strategy used to cross-listed companies
LSDV1_t	LSDV1 strategy used to TGEAR
MIMS	Main Investment Market Segment
mss	Mean sum of square
N	Firm-years or total number of observations
NDTS	Non-debt Tax Shields
OLS	Ordinary Least Squares
PAL	Precision Air Limited
PCSE	Panel Corrected Standard Errors (PCSE)
PROF	Company's Profitability
r2	Squared correlation
r2_a	Adjusted squared correlation
RDIVE	Related Diversification
REM	Random Effects Model
RISK	Risk of the Company
rmse	Root mean squared error
rss	Residuals sum of squares
SGEAR_pred~t	Predicted Short-term Capital Structure Ratio
shortD	Short-term Debt
SIC	Standard Industirial Classification

SIMBA	Tanga Cement Limited
SWISSPORT	Swissport Tanzania Public Limited Company
TANG	Assets Tangibility
TATEPA	Tanzania Tea Packers Limited
TBL	Tanzania Breweries Limited
TCC	Tanzania Cigarette Company
TDIVE	Total Diversification
TGEAR	Total GEAR
TGEAR_pred~t	Predicted TGEAR
TOL	TOL Gases Limited/Formerly Tanzania Oxygen Limited
totalD	Total debt
TWIGA	Tanzania Portland Cement Limited
UDIVE	Unrelated Diversification
VIF	Variance Inflation Factor
X_ACACIA	Cross-listed ACACIA/Formerly African Barrick Gold
X_KQ	Cross-listed Kenya Airways
X_NMG	Cross-listed National Media Group

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the Research Problem

Capital structure is a particular combination of debt and equity financing of a firm (Myers, 1984). Capital structure is basically an enduring long term financing of a company, including ordinary shares and preferred shares, retain earning and debt. Capital structure variability has been a focus of many studies by various researchers around the world. Some significant studies are Myers (1984), Rajan and Zingales (1995), Booth et al. (2001), Alonso (2003), Hall et al. (2004), Ilyas (2008), La Rocca et al. (2009), Hernádi (2014) and Talebnia et al. (2014). In Africa some studies are Abor (2008), Hove and Chidoko (2012), Nyamora (2012), Aremu et al. (2013), Gweyi et al. (2013), Gathogo and Ragui (2014), Mbulawa (2014) and Tarus et al. (2014). In Tanzania are Bundala (2012) and Bundala and Machogu (2012).

Several factors affecting capital structure have been identified in previous studies. These include firm size, profitability, going concern, asset tangibility, growth opportunities and business risk; just to mention a few. Product diversification has emerged in the literature on capital structure determinants in firms in the developed economies. See for example, Alonso (2003), La Rocca et al. (2009), Apostu (2010), Qian et al. (2010) and Quresh (2012). Little or none of similar studies exist in developing or underdeveloped economies.

Product diversification refers to an involvement of a firm in multiple businesses, products or segments (La Rocca, et al. 2009). Such businesses, products or segments may be related in some ways (related diversification) or not related at all (unrelated

diversification). Therefore total product diversification can be decomposed into related and unrelated product diversifications. The degree of relatedness is normally based on the level of resources sharing used in production or services.

Related product diversification refers to an involvement of a firm in similar but not same products based on the extent of sharing of resources in their production and services, for instance all beverage manufacturers produce related products. Their products, such as manufacture of wine, beer, malt and soft drinks are considered to be similar and therefore a production and services mixture among these products would be considered as related product diversification. On the other hand, unrelated product diversification refers to an involvement of a firm in dissimilar or diverse products production and services that do not share resources in their production and services. For instance, the manufacture of beverages, tobacco, textiles and timber would be a mixture of four different manufacturing processes that do not share resources in their production and therefore a production mixture among these products would be considered as unrelated product diversification (Alonso, 2003; La Rocca et al., 2009).

Another distinction is normally made between diversity, which measures the extent to which firms are simultaneously active in many distinct businesses, products or segments at a point of time and diversification which measures diversity across both time and industry simultaneously. (La Rocca et al., 2009). There have been concerted efforts to research on diversification as it relates to and affect capital structure of businesses. Recognition of the distinction between related and unrelated product diversifications has been vital. Empirical evidence, however, is mixed in

terms of how each of the two types of diversification affects the firms' capital structure (Alonso, 2003; La Rocca, et al, 2009; Apostu, 2010). This situation offers more problems to research than it tries to solve.

Although related product diversification gives the impression to be superior to unrelated product diversification in some settings and vice versa, an important question that arises is whether it really matters which product diversification strategy a firm undertakes (Benito-Osorio et al., 2012). Such a question has inevitably motivated studies on related and unrelated product diversification as well as non-diversification choices to determine whether the choice affects the firm capital structure decisions. Thus, this study is yet another attempt to contribute to the debate whether the type of product diversification matters in capital structure decisions (Singh et al., 2003; Klein & Lien., 2009).

Firms have historically practiced diversification strategy for different motives. Some of these motives are; to oppose the ill effects of decline in sales and earnings, mostly in the maturity stage of the business cycle, to defeat competition pressures, to lessen business risk, to evade takeovers by growing 'big' and maintain control, to regulate to the tastes of customers and to satisfy power. All these reasons for diversification are not without a sacrifice from the firm. Since, the choices to finance such diversification stems from either equity or debt finance, that in itself begs the question, to what extent companies should use debt to accomplish such a strategy (Klein & Lien, 2009)?

There is scanty research, so far, in this area in Tanzania. A study by Bundala & Machogu (2012) analysed factors affecting capital structure of listed firms but did

not include product diversification. Their paper was based on Bundala (2012) cross-sectional research study, in which six determinants of capital structure were used, namely size of the firm, profitability of the firm, growth rate, assets tangibility, liquidity of the firm, and dividend pay-out. Profitability and assets tangibility were found to be key factors determining the capital structure decisions in Tanzania. The size of the firm and liquidity of the firm were observed to be indicative determinants. Based on these findings the study recommended that internal financing should be preferred to external financing.

There are wide spread indications for product diversification among companies in Tanzania and these have motivated this present study with the aim of determining whether product diversification has any effect on the firm capital structure decisions. This present study extends beyond the six determinants and a simple cross-sectional approach used by Bundala (2012) by considering a total of ten determinants and uses both the static and the dynamic panel data approaches. This study contributes to the understanding of reasons behind firms financing choices based on diversification choices.

1.2 Statement of the Problem

Capital structure has proved to be a perennial puzzle in finance (Myers, 1984). Companies normally determine their individual optimal capital structure in the long term financing. Capital structure trade-offs involve a balance between cost and risk among other factors. There has been plenty of research focusing on the primary determinants of capital structure as cited earlier in section 1.1. There are still differing opinions regarding which factors significantly affect a firm capital structure

and under which situations. On the other hand, more factors are being introduced and tested. Such added factors include but not limited to the following; corporate diversification, international diversification and product diversification. Although there is empirical evidence on these new factors, the inclusion and exclusion of such factors in the various studies has been dictated and limited by feasibility of such studies (Ilyas, 2008, Rocca et al. 2009; Apostu, 2010).

Ilyas (2008) for instance based on a study of 364 non-financial firms on the Karachi Stock Exchange found that 24% of variation in the level of capital structure depends upon such factors as; profitability, firm size, tangibility of assets, firm growth, non-debt tax shields and taxes, while the rest (76%) is explained by other factors that are still unknown. These determinant factors however tend to differ by approaches used by researchers and by focus of researches, whereas some other factors tend to differ from one economic region to the other. So which composition of factors explains a greater extent of the firms' capital structure variability? This has remained an empirical issue.

The findings advanced so far, on what combination of factors influence capital structure variability are difficult to generalize to other countries such as Tanzania, because of differing contexts, methods used, financial and economic environments. For instance, comparable studies in Europe, such as; Green et al. (2002), Esperança et al. (2003), Hall et al. (2004), La Rocca et al. (2009), Apostu(2010) and in Africa, such as; Ogbulu and Emeni (2012) in Nigeria, Moyo (2013) in South Africa, and Tarus et al. (2014) in Kenya report mixed results in terms of directions and magnitudes of effects of these factors on capital structure variability. A few studies

in developed economies (Rocca et al. 2009; Apostu, 2010), have introduced product diversification as a factor that affect capital structure. In examining the role of product diversification in capital structure decision, these studies have emphasised on the need to separate between related and unrelated product diversification La Rocca, et al. (2009) for example states:-

> "…while an assessment of capital-structure choices must take into account diversification…, it is equally important that it differentiates between related and unrelated product diversification. This conclusion implies that diversification strategy is a feature that differentiates firms with respect to their financial behaviours." (p.28).

However, to the best of the researcher's knowledge, there are no such similar studies conducted in Africa and Tanzania in particular, that attempted to incorporate product diversification as a factor that affects capital structure of firms. Thus, this present study focused on product diversification, as a whole and it decomposed it into related and unrelated product diversifications in determining their effects on capital structure of companies listed in Tanzania. This study aims to contribute to the understanding of reasons behind firms financing choices based on product diversification choices.

1.3 Research Objectives

1.3.1 Broad Objective of the Study

The objective of this study is to investigate variability in the capital structure of firms listed in the Dar es Salaam Stock Exchange in Tanzania by assessing the role of product diversification amidst the conventional determinants.

1.3.2 Specific Objectives

i. To assess capital structure variability of firms listed in Tanzania.

ii. To assess product diversification variability of firms listed in Tanzania.

iii. To assess effects of conventional factors such as assets tangibility, firm size, firm profitability, growth opportunity, going concern, bankruptcy risk and non-debt tax shields on capital structure variability of firms listed in Tanzania.

iv. To analyse the effects of product diversification on capital structure variability of firms listed in Tanzania.

1.4 Significance of the Study

The study contributes additional evidence to the existing body of knowledge on capital structure determinants by presenting empirical evidences from Tanzania based on an extended range of determinants. These are namely; product diversification which is further decomposed into related and unrelated product diversifications. Other factors are; asset tangibility, growth opportunity, non-debt tax shield, company size, risk of bankruptcy, going concern and firm profitability.

The empirical evidence thus obtained helps management of companies listed in Tanzania to plan for their capital structure financing choices after knowing which factors are critical in influence it. The empirical evidences for product diversification among Tanzanian companies help management to plan for the nature and type of product diversifications that are beneficial to optimal capital structure. The choices of product diversification are facilitated by availability of both financial and non-financial resources to the firms. Particularly financial resources can only be raised internally or externally.

The choice between related and unrelated product diversifications underscores the role each type of diversification plays in influencing choices of financing. This is so because unrelated product diversification is associated to low risk of bankruptcy. This in turn attracts debt financing. Lenders would be more willing to supply funds to companies with unrelated than to companies with related product diversification. Therefore, findings on the type of product diversification which has significant effect to capital structure provide managers with crucial knowledge to manage debt financing.

Related product diversification attracts internal financing because of increased risk from producing similar products. Unrelated product diversification is more related to external financing due to reduced risk, as a result of uncorrelated cash flows from these unrelated products. On the other hand, presence of tangible assets such as plants, property and equipment dictate the ability for a firm to finance externally and hence adjust its capital structure both in the short run and long run. Presence of large amounts of retained profits facilitated by big firm size and high growth opportunities help firms resort to internal financing. Thus, this knowledge is crucial to management in their quest for excellent capital structure strategies, policies and plans. These strategies, policies and plans ultimately have consequential effects on liquidity, risks and costs attributable to capital structure decisions.

The knowledge of these factors help management to balance risks and costs of capital structure involved. This can be achieved by managing those factors which the firm can easily manipulate or control such as profitability and product diversification or by learning from factors which the firms cannot easily manipulate or control but

can take advantages of, especially in the short run, such factors as, firm size, firm age, asset tangibility and bankruptcy risk.

1.5 Organization of the Thesis

The remainder of the thesis is organized as follows: chapter two presents results of a review of related literature. Chapter three presents the research methodology used in the study. Chapter four presents findings of the study while chapter five discusses them. Finally chapter six concludes and draws implications and offers recommendations. Areas of future research are also provided.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Overview

This chapter presents results of a review of literature related to capital structure determinants. It provides the conceptual definitions, reviews relevant theories and previous empirical works on product diversification, capital structure variability and its conventional determinants of capital structure. It then presents the research gap and the resultant conceptual framework.

2.2 Conceptual Definitions

2.2.1 Capital Structure Variability

The capital structure of a company is a particular combination of debt and equity capital that it uses to finance its assets. The proportion of debt to equity or total capital is termed financial gearing. Capital structure is basically an enduring long term financing of a company including ordinary shares and preferred shares, retained earnings and debt. On the other hand capital structure variability refers to the level of changeability or volatility or instability on the combination of debt and equity capital (capital structure) of firms. This level is assessed across industries and along years.

2.2.2 Product Diversification

Product diversification refers to the extent to which a firm participates in more than one business products or segments, as a proxy of core product type based on different business classification approaches, particularly the Standard Industrial Classification (SIC) (Prosser, 2009). For instance, a firm that produces only one type of products which belongs to the same business class based on SIC would be

considered as product undiversified firm or focused firms. For examples; a firm selling furniture, household goods, hardware and ironmongery would be considered as selling *same* products belonging to the same SIC class only (SIC code 46.15). A firm manufacturing games and toys only (SIC code 32.40) or manufacturing of electric motors, generators and transformers only (SIC code 27.11), or a firm selling a single range of products in only one out of these SIC codes, would also be considered undiversified in its products. But, a firm that has a combination of products or services across these SIC classes, such as SIC codes 46.15, 32.40 and 27.11 would be considered product diversified (Alonso, 2003; La Rocca et al., 2009; Prosser, 2009).

Related product diversification refers to an involvement of a firm in *similar* but not *same* products that are within four digits of the SIC codes, that is the classes vary only by at most the last two digits. For example wholesale of sugar and chocolate and sugar confectionery (SIC code 46.36) and Wholesale of coffee, tea, cocoa and spices (SIC code 46.37) are considered as products within four digits of the SIC codes (i.e. 46.36 to 46.37). These two ranges of products whole sales are considered *similar* but not *same,* hence related products.

The relatedness of a product is based on the degree of resources sharing (such as technology, materials, labour and equipment) in the products' production or processing or sale. Since firms involved in the sale of product classified based on SIC classes in the preceding example (46.36 to 46.37) share selling resources in such firms their diversification is considered to be related. Note that, the preceding example does not refer to production or manufacturing of such same products,

because that would be in other SIC classes. For example, the manufacture of cocoa, cocoa butter, cocoa fat, cocoa oil is in SIC class 10.82, while manufacture of ground coffee, soluble coffee, extracts, concentrates of coffee, tea and mate is in SIC class 10.83. In these later manufacturing examples the SIC classes grouping are not based on sales or sharing of selling resources but they are based on sharing of manufacturing resources. Thus the two SIC codes (i.e. 10.82 and 10.83) are considered to be related because they are within four digits of SIC codes which vary only by at most the two last digits (Alonso, 2003; La Rocca et al., 2009; Prosser, 2009).

Unrelated product diversification refers to an involvement of a firm in *dissimilar* or diverse products that are within two digits of the SIC codes, that is they vary by the first two codes which represent a wide range of variations in which case the production, services or sale of such products requires independent resources. Such products do not share resources in their production or services or sales. For example, a firm that is involved in manufacture of distilled, potable, alcoholic beverages such as whisky, brandy, gin and liqueurs (SIC codes 11) and manufacture of tobacco products and products of tobacco substitutes such as cigarettes, fine cut tobacco, cigars, pipe tobacco, chewing tobacco and snuff (SIC codes 12). These two ranges of products vary by the first two digits.

On the other hand, total product diversification is normally composed of both related and unrelated product diversifications. While product diversification considers product mixture across industry and time (years) product diversity considers product mixture across industry only; that is at a particular point in time only (Alonso, 2003;

La Rocca et al., 2009; Prosser, 2009).

2.3 Review of Relevant Theories

2.3.1 Theories of Diversification on Capital Structure

The effects of product diversification on capital structure choices have been explained mostly through the co-insurance effects, the agency cost and the transaction cost theories, which are explained in detail in the following sub sections.

2.3.1.1 The Co-Insurance Effect Theory

The idea of a *co-insurance effect* for corporate debt was first advanced by Lewellen (1971). Lewellen argued that the joining-together of two or more firms whose earning streams were less-than-perfectly correlated would reduce the risk of default of the merged firms (i.e., the co-insurance effect) and thereby increase the "debt capacity" or "borrowing ability" of the combined enterprise (Lewellen, 1971; Kim & McConnell, 1977; Monteforte & Stagliano, 2014).

Singh et al., (2003) argued that, the level of capital structure ratios depends on the level of the co-insurance effect. The *coinsurance effect* deals with the reduction of operating risk, which is due to the imperfect correlation between the different cash flows of a firm running diverse businesses (Lewellen, 1971; Kim & McConnell, 1977; La Rocca et al., 2009). This effect is more relevant for firms that develop unrelated product diversification approaches. It is caused by the low correlation between products returns under the diversification mix. The low correlations between products in turn lead to low cash flow risk. Therefore, these firms should be able to assume more debt (Kim & McConnell, 1977; La Rocca et al., 2009).

The *co-insurance effect* advocates that firms can decrease risk by means of diversifying their businesses and, thereby the reduced risk can raise the debt capacity for the firm. The *co-insurance* effect has a positive effect on the firm debt capacity as a result of the reduction in the volatility of firm revenues and profits. It is expected that this effect would be more intense in firms that develop unrelated product diversification strategies. Co-insurance effect predicts a positive relationship between the degree of the firms' product diversification and capital structure variability. Consequently, it increases debt capacity and results in increased debt usage for unrelated product-diversified firms (Singh et al., 2003; Apostu, 2010).

2.3.1.2 The Agency Cost Theory

The agency costs theory was introduced by Jensen and Meckling (1976) building on former works of Fama and Miller (1972). Agency cost theory has its roots in the existence of conflicts of interests between shareholders and managers. Debt financing is considered as an essential mechanism to alleviate conflicts between managers and equity holders. Shareholders can use it as a tool to reduce the availability of "free cash flows" at the disposal of firm managers. Debt financing, if used, decreases free cash flow, agency costs and turn away managers from undertaking value-decreasing decisions in the firm, due to increased debt obligations.

At times, shareholders endorse borrowing as a tool to regulate managerial behaviour, limiting unhealthy diversification decisions. As a result, product diversification can be endorsed by shareholders as a tool to promote debt usage. This agency effect is accounted for in two ways; first, based on conflicts of interest between shareholders

and managers, the optimal capital structure is obtained by trading off the benefits of debts against the cost of debt, by encouraging the use of debt in value increasing product diversification investments against value decreasing investments. Secondly, once debt is introduced into capital structure another type of conflict of interest arises, i.e. the conflict between equity and debt holders. In highly geared firms, the incentives for shareholders to push managers to pursue riskier product diversification projects can result in “an asset substitution effect”, where equity instruments are substituted for debt instruments thus a disincentive from shareholders to promote managers to use debt financing happens based on the need to protect ownership control (Chen et al., 1998).

Agency cost arguments indicate that product diversification at times can be considered as an unhealthy corporate strategy, because it may give executives either too much or little financing choices flexibility. Based on this situation, shareholders may use product diversification as a tool to discipline executives by promoting debt financing through product diversification investments in order to keep managers busy servicing debts (Li & Li, 1996; Apostu, 2010). Thus, the *agency costs theory* predicts that, if agency conflicts and cost exists, shareholders may endorse product diversification investments in order to promote debt usage, so that they may control managers from investing in unhealthy investments. This eventually leads to high capital structure ratios due to increased debt finance in the capital structure (Apostu, 2010).

2.3.1.3 The Transaction Cost Theory

The transaction cost theory emerged from transaction cost economics. Transaction

cost economics has a stretched history. It was known properly as ‘transaction costs’ for centuries. The precedent of transaction cost economics was not tied up in a particular research model or theory, but rather in uncoordinated attempts to give the elementary idea of “costly exchange” an operational counterpart. In 1940, Tibor Scitovsky introduced the label of ‘transaction costs’ into the economic vocabulary. In the meantime, Ronald Coase published his 1937 paper in which he attributed the existence of the firm to the cost of using the price mechanism. But, as a theory it began with the work of Oliver Williamson in 1979 (Hardt, 2009).

Williamson (1988) argues that debt and equity are substitute forms of governance and that the optimal financing choice depends on the characteristics of the assets, particularly the re-usability of these assets in a given case in point. Debt, which represents a market mode of organization, is favoured when asset specificity is low while equity, the equivalent of internal organization, is favoured when relationship-specific investments are more prominent. So, according to the *transaction costs theory*, the type of diversification adopted by a firm depends on the nature of the unutilized resources that lead firms to diversify.

Since the type of assets employed by a firm influences the financial decisions it is possible to establish a relationship between capital structure and the product diversification approach of a firm, through the transaction costs theory. This theory examines a firm financial decision in terms of the degree of specificity (“inflexibility”) of firm assets. When asset specificity is high, firms will prefer equity as a financing instrument because, in case of liquidation, these assets have low values as they cannot be easily reemployed. In contrast, debt is the preferred

financing tool in the presence of general purpose (“flexible”) assets which are more valuable as collateral and are able to retain their value in the event of liquidation/default (Apostu, 2010).

On the other hand, as noted previously, firms diversify their activity in response to the presence of an excess of unutilized assets. Firms are more prone to adopt related product diversification strategies when they have an excess of highly specific (“inflexible”) assets because these assets can only be transferred across similar business products. Excess physical resources, most knowledge based resources and external financial resources are more associated with unrelated product diversification, while intangible resources and internal financial resources are more associated with related product diversification. So, transaction cost explanations suggest that firms that are diversified across many business segments have a lower employment of specific assets and, hence, can support more debt (Chatterjee & Wernerfelt, 1991; Apostu, 2010).

Excess inflexible resources have low collateral values because they are less reusable or cannot be redeployed to other uses. As a result they have less liquidation values. They tend to discourage lenders because of their low liquidation values. Related product diversification is possible with highly similar resources which are characteristically inflexible. Thus related product diversification investments are possible with and considered related to internal financial resources, such as retained earnings and equity, because lenders perceive high costs associated with using low value collaterals. Thus borrowing to finance related product diversification investments is costly due to low collateral values availed by assets used in related

product diversification investments. The only comparatively less costly option for such investments is internal financing. Thus, related product diversification will be related to internal financing.

On the other hand, excess flexible resources have high collateral values. They tend to encourage lenders because of their high liquidation values. Unrelated product diversification is possible with non-specific resources which are characteristically flexible. Unrelated product diversification investments are possible with and considered related to external financial resources, such as loans and bonds, because lenders perceive low cost associated with using high valued collaterals. Borrowing to finance unrelated product diversification investments is less costly dues to high collateral values available from unrelated product investments. Thus unrelated product diversification is related to external financing.

2.3.2 Product Diversification Hypotheses

2.3.2.1 Related Product Diversification Hypothesis

Based on the *transaction cost hypothesis,* the type of diversification adopted by a firm depends on the nature of the unutilized resources that led it to diversify. Inflexible resources and internal finances are considered to be associated with related product diversification, because, investments in similar or related product diversification is hampered by high debt transaction costs. Lenders perceive such investments collaterals to be less valuable. Managers will have to pay more for less debt resulting in costly exchanges. Consequently, managers are left with only one option which is: internal financing. Accordingly, the *co-insurance effects theory* suggests that, product diversification in related business segments results into

correlated returns which do not lower returns volatility, which in turn discourages lenders from offering loans to finance related product diversification investments. Thus, internal financing is the only possible way for these firms to use in financing investments in related product diversification. A negative relationship between related product diversification and capital structure ratio is expected; hence our first hypothesis states;

H_1: Related product diversification negatively affects capital structure of companies listed in Tanzania

2.3.2.2 Unrelated Product Diversification Hypothesis

Based on the *co-insurance effect hypothesis*, unrelated product diversification produces uncorrelated returns from diverse business products or segments, which reduces business risk and creates greater debt capacities. Thus lender will prefer to offer debts to businesses operating in unrelated products or segments. Similarly, based on the *transaction cost hypothesis*, unrelated product diversification implies less debt transaction costs and thus managers pay less for debts procured resulting in un-costly exchanges. It follows that, a positive relationship would be expected between unrelated product diversification and capital structure ratios. Hence, the second hypothesis states;

H_2: Unrelated product diversification positively affects capital structure of companies listed in Tanzania

2.3.2.3 Total Product Diversification Hypothesis

Based on the *agency theory* total product diversification is arguably *positively* related to capital structure ratios, as a result of shareholders trying to control managerial opportunistic practices by encouraging debt use through product diversification investments. The *agency costs theory* predicts that debt will be used to reduce the

ability of a manager to undertake detrimental investments by promoting healthy investments, which would be financed by debt.

Consequently, shareholders will promote the use of debt as a device to discipline managerial behaviour up to the point when their objective is realised. One of the ways to do this is to endorse investments in profitable product diversification projects. Hence, a positive relationship would be expected between total product diversification and capital structure ratios up to that realization. The relationship may be reversed if such an objective is not pursued. Hence, the third hypothesis stated in null statement states;

H_3: Total product diversification does not affect capital structure of companies listed in Tanzania

2.3.3 Conventional Determinants of Capital Structure

2.3.3.1 Assets Tangibility

Tangibility refers to the degree to which firm assets are tangible, physical or material in nature. Assets such as property plants and equipment are considered to be more tangible while goodwill, brand names and skills or expertise are less tangible (Jensen & Meckling, 1976; Kochhar & Hitt, 1988). Tangible assets are less subject to informational asymmetries and usually they have greater values than intangible assets in case of bankruptcy. So, tangible assets provide better collateral for loans and thus are positively associated with higher debt levels (Titman & Wessels, 1988; Rajan 1995; Apostu, 2010). It is therefore expected that asset tangibility will have a positive relationship with debt financing. Hence, the fourth hypothesis states;

H_4: Tangibility of the firm assets positively affects capital structure of companies listed in Tanzania.

2.3.3.2 Firm Size

It refers to the currency value of assets. It tells how big a firm is, and captures the idea of capacity (Rajan & Zingale, 1995; Ogbulu & Emeni, 2012; Oh et al., 2014). Firm size is a proxy for the inverse probability of default. It is assumed to be positively correlated with capital structure ratios. As a result, large firms easily access financial markets and are capable of borrowing at better conditions (Titman and Wessels, 1988; Harris & Raviv 1991; Rajan & Zingales, 1995; Frank & Goyal, 2002; Apostu, 2010).

Firm size can also affect capital structure negatively. For example, due to "control rights" effects, small firms are not ready to surrender their rights for control to outside investors and consequently, they prefer debt as a financing option (Vries, 2010). Also, Firm size is a sign of ability to eliminate information asymmetry. Less asymmetric information leads to more appetite to finance with equity than debt, hence a negative relationship with debt levels would be expected. Thus, it is expected that asset size and capital structure ratios will be either positively or negatively related. Hence, the fifth hypothesis is stated in a null form as follows:

> **H_5:** Size of the firm does not affect capital structure of companies listed in Tanzania

2.3.3.3 Firm Profitability

Profitability refers to the level of profit generation over years in relation to its assets values (La Rocca et al., 2009; Apostu, 2010; Tarus et al., 2014). The relationship between capital structure and profitability of a firm is theoretically and empirically in two ways. First, as firms prefer to obtain financing through internally generated fund, because of its relatively low costs, capital structure ratios will be negatively

related to profitability (Apostu, 2010). The more profitable a firm is the lesser it is going to depend on external finance. Firm profitability will be negatively related to capital structure. Conversely, at times, profitable firms can borrow more because the likelihood of paying back the loan is greater; assuming that past profitability is a good proxy for future profitability. Thus, debt will be positively related to capital structure ratios. Due to expected mixed results, the sixth hypothesis is stated in a null form as follows:

H_6: Profitability of the firm does affect capital structure of companies listed in Tanzania

2.3.3.4 Growth Opportunity

Growth opportunity refers to potential for a firm to grow in value, size and profitability. It ultimately captures the scalability and potentiality of the firm (Jairo, 2006; Nyamora, 2012; Oh, et al, 2014). High growth opportunity firms have high information asymmetry. Therefore one would expect these firms to have less debt in their capital structures, because lenders will shy away from these firms. Additionally, firms with high growth opportunities will retain financial flexibility through a low leverage in order to be able to exercise those opportunities in subsequent years.

Market-to-book value ratio is usually used as a proxy for growth opportunities. A higher market-to-book ratio indicates the extent to which the market is willing to pay for the firms' shares relative to their book values. Firm managers tend to explore this difference as an opportunity to issue equity more cheaply. Stated differently, it is an opportunity for firms to raise the target funding from equity shares without having to dilute shareholders' control too much. Therefore, firms with high growth

opportunities i.e. higher market-to-book ratio firms would prefer to finance by equity, hence less debt. This, leads to a negative relationship between growth opportunities and debt ratios.

A positive relationship between growth opportunities and capital structure ratios has also been widely assessed (Doku, et al., 2011; Hove & Chidoko, 2012; Nyamora, 2012; Ogbulu & Emeni, 2012; Bundala & Machogu, 2012; Latridis & Zaghmour, 2013; Gweyi et al., 2013; Nyanamba et al., 2013). It is observed that, such a relationship is due to the fact that, small size firms have higher needs of funds to be used in acquiring more of non-current assets, because they need to grow. Higher growth firms are normally relatively young (Vries, 2010). Due to their limited size, they have small internal funds; consequently, they rely on external funds to be able to acquire the required assets for growth despite the fact that such funds are expensive to them.

Furthermore, with equity and debt, firms are further dictated by ownership control rights effects. Firm ownership is not easily shared-out. Consequently these firms rely on debt financing since equity issues infringe control rights. Thus a positive relationship between growth and capital structure ratios is supported in the developing economies (Vries, 2010). Therefore, growth opportunities are expected to be either positively or negatively related to capital structure ratios. Hence, the seventh hypothesis is stated in a null form as follows:

> **H_7:** Growth opportunities of the firm do not affect capital structure of companies listed in Tanzania

2.3.3.5 Going Concern

Going concern refers to the degree to which a firm will continue to exist in a foreseeable future. The length of time in operation normally determines the going concern of the firm (Alonso, 2003; Apostu 2010; Nyanamba et al., 2013). Abor (2008) argues that age of the firm is a typical measure of reputation in capital structure models. As a firm continues longer in operation, it initiates itself as a continuing business concern and therefore increases its debt capacity. Thus a sound going concern is positively related to debt. Hence, the eight hypothesis states:

H_8: Going concern of the firm positively affects capital structure of companies listed in Tanzania

2.3.3.6 Bankruptcy Risk

Bankruptcy risk refers to the degree to which a firm level of debt usage attracts bankruptcy proceedings. Higher use of debt leads to higher level of bankruptcy risk (Kremp et al., 1999; Booth et al., 2001). Firms with high debt levels have higher volatility of net profit and implicitly higher bankruptcy risk. High bankruptcy risk leads to less use of debt, as a mechanism to avoid bankruptcy. Consequently, one would expect a negative effect of bankruptcy risk to debt finance (Titman & Wessels, 1988; Kremp et al., 1999; Booth et al., 2001; Alonso, 2003). Hence, the ninth hypothesis states;

H_9: Bankruptcy risk of the firm negatively affects capital structure of companies listed in Tanzania

2.3.3.7 Non-debt Tax Shield

Non-debt tax shield refers to the profit size consequences that results from tax savings that are caused by deducting items such as depreciation costs and finance

costs in determining taxable income (Myers, 1984; La Rocca et al., 2009). Unlike in the case of debt tax shields, De Angelo and Masulis (1980) make a case for non-debt tax shield arguing that, firms that are capable of decreasing taxes by means other than interest expense deductions will employ less debt in their financing structures. For that reason, if a firm has a huge amount of non-debt tax shields, such as depreciation, its likelihood of negative taxable income is higher and it is expected that its amount of debt will not be increased for tax reasons.

Thus, debt level should be negatively related to the level of non-debt tax shields (La Rocca et al., 2009). A negative effect of no-debt tax shield on capital structure ratios will be expected. Hence, the tenth hypothesis states:

> **H_{10}:** Non-debt Tax shield of the firm negatively affects capital structure of companies listed in Tanzania

2.4 Empirical Literature Review

2.4.1 Diversification and Capital Structure

There is scanty empirical evidence on the relationships between product diversification and capital structure. Some of the studies that have looked at the diversification-capital structure relationship are surveyed here; Kochhar and Hitt (1998) found that equity financing was associated with related product diversification, while debt financing was associated with unrelated product diversification. Their justification was that, related product diversification brings in more specialized assets whereas unrelated diversification put in assets less specialized to the firm, since less specialized assets have high liquidation value, and as a result, they attract more debt financing than specialized assets.

Alonso (2003) employed panel data from 480 firms from 1991 to 1994 to study product diversification in Spain. Total debt ratio, a logistic transformation of total debt ratio, short term debt ratio, long term debt ratio, were used as measures of capital structure. Also two dissimilar proxies of product diversification strategies were used, namely; the Barry-Herfindahl index and the Entropy index of total product diversification. Alonso further controlled for firm specific characteristics such as; business risk, growth opportunities, firm size, intangible assets and firm profitability. An insignificant negative relationship between product diversification and capital structure ratios was found.

La Rocca et al. (2009) analytically studied the relationship between product diversification and capital structure using a panel data approach among 190 Italian firms in which 76 were listed in stock markets from 1980 to 2006. They further used a target adjustment model, estimated using Generalized Method of Moments (GMM) approach. They found that total product diversification was negatively related to capital structure ratios. In addition, they found that the extent of product relatedness between business products is vital in the relationship between product diversification and capital structure ratios.

They were able to show that related product diversification based on business synergies and resource sharing, was negatively related to capital structure ratios. They also found that, unrelated product diversification based on financial synergies was positively related to capital structure ratios. Additionally, they found that type of product diversification causes different speeds of influence on capital structure ratios towards optimum ones. That is, firms pursuing related product diversification and

firms that are undiversified moves toward their optimum capital structure ratios more slowly while firms pursuing unrelated product diversification move toward their optimum capital structure ratios more quickly.

They additionally found that, the preceding year's capital structure ratio has a positive influence on the current debt financing level, significant at the 1% level. The coefficient of the lagged capital structure ratios level variable, (1 - α), interpreted according to the direction was in the range of 0.29–0.65. As a result, the parameter α, which measures a firm rate of adjustment of the existing debt ratio on the way to a target debt ratio, was in the range 0.35-0.71.

Consistent with the postulation of the transaction cost hypothesis, the adjustment process was shown to be a trade-off between the adjustment (transaction) costs involved in moving towards a target ratio and the costs of being in disequilibrium. Thus, firms that have adopted related product diversification have greater transaction costs as a result they slowly adjust their capital structure ratios to the optimum ones, while unrelated product diversified firms have lesser transition costs as a result they quickly adjust their capital structure ratios to the optimum ones.

Other empirical studies (Rumelt, 1974; Barton & Gordon, 1988; Taylor & Lowe, 1995; Kochhar & Hitt, 1998; La Rocca et al., 2009) showed that firms following unrelated product diversifications have higher capital structure ratios while those following related product diversifications have lower capital structure ratios. Their findings are consistent with the co-insurance effect and the transaction cost suggestions. That is, capital structure ratios increase with the *degree* of related-

unrelated level of product diversification, thus projecting a positive relationship between product diversification and capital structure ratios.

These findings are consistent with agency-cost theory. It predicts that capital structure ratios decrease with the *degree* of related-unrelated level of product diversification. This happens especially when the level of investments in product diversification detriments increases with the degree of related-unrelated product diversification. However, previously noted studies by other researchers produced contrary results; Alonso (2003) and Singh et al., (2003) established a negative but insignificant relationship between capital structure ratios and total diversification; and La Rocca et al. (2009) established a negative but significant relationship between total product diversification and capital structure ratios.

By studying a sample of 2,286 firms that were involved in product diversification from 1960 to 1973, Kim and McConnell (1977) cited in Apostu (2010), found that product diversified firms make greater use of debt-equity mixtures than the blend of independent firms did before product diversification was implemented. Consistent with these results, Apostu (2010) confirms that product-diversified firms are significantly using debt financing than product-focused firms. Conversely, when geographic diversification, size, growth, tangibility, profitability and risk were controlled for, Apostu's analysis confirms the results of Alonso (2003) and Singh et al. (2003) which had reported a negative but insignificant relationship between capital structure ratios and product diversification.

While controlling for geographic diversification, asset turnover, firm size, past firm growth, expected firm growth, and profitability, Singh et al. (2003) found that

product diversity individually is on average unrelated to debt ratios. Their findings confirmed that firms following a strategy of dual diversification, that is product diversification and international diversification concurrently, appear to use more debt. Thus, due to existence of *the co-insurance effect* there is increased debt capacity that in turn attracts more debt financing. Therefore, although individually each type of diversification may be negatively related to firm capital structure ratios, the two types of diversification complement each other in promoting debt financing.

Quresh et al. (2012) empirically confirmed both, *the co-insurance effect theory* and *the transaction cost theory*. Firms having both product and geographic diversification have greater amount of debt as compared to the non-diversified firms. The diversified firms; manufacturing and exporting several products; have a bigger capacity to take on debt due to their strength in difficult circumstances which may cripple the entire firm if it is specialized.

Therefore, the nature of firms' resources and possibility of resources sharing dictate a type of diversification to be employed. The type of diversification matters in the analysis, and in studying effects of diversification on capital structure. Empirical evidences are mixed on the way types of product diversification affect capital structure, due to various reasons such as types of industries, methods of analysis used and focus of a given study. The direction of relationships between product diversifications and capital structure depends on the structure of product diversification itself. But significantly as well is that the type of product diversification dictates the speed at which firms adjust their capital structure ratios towards optimum ones.

2.4.2 Conventional Determinants of Capital Structure

Empirical studies have shown that profitability, asset tangibility, firm size, bankruptcy risk, growth opportunities and tax shields affect capital structure (Oh et al., 2014). The evidences on these factors vary across countries, sectors and firms within a given industry due to attributes specific to a firm (Vries, 2010).

2.4.2.1 Assets Tangibility

From a theoretical point of view a contributing factor of capital structure is the type of assets of the firm, because costs of financial distress depend on the type of asset structure of a firm (Vries, 2010, p. 59). Most empirical studies report a positive relationship between the proportion of tangible assets and the level of debt (Apostu, 2010). Consistent with empirical evidences from most researches such as Titman & Wessels (1988) and Apostu (2010) in developed countries, some researchers in Africa have found a positive relationship between asset tangibility (asset structure) and capital structure ratios (Abor , 2008; Khediri & Daadaa, 2011; Hove & Chidoko, 2012; Gweyi et al., 2013; Umer, 2014).

The reasons for a positive relationship were based on arguments that, tangible assets are less subject to information asymmetry and have larger liquidation values than intangible assets in case of bankruptcy (Apostu, 2010, p. 35; Vries, 2010, p. 59). A large number of tangible assets increase the ability of a firm to issue secured debt (Booth et al., 2001). So, such assets provide better collaterals for debt, as a result they are positively related to capital structure ratios. On the other hand, based on agency conflicts, firms with assets that are less qualifying as collaterals may as well opt for higher debt levels to limit managerial privileges from being enjoyed (Titman

& Wessels, 1988; Apostu, 2010).

Consistent with the evidence of Booth et al. (2001), a few researchers in Africa (such as Kenya, Nigeria, Ghana, Morocco, Ethiopia, Zimbabwe and Tanzania) found a negative relationship between asset tangibility and capital structure ratios (Vries, 2010; Doku, et al., 2011; Aremu et al., 2013; Bundala & Machogu, 2012; Chechet et al., 2013; Latridis & Zaghmour, 2013; Moyo, 2013). The justification that has been put forward is that agency costs of debt increase when assets cannot be collateralized (Jensen & Meckling, 1976; Apostu, 2010; Vries, 2010). Thus, creditors place stringent terms, consequently leading firms to use equity rather than debt.

2.4.2.2 Firm Size

Empirical results on the relationship between the size of a firm and its capital structure are mixed (Vries, 2010, p. 69). Most empirical studies in Europe, Australia and America report a positive relationship between size and capital structure ratios (Rajan & Zingales 1995; Frank & Goyal 2002; Apostu, 2010). Despite the differing industries, sample size, sample composition, capital structure ratios, firm size measures and regression techniques, the positive and significant relationship has been persistent in most studies in Africa (such as Kenya, Nigeria, Ghana, Ethiopia, Zimbabwe and Tanzania) have indicated a positive and significant relationship between size of the firm and capital structure ratios (Abor, 2008; Doku, et al., 2011; Khediri & Daadaa, 2011; Hove & Chidoko, 2012; Nyamora, 2012; Ogbulu & Emeni, 2012; Bundala & Machogu, 2012; Aremu, et al.,2013; Latridis & Zaghmour, 2013; Gweyi et al., 2013; Nyanamba et al.,2013; Umer, 2014; Gathogo & Ragui, 2014).

This relationship was attributed to the fact that asset size attracts lenders. Assets are used as collateral for loans because they project lower risk of bankruptcy and distress costs. Size effects trigger higher firm reputation and result into high credit ratings for larger firms. As a result, financial institutions are more willing to offer loans to larger firms and at a lower rate than to smaller ones.

However, a few exceptions are there that find a negative relationship between firm size and capital structure ratios. For instance, Vries (2010) studied a large sample of 280 listed and delisted South African firms, with 2,684 observations. Unlike the previous studies that used asset values, Vries used natural logarithm of sales as a measure of firm size. Vries found a negative relationship between firm size and capital structure ratios. The negative relationship was attributed to low information asymmetry presented by large firms. Vries argues that, larger firms provide more information than smaller ones, especially on their equity issues. Thus, the public investors are more informed about the firm, therefore the chances that the shares are undervalued are very low, and as such investors are more willing to buy equity. As a result, such firms, at time may prefer equity relative to borrowing, which means their equity are more attractive to investors than debt.

Further, Achy (2009) employed a panel of 550 non-listed Moroccan firms, with 2,859 observations; used various measures for size, for a robust analysis; natural logarithms of sales, natural logarithms of assets and natural logarithms of employment. All the three measures for firm size were found to be negatively related to long term capital structure ratios. Archy attributed the results to a number of

possible explanations. Small firms are constrained by “control rights” effects. They are not ready to surrender their rights for control to outside investors. As a result, they prefer debt as a financing option. Second, firms with large amounts of tangible assets already have a stable income that pushes them to resort to internal financing rather than debt financing. The two attributes viewed concurrently, presents a negative relationship between firm size and capital structure ratios.

2.4.2.3 Firm Profitability

Empirical evidence from previous studies supported both negative and positive relationships between profitability and capital structure ratios (Apostu, 2010). Evidences for a negative relationship are extensive (Rajan & Zingales, 1995; Booth, et al., 2001; Fama & Frech, 2002; Abor, 2008; Vries, 2010; Khediri & Daadaa, 2011; Hove & Chidoko, 2012; Aremu et al., 2013; Latridis & Zaghmour, 2013; Umer, 2014; Tarus et al., 2014). The rationale for the negative relationship is that if the firm is following a perking order financing behaviour then firms would prefer internal financing to external ones (debt) (Apostu, 2010; Vries, 2010). Additionally, profitable firms may avoid debt if there are non-debt tax shields (for example depreciation) large enough to be an inducement against using debt financing for debt tax shields.

Research findings for a positive relationship are as well persistent (Achy, 2009; Doku, et al., 2011; Nyamora, 2012; Gweyi et al., 2013; Moyo, 2013; Gathogo & Ragui, 2014). The justifications for the positive relationship are that first, if a firm is influenced by cost-benefit trade-offs behaviour in its financing, then more profitable firms will prefer debt financing in order to benefit from debt tax shields (Apostu,

2010; Vries, 2010). Secondly, if past profitability acts as a proxy for future profitability, more profitable firms are capable of borrowing more because of their increased likelihood of ability to pay back the loans (Harris & Raviv, 1991; Vries, 2010). Thirdly, debt financing can be used by profitable firms as a means to reduce agency costs (Vries, 2010). The use of debt triggers debt obligations such as interest payments in order to limit management freedom. Particularly, debt is used in this respect to discipline managers from misusing free cash flows. Thus, due to high debt capacity, lower agency costs and tax shields advantage, firms with higher profitability have higher capital structure ratios (Apostu, 2010; Vries, 2010).

2.4.2.4 Growth Opportunity

Empirical evidences on growth opportunity are mixed. Studies in Africa (such as Kenya, Nigeria, Ghana, Morocco, Ethiopia, Zimbabwe and Tanzania), which are largely represented by developing economies indicate a positive relationship between growth opportunity and capital structure ratios (Doku, et al., 2011; Hove & Chidoko, 2012; Nyamora, 2012; Ogbulu & Emeni, 2012; Bundala & Machogu, 2012; Latridis & Zaghmour, 2013; Gweyi et al., 2013; Nyanamba et al.,2013). It is observed that, such a relationship is due to the fact that, small size firms have higher needs of funds to be used in acquiring more of non-current assets, because they need to grow.

Higher growth firms are normally relatively young (Vries, 2010). Due to their limited size, they have small internal funds; consequently, they rely on external funds to be able to acquire the required assets for growth. With the two options, equity and debt, they are further constrained by ownership control rights effects

preferences. They are not willing to share-out firm ownership, as a result they have to rely on debt financing because equity issues violate control rights. Thus, positive relationships between growth and capital structure ratios were evidenced in the developing economies (Vries, 2010).

However, many studies, particularly from developed economies, support a negative relationship between growth opportunity and capital structure ratios (Rajan & Zingales, 1995; Chen, 2004; La Rocca et al., 2009; Aremu, et al., 2013). Several explanations have been provided. Firms with high growth opportunities should use less debt and more equity thereby projecting a negative relationship. Based on agency cost arguments, improvements in growth opportunities lead to higher agency costs for debt. The lenders will impose higher costs on debt for growing firms, because they fear such firms may engage in risky projects in future, thus increasing their bankruptcy risk and costs. Thus lenders will shy away from these firms (Booth et al., 2001).

Similarly, when firm leverage is high, management have incentives to engage in "asset substitution" (share-bond exchange process), exchanging bonds for shares, which transfers wealth from shareholders to bondholders. Thus, due to this phenomenon and the agency conflict between shareholders and lenders, high growth firms, tend to keep their debt ratios low, because they have a stronger incentive to avoid underinvestment and asset substitution, which arise due to agency conflicts between shareholders and lenders. Therefore, such situation would project a negative relationship between growth opportunity and capital structure ratios.

2.4.2.5 Going Concern

The proxy for going concern (GOCO) is a firm age and has traditionally been included among the factors that determine capital structure. Petersen and Rajan (1994) found that aged firms maintain higher capital structure ratios, because of accumulated reputation. Hall et al. (2004) established that age is positively related to long-term capital structure ratios but negatively related to short-term capital structure ratios. Green et al. (2002) also established that age has a negative weight on the possibility of incurring debt in the initial capital mix and no impact in the additional capital mix. The reason for this relationship was that, the older the firm the more they are exposed to information; consequently, they project less information asymmetry to lenders. They are able to present a good credit history and thus are good candidates for loans (Abor, 2007).

As firms mature, they become more reputable and are able to raise debt much easily because the bond markets recognise their names. Mature firms have higher debt ratios because they are considered higher quality firms based on experience and reputation accumulated over the years (Peterson & Rajan, 1994; Umer, 2014). But, notably Esperança et al. (2003) found that age is negatively related to both long-term and short-term capital structure ratios, the reasons for this relationship were probably due to young age and information asymmetry presented by young firms.

2.4.2.6 Bankruptcy Risk

The level of risk is said to be one of the primary determinant of capital structure (Abor, 2007). Research evidences indicate that firms tend to shy away from excessive debts in order to reduce their bankruptcy risk. Findings from both

developed and developing economies indicate that bankruptcy risk is negatively related to capital structure ratios (Alonso, 2003; Abor, 2008; Moyo, 2013; Umer, 2014; Gathogo & Ragui, 2014). The rationalization put forward was that, bankruptcy risks emanate from both increases in direct and indirect financial distress costs. The direct costs include all the costs of bankruptcy which are cash outflows of legal and administrative fees. Indirect costs are non-cash firms' economic losses resulting from bankruptcy. Firms that increase significantly their debt financing increase their financial distress costs (Vries, 2010).

Firms increase their debt level as a result of tax benefits, their ability to meet fixed interest payments decreases (Abor, 2007). Such a situation increases the risk and cost of bankruptcy for such firms. Firms that adjust their capital structure away from excessive debt reduce the risk and cost of bankruptcy. Firms with high profitability and risk averse tend to avoid debt usage by relying on internal financing in order to reduce bankruptcy risk. The tax shelter-bankruptcy cost theory of capital structure determines a firm optimal capital structure ratio as a function of business risk. In presence of agency and bankruptcy costs there are no incentives for the firm to utilise the tax benefit of 100% debt within the static framework model (Abor, 2007).

2.4.2.7 Non-debt Tax Shield

Studies have found that debt tax shield is positively related to capital structure ratios while non-debt tax shields such as depreciation are negatively related to capital structure ratios (La Rocca et al., 2009). Empirical evidences both in developed and developing economies have persistently indicated a negative relationship between non-debt tax shields and capital structure ratios (Abor, 2008; La Rocca, et al., 2009;

Khediri & Daadaa, 2011; Hove & Chidoko, 2012).

The rationalizations for a negative relationship are that; when corporate taxes increases are high, firms which are able to reduce taxes by means other than; deducting interest expenses will employ less debt in their capital structure (Vries, 2010). Non-debt tax shields may be regarded as substitute for debt tax shields (La Rocca et al., 2009). Thus, non-debt tax shield and debt tax shield are inversely related. So, if non-debt tax shields, such as depreciations are higher, the probability of negative taxable income increases, it is less likely that the amount of debt will be increased for tax reasons. When non-debt tax shields are larger firms have less incentive to use debt tax shields to benefit from interest deductibility. Thus, non-debt tax shields are negatively related to capital structure ratios, while debt tax shields will be positively related to capital structure ratios.

On the contrary, but consistent with the findings of Titman and Wessel (1988), Umer (2014), found a positive relationship between non-debt tax shields and capital structure ratios, in Ethiopian companies. The possible explanation put forward was that non-debt tax shields (tax deduction for depreciations) were not a substitute for debt tax shield.

2.5 Synthesis and Research Gap

The research gap is the missing element in the existing literature. The following are the elements that are missing and need to be addressed on “Product diversification effects on Capital structure ratios”;

Contextual elements: - The Tanzanian context provides a fresh ground for substantiation of research. Presence of mixed previous empirical results on how related, unrelated and total product diversifications affect capital structure ratios is a knowledge gap (La Rocca, et al, 2009). This study incorporated product diversification as a new variable within the African context and decomposes it into related and unrelated product diversifications. To the best of the author's knowledge, this factor has not been studied in Tanzania and Africa in general. The need to validate firm characteristics such as tangibility, size, profitability, going concern, growth opportunity, bankruptcy risk and tax shield effects on capital structure ratios is a gap that need needs to be filled as well in a Tanzanian setting where this related study has been at least once done (Bundala, 2012).

The presence of mixed results on the magnitude and direction of effects (positive or negative) to capital structure ratios is yet another gap, but also presence of mixed results in terms of whether the effects are significant or not; because some study find positive or negative significant or insignificant relationships, some examples are; (Esperança et al., 2003; Hall et al., 2004; Apostu, 2010; Hassan, 2011; Ogbulu & Emeni, 2012).

Methodological elements; the presence of various empirical approach to the topic provides several knowledge gaps, some studies employ static regression models (Bundala, 2012; Kariuki & Kamau, 2014) others dynamic models (Abor, 2008; La Rocca et al., 2009; Apostu, 2010; Moyo, 2013; Mbulawa, 2014) with inconsistent results. Unlike the study by Bundala (2012) which used cross-sectional data, this

study went further by using panel data which is more informative and rich in data than a mere cross-sectional or longitudinal study. This study used both the static and dynamic methods, namely the fixed effects regressions models and the General methods of Moments regression model and compared them to better fit the data and produce more reliable results.

The difference in variable measurement methods is yet another gap; for instance, some have used debt to equity ratios to measure capital structure (Kochhar & Hitt, 1998; Alonso, 2003). Others long term debt to total assets ratios (La Rocca et al, 2009; Apostu, 2010) that yielded conflicting results. Similarly, in measuring various product diversification strategies others have used Entropy Index (Palepu, 1985; La Rocca et al., 2009) while, others Barry-Herfindal Index (Jacquemin & Berry, 1979; Kranenburg et al., 2004) or Categorical measures (Varadarajan & Ramanujam, 1987). Lack of consensus in methods provides avenues for more studies in this area. This study particularly used the entropy index to measure product diversification and further decomposed it into related and unrelated product diversifications.

Theoretical elements**:-** The presence of alternative theoretical postulation on the effects of product diversification strategies on capital structure calls for theory validation and testing; there are at least three theories that attempt to explain, from different angles, the effects of product diversification on capital structure:- These are the *transaction cost hypothesis* (Penrose, 1959; Chatterjee & Wernerfelt, 1991), *co-insurance hypothesis* (Singh et al., 2003; Apostu, 2010), *and agency theory arguments* (Li & Li, 1996; Apostu, 2010). Some studies support the theories while some studies do not. The mixed results necessitate research in this area (La Rocca et

al., 2009; Apostu, 2010), and the quest is to assess which theory is supported in Tanzania.

Therefore, the knowledge gaps that this research attempted to fill were to contribute to the efforts to explain the capital structure ratios variability by providing empirical evidence on related, unrelated and total product diversifications when controlling for conventional capital structure determinants and lagged debt ratios through panel data models. This was done in an effort to find better ways to explain capital structure variability in Tanzania. Thus, this research used an empirical approach, based on panel data regression analysis, and data from companies operating in Tanzania, based mainly on the transaction cost theory arguments, co-insurance effects hypothesis and agency cost theory. The study was led by ten hypotheses that test these knowledge gaps. The methods and hypotheses on how these research gaps were addressed are summarized in the conceptual framework and detailed in the methodology chapter.

2.6 Conceptual Framework

To envisage theoretical relationships between independent variable and dependent variables the following general formulation is employed in mapping the conceptual framework. GEAR = *f* (L.GEAR, RDIVE, UDIVE, TDIVE, TANG, SIZE, PROF, GROP, GOCO, RISK, NDTS, U). Where GEAR is capital structure, L.GEAR is a lagged capital structure variable, RDIVE is related diversification, UDIVE is unrelated diversification, TDIVE is total diversification, TANG is asset tangibility, SIZE is firm size, PROF is firm profitability, GROP is growth opportunity, GOCO is going concern, RISK is risk of bankruptcy, NDTS is non-debt tax shields and U as

the error term.

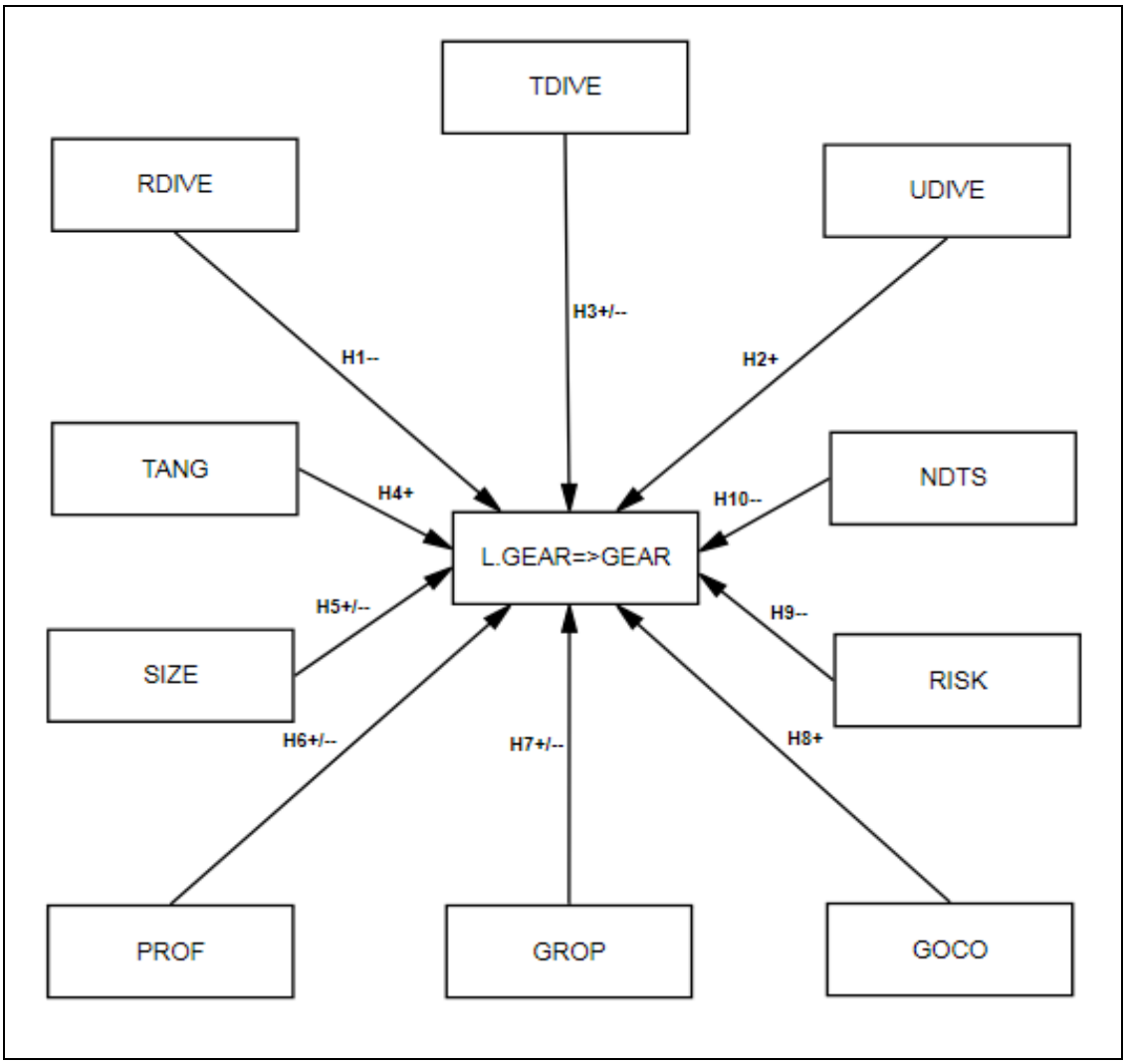

Figure 2.1 Conceptual Framework

Source: Researcher's own Design (2015).

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Overview

This chapter presents the research philosophy, paradigm, strategy and design used in the study. It covers the research study area and population, sampling procedures, data collection methods, variable measurements and data analysis procedures and techniques used in the study.

3.2 Research Philosophy, Approach and Strategy

According to Greener (2008), research philosophy or paradigm refers to a set of beliefs which guides researchers on what to be researched and how the findings should be interpreted. These paradigms are crucial in deriving logic and reconciling differences on researchers' varying perception of the same phenomenon. This study employed a post-positivist paradigm which is a sibling of the positivist paradigm. This research philosophy is also known as realism (Saunders, et al. 2012). The positivist paradigm is strictly empirical in nature. It tends to ignore all logical reasoning which may not be tapped by strictly empirical analysis. The Post-positivist paradigm takes a position from which one can make reasonable inferences about a phenomenon by combining empirical observations with logical reasoning. Post-positivists view business phenomenon as being probabilistic, based on many contingencies, and habitually seek to discover these contingencies as a way of comprehending reality better (Bhattacherjee, 2012).

The study employed a deductive research approach. It starts with a theory and testing theoretical postulates using empirical data (Saunders, et al. 2012; Bhattacherjee,

2012). In deductive research, the objective of the researcher is to test concepts and patterns modelled into hypotheses, identified from theory by means of new empirical data. Thus deductive research is said to be theory-testing research. Deductive (theory-testing) research is more productive when there are many competing theories of the same phenomenon and researchers are interested in knowing which theory works best and under what circumstances (Bhattacherjee, 2012).

Deductive research is often derived from a set of first principles or axioms. Deduction is the process of drawing conclusions about a phenomenon or behaviour based on theoretical or logical reasons based on an initial set of premises. Since deductive research involves theory-testing, the next step was to identify one or more theories that were relevant to addressing the research objectives. These theories identified were namely the agency theory, the co-insurance hypothesis and the transaction cost theory.

The study adopted mono quantitative methodology. It used secondary data in which panel data technique was employed. The study used an archival research strategy. This strategy uses records and documents as the principal sources of data. It allows for researches studies that focus upon the past and changes over time to be answered (Saunders, et al., 2012). The study used research techniques and procedures is similar to those used by other studies in the field, for instance to cite some in Europe (Alonso, 2003; La Rocca et al., 2009; Apostu, 2010), and others in Africa (Aremu et al., 2013; Gathogo & Ragui, 2014; Mbulawa, 2014). It adopted a deductive approach, because it starts from established theories.

The study used regression analysis with panel data techniques. The main advantage of panel data technique is its objectivity in methods and outputs, others are: "….because of the several data points, degrees of freedom are increased and co-linearity among the explanatory variables is reduced, thus the efficiency of economic estimates is improved" (Abor, 2008, p. 13). Furthermore, "A panel data set also allows us to control for unobserved cross section heterogeneity" (Woodridge, 2002, p. 169), other advantages are; control for individual heterogeneity, provides more informative data, more variability and more efficiency. In using panel data methods "Micro panel data gathered on individuals, firms and households may be more accurately measured ….Biases resulting from aggregation over firms or individuals may be reduced or eliminated" (Baltagi, 2005, p. 7).

3.3 Study Population

The study is based on a population of registered companies in the Dar es Salaam Stock Exchange (DSE). The exchange was incorporated on September 1996 and trading started in April, 1998. It is located in Dar es Salaam Tanzania and is organised into two segments; one, the Main Investment Market Segment (MIMS) which is the main exchange and; two, the Enterprise Growth Market (EGM) (Dar es Salaam Stock exchange, 2014). The exchange is monitored by the Capital Market and Securities Authority (CMSA) (Norman, 2010).

The Dar es Salaam Stock exchange since its establishment in 1994 and its incorporation in 1996 to 29/12/2015 has listed a total of 23 companies. These are listed on both segments. One company, National Investment Company Limited (NICOL) was delisted in 2011. The MIMS had listed a total of 19 companies

namely: (Precision Air Limited, Tanga Cement Limited, Swissport Tanzania Public Limited Company, Tanzania Tea Packers Limited, Tanzania Breweries Limited, Tanzania Cigarette Company, TOL Limited (formerly Tanzania Oxygen Limited (TOL)) and Tanzania Portland Cement Limited; which are locally listed at the Dar es salaam stock exchange (DSE).

Companies that are cross-listed are: African Barrick Gold, Kenya Airways and National Media Group. The EGM had listed a total of 3 companies namely: Mwalimu Commercial Bank, Maendeleo Bank and Mkombozi Commercial Bank. Both segments are composed as follows; 15 local companies from Tanzania and 7 cross-listed companies (6 from Kenya and 1 from United Kingdom) (Dar es Salaam Stock Exchange, 2015, “Listed companies”, para.1-2).

3.4 Sampling Procedures and Sample Size

The sampling frame for the study was all 23 local and cross-listed companies. This population was selected because these companies have homogeneous characteristics; first, they are subjected under similar conditions such as similar stock market regulations; second, they are all subject under same financial reporting standards and requirements which makes availability of data for research accessible; and third, this study chose listed firms following the approach of other studies as indicated in Table 8.1. The study sample was drawn from these local and cross-listed companies in the Dar es Salaam Stock Exchange, for the years 1997-2014.

The study observes variables across years for the past maximum 17 years, thus maximizing on the number of observations (firm-years) from the population, which

is arrived at by adding the total number of years in operation for each firm since first listing or cross listing at DSE. The 23 companies in the study population were subjected to different exclusion and inclusion criteria. The following companies were excluded. Eight highly regulated companies namely: Dar es salaam Community Bank, National Microfinance Bank, Jubilee Holdings Limited, Kenya Commercial Bank, CRDB Bank, Mwalimu Commercial Bank, Maendeleo Bank and Mkombozi Commercial Bank. These were banks and insurance companies which are normally highly regulated, their regulators normally imposes maximum gearing ratios which they are not supposed to violate, such an effect cannot easily be isolated when these companies are combined with companies that do not have such restrictions.

A company must have been consistently listed. This criterion excluded one company namely National Investment Company Limited which was delisted in 2011. Availability of data was another criterion which eliminated three companies, data for which were not available. These companies were namely: East African Breweries Limited, Swala Gas & Oil and Uchumi Supermarket. It was difficult to find the required data from these companies. Their prospectus did not give details of financial statements that could provide the needed data. A total of 11 companies were excluded leaving a sample size of 11 companies which were finally included in the study. Thus, the *maximum* number of sample observations (firm-years) was 128, constructed from 11 companies that meet the above inclusion criteria. Some comparable study samples are as indicated in Table 8.1 of Appendix I.

3.5 Data Sources and Collection Techniques

Data came from the Dar es Salaam Stock Exchange database and sampled

companies' databases. The data was extracted from companies' annual reports, which normally include the following statements; the statements of financial position, the income statements, the cash flow statements and the statements of change in equity. These statements provided data for the calculation of the ratios and indices which were used in measuring capital structure ratios and the various factors that were predicted to affect capital structure. The notes to these statements, management reports on the operations of the companies and DSE market reports provided qualitative information of the nature and operations of the companies under study.

3.6 Reliability and Validity of Measurements

Reliability and validity are the benchmarks against which the adequacy and accuracy of the measurement procedures are evaluated in research. It was crucial to ensure that variable measurements were meeting the acknowledged standards (Bhattacherjee, 2012).

3.6.1 Reliability of Measurements

Reliability is the level at which the measure of a variable or construct is consistent or dependable. In other words, the same measurement results are expected for a particular variable over time using the same scale assuming that the phenomenon is not changing. Reliability implies consistency but not accuracy. It is measuring the intended variable consistently and precisely (Bhattacherjee, 2012). Following the advice of Bhattacherjee (2012) reliability was improved by using quantitative measures. Quantitative measures are objective; they are more reliable than subjective measures. The use of statistical packages such as excel for data cleaning, control and

organization was used to avoid human errors and data loss before entering data in STATA for analysis was ensure.

3.6.2 Validity of Measurements

Validity refers to the degree to which a measure sufficiently represents and measures the underlying variable or construct that it is intended to measure. Theoretical assessment of validity focuses on how well the idea of a theoretical variable or construct is translated into or represented in an operational measure. Translational validity (or representational validity) examines whether a measure is a good reflection of its variable or construct. It consists of two subtypes: face and content validity (Bhattacherjee, 2012). Face validity relates to whether an indicator seems to be a reasonable measure of its variable or construct. Content validity relates to how well the indicators and attributes, such as profit, assets, years, sales, debt and equity that went into the calculations or measurements of the variables ratios or indices relationally represent the variable (ratio) intended. It tries to assess whether the content of the measurement technique is in consonance with the known literature on the topic.

Translational validity is typically assessed using a panel of expert who are conversant with the area of study. This was taken care of by a review of researchers' works that used similar measurements for the variables used in this study. But also experts in this field were consulted to make sure that the measures used sufficiently capture the variable intended. The study used attributes in the calculation of variables' ratios that related to the variables that they were measuring. For instance, the use of profit and assets figures in calculating profitability. Profit figures directly

relate to profitability while assets figures represent the drive for such profitability thus a ratio of profit over assets has more face validity than if it were constructed using other attributes. As suggested by Bhattacherjee (2012) content validity was easily estimated from a review of the literature on the concept/construct topic and through consultation with experts.

Criterion-related validity examines whether a given measure behaves the manner it should, given the theory of that variable or construct. It includes two sub-types: convergent and discriminant validities. Convergent validity refers to the closeness with which a measure relates to (or converges on) the construct that it is purported to measure, and discriminant validity refers to the degree to which a measure does not measure (or discriminates from) other constructs that it is not supposed to measure. Usually, convergent validity and discriminant validity are assessed jointly for a set of related constructs (Bhattacherjee, 2012).

Convergent validity was established by comparing the observed values of one attribute (indicator) of one variable (construct) with another attribute (indicator) of the same construct and demonstrating similarity (or high correlation) between values of these attributes (indicators). It was demonstrated that the attributes (indicators) that were used in constructing variables (constructs) were highly correlated; for instance, profitability as a variable (construct) had attributes (indicators) namely; profit and assets. Because these two attributes (indicators) are closely related they indicated high correlation. The same procedure was maintained for the rest of the other variables to ensure convergent validity of the measurements.

Discriminant validity is established by demonstrating that attributes or indicators of one variable or construct are dissimilar from (i.e., have low correlation with) other variable constructs. For instance, the following variables were included in the study; profitability (attributes were profit and assets), growth opportunity (attributes were percentage changes in sales) and capital structure (attributes were debt and equity). Thus, the ratios from profitability, growth opportunity and capital structure are not correlated because, the variables do not share the same data in their construction, attributes across variables are not correlated and at least one of their attribute is not directly related to the rest of the attributes (indicators).

In these attributes (indicators) where there were close correlations the indicators or variables were transformed using mathematical procedures such as logarithm transformation for instance natural logarithms were used in calculation of firm size based on total sales. All the transformations were based on theory and other researchers' empirical practices. Thus correlation between attributes within the same variable indicated high convergent validity while lack of correlation between attributes from different variables indicated high discriminant validity.

3.7 Operational Definitions and Variables Measurements

Operational definition refers to the process of developing indicators or items for measuring constructs or variables. This process allows for an examination of the proximity amongst these indicators as an assessment of their accuracy technically referred to as reliability. Indicators operate at the empirical level, in contrast to constructs, which are conceptualized at the theoretical level.

The combination of indicators at the empirical level representing a given construct is called a construct or variable. This combination technically refers to operational definitions of the variables. Each indicator may have numerous attributes (or levels) and each attribute represent a value. An index is a composite score derived from aggregating measures of multiple constructs or components using a set of rules and formulae (Bhattacherjee, 2012). The procedures described below were used to come up with the variables that were used in this study.

3.7.1 Dependent Variable: Capital Structure

Due to data limitations many studies measure capital structure in book values rather than in market values. The ratio of total debt to total capital (defined as total debt plus equity or only equity) is considered to best represent the effects of past financing decisions. Thus, the study involved debt ratio to capture capital structure measure. Debt ratio was computed as the ratio of book value of debt to the sum of total equity value and total debt values as used by Apostu (2010).

The capital structure measure (ratio) was categorised into three primary types of capital structure ratios; total capital structure ratio or total gearing (TGEAR), long term capital structure ratio (LGEAR) and short term capital structure ratio (SGEAR). These are respectively referred to as total debt ratio, long term debt ratio and short term debt ratio. The dynamic regression analysis further developed these ratios into lagged total capital structure ratio (L.TGEAR), lagged long term capital structure ratio (L.LGEAR) and lagged short term capital structure ratio (L.SGEAR) respectively.

3.7.2 Independent Variable: Product Diversification

The first set of independent variables included related product diversification, unrelated product diversification and total product diversification. There are several ways to measure diversifications, some of them are; Entropy Index, Modified Barry-Herfindal Index, Efficient Diversification Measure and the Two-dimensional Categorical Measure. The study differentiates between related product diversification and unrelated product diversification, based on Standard Industrial Code (SIC).

3.7.2.1 SIC Categorical Classification

The simplest measure of product diversification is business segments count measure. It is the number of industry groups in which a firm operates based on Standard Industrial Classification (SIC) codes. SIC data is comprised of a four-digit scheme that can be used to define increasingly more refined measures of business or industry affiliation (i.e., with a single digit code being the least refined measure and the four-digit code representing the most refined measure of a firm business or products or segments (Martin & Sayrak, 2001).

3.7.2.2 Entropy Index

La Rocca et al., (2009) define the entropy index a product diversification measure that uses data from sales segments by taking into account concurrently the number of business segments in which a firm operates, the allocation of a firm total sales across industry segments, and the various degrees of relatedness among the industries. In this study it is represented by the following symbols; $TDIVE_{i,t}$ which is total product diversification entropy indicator of firm i in time t. Constructed as;

$TDIVE_{i,t} = \sum_{j=1}^{\infty} P_j \ln\left(1/P_j\right)$; where P_j is the proportion of business sales of business segment j defined by the 4 digit SIC codes (standard industrial classification codes) (Prosser, 2009). Thus, the higher the $TDIVE_{i,t}$ ratio is the more product diversified a firm is in all of its' products. Hoskisson et al., (1993) argued that, the entropy index indicates a high level of validity on several dimensions including face, content, convergence, divergent and prediction validities. The component of the entropy index can be derived by a separation of total entropy into its related and unrelated parts. It weighs the segments by the relative size of their sales. It is readily derived from secondary data and can be measured at a ratio scale. This measure has been widely used in measuring product diversification in the literature (La Rocca et al., 2009). Refer to Table 8.2 of Appendix I.

SIC codes represent business segments classification for all economic activities. The business segments are used as proxies for products. Sales for a particular product represent sales for that particular business segment. For example, in this study Tanzania Breweries (TBL) is involved in the following business segments represented by SIC class codes; 11.01, 11.02, 11.04 and 11.05. The following is a sample of SIC classes representing different business segments: - 11.01: Distilling, rectifying and blending of spirits, 11.02: Manufacture of wine from grape, 11.03: Manufacture of cider and other fruit wines, 11.04: Manufacture of other non-distilled fermented beverages, 11.05: Manufacture of beer, 11.06: Manufacture of malt, 11.07. These (SIC class codes:- 11.01, 11.02, 11.04 and 11.05) represent some of business segments in which TBL is involved in, while 11.03 and 11.06 and 11.07 are examples in which TBL is not involved in.

Similarly, Tanzania Tea Packers (TATEPA) is involved in the following business segments represented by SIC codes; 01.27, 10.83 and 82.92. These SIC classes are:- 01.27: Growing of beverage crops, this class includes: growing of beverage crops: such as coffee, tea, mate, cocoa and other beverage crops. SIC class 10.83: Processing of tea and coffee which includes tea processing, blending of tea and mate, manufacture of extracts and preparations based on tea or mate, manufacture of herb infusions (mint, vervain and chamomile). SIC class 82.92: Packaging activities, this class includes: packaging activities on a fee or contractual basis, whether or not these involve an automated process: bottling of liquids, including beverages and food, packaging of solids (blister packaging, foil-covered etc.), security packaging of pharmaceutical preparations, labeling, stamping and imprinting and parcel-packing and gift-wrapping.

The products sales from these business segments are used as proxies for product sales diversification. The entropy index is derived from summation of all individual products sales (based on SIC codes) each weighted by their respective logarithms of the inverse of individual products sales (based on SIC codes) for each firm and year. That single formula and calculation result ($\mathbf{TDIVE_1(i,t))}$ represents only one single observation for entropy, which is observed for a single firm at a single time period. This is a single firm-year entropy for total product diversification. Thus, the calculations were made for all firms and all years under study to arrive at complete data for total product diversification.

$UDIVE_{i,t}$ is unrelated product diversification entropy indicator of firm i in time t, constructed as; $UDIVE_{i,t} = \sum_{j=1}^{n} S_j \ln\left(1/S_j\right)$; where S_j is the proportion of business

(sales) of segment j defined according to the first 2 digits of the SIC code. The higher the $UDIVE_{i,t}$ the more a firm is diversified in unrelated products. While $TDIVE_{i,t}$ considers all business segments that the company is involved in as demonstrated in the preceding paragraph, $UDIVE_{i,t}$ considers only business segments (based on SIC codes) which are different by the first two digits. For instance, in the TATEPA example, the company operates in business segments represented by SIC codes 01.27, 10.83 and 82.92. It operates in three unrelated business segments. Thus, it is involved in unrelated product diversification.

$RDIVE_{i,t}$ is related product diversification entropy indicator of firm i in time t, given by; $RDIVE_{i,t} = TDIVE_{i,t} - UDIVE_{i,t}$. Thus, a group of products using respective SIC classes business segments sales as their proxies is defined as a set of related segments, such that $RDIVE_{i,t}$ is the related diversification of several segments within an industry group i in time t (Palepu, 1985). Diversity is therefore measured within industry groups at a time. The higher $RDIVE_{i,t}$ index is, the more diversified the firm is in its related products (García et al., 2013). Using the TBL example, the SIC codes 11.01, 11.02, 11.04 and 11.05 are considered $RDIVE_{i,t}$ since they only vary by the last two digits, and are within the major class 11.00. Thus, TBL is involved in four related business segments. It is following a related product diversification strategy. Thus, $TDIVE_{i,t}$ is the summation of both $RDIVE_{i,t}$ and $UDIVE_{i,t}$.

3.7.3 Conventional Determinants of Capital Structure

Consistent with previous studies such as; Mayer and Whittington (2003), Alonso (2003), La Rocca et al., (2009) and Qian et al., (2010), the present study used several firm specific characteristics as conventional variables in order to address alternative

explanations for the expected results as well as to clearly determine the effect of product diversification types on capital structure ratios by isolating other factors influences.

The choice of conventional variables was led by the theories and review of variables that explain corporate capital structure and which were briefly described in chapter two. As noted earlier on, theoretical and empirical studies have shown that firm profitability, asset tangibility, firm size, bankruptcy risk, going concern, growth opportunities and non-debt tax shields affect capital structure (Oh et al., 2014). The definition and measurements are indicated in Table 8.2 in the Appendix I. Further, following Rajan and Zingales (1995), the study used firm and time dummies to control for firm-specific and time-specific effects. Further, capital structure ratios levels have year specific effects caused by different macroeconomic conditions across time, affecting all firms at a particular point in time.

The conventional determinants or conventional variables used in this study are based on a ratio scale coding (refer to Table 8.2 of Appendix I) as follows; Tangibility: Non-current assets (NCA) to the book value of total assets (TA) that is (NCA/TA) and this was symbolised by $TANG_{i,t}$ for firm i at time t. (La Rocca, et al. 2009; Apostu, 2010). Firm size: natural logarithms of total sales, that is ln(Sales) and this was symbolised by $SIZE_{i,t}$ for firm i at time t. (Alonso, 2003; La Rocca, et al. 2009). Profitability: the ratio of earnings before interest, taxes, depreciation and amortization (EBITDA) to the book value of total asset ratio i.e. EBITDA/TA. This was symbolised by $PROF_{i,t}$ for firm i at time t (Apostu, 2010; Vries, 2010; Oh, et al. 2014).

Growth opportunities: sales annual growth, Sales annual growth and was symbolized by $GROP_{i,t}$ for firm i at time t (Apostu, 2010;Oh et al. 2014). Going concern: Age of the company that is the number of years in operations symbolized by $GOCO_{i,t}$ for firm i at time t (Alonso, 2003; La Rocca, et al. 2009; Apostu, 2010). Non-debt Tax Shield: depreciation and amortization (DA) divided by total assets (TA) that is DA/TA and is symbolised as $NDTS_{i,t}$ for firm i at time t. (Booth, et al. 2001; Alonso, 2003; La Rocca, et al. 2009; Apostu, 2010). Bankruptcy risk/Financial distress: Earnings volatility as a percentage change of earnings (operating incomes) or earnings change as percentage, that is %Δ (EBITDA), and is symbolised by $RISK_{i,t}$ for firm i at time t (Alonso, 2003; La Rocca et al. 2009; Apostu, 2010).

3.8 Data Analysis

The analysis of data was quantitatively done using the STATA software version 12 was used. Both descriptive and multivariate analysis techniques were used and reported.

3.8.1 Descriptive Statistics

A variety of measures for the dependent, independent and conventional variables were calculated. This was done for measurement purposes, comparison purposes and robustness checks and assessment of the best measures given the data characteristics. In order to partly address objectives one and two of this study, that is to assess the level of capital structure variability (objective one) and assess the level of product diversification variability (objective two) descriptive analysis on these variables was executed to produce means, medians, maximums, minimums and standard deviations in the sample of firms.

3.8.2 Univariate Analysis

Univariate analysis was done to facilitate group wise analysis. Parametric test (T-test) was done to compare firms means based on type of product diversifications used by firms. Related and unrelated product diversified groups were compared. The test compared these two groups by testing differences of the firms' characteristics. Particularly the use of the regression variables was employed. These variables were TGEAR, LGEAR, SGEAR, RDIVE, UDIVE, TDIVE, TANG, SIZE, PROF, GROP, GOCO, RISK and NDTS. This prepared the ground for regression analysis based on the two groups' characteristics, which is related and unrelated product diversified groups.

Secondly, two sample T-test was done to assess if the types of capital structure ratios, that is long term and short term capital structure ratios were statistically different. This was done to ascertain validity of analysing capital structure based on types of capital structure ratios. Thus long term capital structure ratio was compared with short term capital structure ratio. This assisted in knowing if companies are making distinction between the two types of capital gearing and thus evaluate if capital structure determinants exhibit differentiated capital structure profiles based on types of capital structure ratio used. Thus warrant regression analysis based on types of gearing, that is short and long term gearings groups. Thirdly, two sample T-test was used to assess if the variability of product diversification based on its types was statistically different. This helped to identify if two types of product diversification were empirically different from each other as proposed by co-insurance hypothesis based on cash flow volatility.

3.8.3 Multivariate Analysis

Correlation analysis was done to assess the relationship between the variables that were used in the study. It helped to determine the extent to which various pairs of variables used were related. It simply established association of these variables. It also helped to identify directions of relationship between the variables. The low correlations exhibited help to indicate absence of multicollinearity in the data set; to confirm both divergent and convergent validity of variables and prove exogeneity of the independent variables in the regression model. Since low correlations of residual and independent variables implies that independent variables are not related to each other and therefore independent or self-determining.

The study used the following regression equations; the static and dynamic regression equations. The dynamic regression equation was introduced to capture the effect of prior years' debt on current years' debt levels and be able to measure the speed of adjustment of capital structure ratios over time.

Regression Models

$$D_{i,t} = \varphi_{i,t} + \beta X_{i,t} + \gamma Z_{i,t} + d_t + v_i + \varepsilon_{i,t} \quad \text{(1)}$$

$$D_{i,t} = \varphi_{i,t} + \delta D_{i,t-1} + \beta X_{i,t} + \gamma Z_{i,t} + d_t + v_i + \varepsilon_{i,t} \quad \text{(2)}$$

Where;

$\varphi_{i,t}$: Constant term of firm i in year t,

$D_{i,t}$: The capital structure {GEAR} of firm i in year t,

$D_{i,t-1}$: A lagged capital structure {L.GEAR} variable

$X_{i,t}$: Diversification variables {DIVE}, decomposed into; (related diversification

{$RDIVE_{it}$}, unrelated diversification {$UDIVE_{i,t}$}, or total diversification {$TDIVE_{i,t}$})

$Z_{i,t}$: Conventional variables ($TANG_{i,t}$, $SIZE_{i,t}$, $PROF_{i,t}$, $GROP_{i,t}$, $GOCO_{i,t}$ $RISK_{i,t}$, $NDTS_{i,t,}$)

β : A vector of constants for all diversification strategies

γ: A vector of constants for conventional variables

δ: A constant for lagged dependent variable

d_t: Time-effect dummies

v_i: Firm-effect dummies

$\varepsilon_{i,t}$: The error term for unobserved heterogeneity conditions

Model (1) is a static regression model while Model (2) is a dynamic regression model.

3.8.4 Regressions Assumptions and Diagnostics

The basic regression equation takes into account the Ordinary Least Square (OLS) regression assumptions. In order to achieve the analysis objectives, the necessary assumptions that need to be met and/or controlled for our data to qualify for the analysis were reviewed and tested. OLS consists of the following five major assumptions (Green, 2008:11-19; Park, 2011:7).

(a) Linearity: the assumption that the dependent variable is formulated as a linear function of a set of independent variable and the error (disturbance) term.

(b) Exogeneity the assumption that the expected value of disturbances is zero or disturbances are not correlated with any regressors.

(c) Disturbances (i) have the same variance (homoscedasticity) and (ii) are not related with one another (non-autocorrelation)

(d) The observations on the independent variable are not stochastic but fixed in repeated samples without measurement errors.

(e) Full rank assumption says that there is no exact linear relationship among independent variables (no multicollinearity).

If individual effects u_i are not zero in panel data, heterogeneity (individual specific characteristics like company and time specific effects, such as company policies and size effects that are not captured in regressors) may influence assumption (b) and (c). In particular, disturbances may not have same variance but vary across individuals (*heteroscedasticity*, violation of assumption (c)(i) and/or are related with each other (*autocorrelation*, violation of assumption (c)(ii) This is an issue of *non-spherical* variance-covariance matrix of disturbances. The violation of assumption (b) renders random effect estimators biased. Hence, the OLS estimator is no longer best linear unbiased estimator (BLUE). Then panel data models provide a way to deal with these problems (Park, 2011). Such ways are the different regression strategies that depend on the characteristics exhibited by the panel data or sample under analysis. Thus, regression diagnostics were run to help control for violations of these regression assumptions.

3.8.4.1 Linearity and Normality

To achieve best linear unbiased estimators (BLUE) first diagnostic tests are run to assess if the data meet those OLS regression assumptions. The analysis of residuals is normally very useful in this regard. To test for linearity, the STATA 12 command *acprplot* (augmented component-plus-residual plot) was employed which provides a graphical way to examine the relationship between variables. It does provide a good

testing for linearity. This command was run after running a regression as recommended in (Torres-Reyna, 2007). The STATA command option *lowess* (locally weighted scatter plot smoothing) draws the observed residual pattern in the data to help identify nonlinearities (Torres-Reyna, 2007). Refer to Appendix V. All of the variables were linear as expected. The three graphs in (Appendix VI) indicate that the data used in the present study were normally distributed.

3.8.4.2 Exogeneity

The data indicated presence of endogeneity problems (refer to Appendix VII), as indicated in the residual plots. These are company and time specific effects that are correlated with regressors, these problems were fixed by running particularly dynamic regression models i.e. the general methods of moments (GMM). La Rocca et al (2009), argue that the use of the GMM technique to control for the endogeneity problem, the importance of which has been demonstrated by extensive literature. Some robustness checks were applied as in their study.

3.8.4.3 Homoscedasticity and Non-autocorrelation

If the model data is heteroscedastic, it is possible to have the wrong estimates of the standard errors for the coefficients and their t-values. Thus, it was important to test for presence or absence of heteroscedasticity. The following test was done. Breusch-Pagan test which indicated the presence of heteroscedasticity. Breusch-Pagan test for heteroscedasticity was: - Ho: Constant variance; Variables: fitted values of TGEAR; chi2 (1) = 12.81, Prob.> chi2 = 0.0003. Based on the test of homoscedasticity, the null hypothesis (variances are not constant) was rejected. Thus the data was not homoscedastic. That is, the Breush-Pagan test suggested the possible presence of

heteroscedasticity in the data.

The Wooldridge test for serial autocorrelation indicated the presence of autocorrelations: Wooldridge test for autocorrelation in panel data; Ho: no first-order autocorrelation F (1, 10) = 25.489 Prob.> F = 0.0005. First order autocorrelation on the other hand may be a problem. Second order autocorrelation is considered a problem in macro panels with long time series over 20-30 years. This study's data has only a maximum range of 17 years, thus the later problem was not an issue in the panel (Torres-Reyna, 2007). Advanced techniques to control for these two problems were applied. These are the least square dummy variable one (LSDV1) with clustered standard errors (CSE) and Prais-Winsten adjusted clustered standard errors (PCSE) fixed effects regression techniques and the General Method of Moments (GMM) regression techniques.

3.8.4.4 Non-stochastic Independent Variable

The observations on the independent variable are not stochastic but fixed in repeated samples without measurement errors. This was ensured during data preparation and cleaning process and by developing reliable and valid measurements.

3.8.4.5 Full Rank or Lack of Multicollinearity

An important assumption for the multiple regression models is that independent variables are *not perfectly multicollinear*. One regressor should not be a linear function of another. When multicollinearity is present *standard errors may be inflated*. The test of multicollinearity indicated some high values for some variables. These were total and related product diversification variables which had VIFs of

16.56 and 19.46. But these are readily justifiable because RDIVE and TDIVE are related in their construction, since RDIVE is derived from TDIVE and both share most data in their construction so they were having multicollinearity problems. Other variables satisfied the assumption. The mean VIF is within the threshold of 5 (Table 3.1) (Torres-Reyna, 2007).

Table 3.1 Variance inflation factors

Variable	VIF	1/VIF
RDIVE	19.54	0.051165
TDIVE	16.57	0.060335
UDIVE	2.86	0.350073
PROF	2.01	0.498745
SIZE	1.60	0.625107
TANG	1.42	0.704517
GOCO	1.32	0.756417
NDTS	1.21	0.825521
GROP	1.09	0.917389
RISK	1.09	0.919984
Mean VIF	4.87	

Source: Data analysis (2016).

3.8.5 Panel Data Modelling Strategy

The study adopted the following regression procedures as proposed by Park (2011), which ensures a selection of a regression strategy that fits well the data. If individual effect u_i (cross-sectional or time specific effect) does not exist ($u_i = 0$), ordinary least squares (OLS) is considered to have both efficient and consistent parameter estimates. But if fixed effects exist then the fixed effects model is chosen, but if random effects exist then the random effect model is selected (Table 3.2). But if both fixed and random effects exist then the Hausman test is used to make a choice between the models. This ensured that bias in the estimations were controlled and taken care off.

In the analysis the tests (see the proceeding sections) indicated that the fixed effects models were the best models for the analysis. The analysis was done through all the process and indicated all the steps which were involved in the analysis.

Table 3.2 Panel data modelling

Fixed effect (F test)	Random effect (B-P LM test)	Selection
H0 is not rejected (No fixed effect)	H0 is not rejected (No fixed effect)	Pooled OLS
H0 is rejected (fixed effects)	H0 is not rejected (No random effect)	Fixed effect model
H0 is not rejected (No fixed effect)	H0 is rejected (random effect)	Random effect model
H0 is rejected (fixed effect)	H0 is rejected (random effect)	Choose a fixed effect model if the null hypothesis of a Hausman test is rejected; otherwise, fit a random effect model.

Source: Park (2011).

The analysis was based on a comparison of models' specifications and performance to meet the assumptions of regression modelling. It conducted two tests; the F-test to test for individual effect u_i (cross-sectional (in our case company specific effects)) or time specific effect) to verify if they do not exist (u_i =0). That is, the null hypothesis H_0 : both firm specific and time fixed effects are zero. The test result was (F (10, 101)) = 12.87 and Prob.> F = 0.0000), the null was rejected, thus there were both firm specific (companies) and time (Years) fixed effects. The Breusch-Pagan Lagrange multiplier (LM) test was conducted to examines if any random effects existed (*var(u)=0*). The null hypothesis H_0: variance across entities was zero. The Breusch-Pagan Lagrangian Multiplier test result was (Chi2(1) =0.00 and Prob.>1.0000). The null hypothesis: no random effects; was not rejected. Thus there

were no random effects. Thus based on this diagnostic, the fixed effect model was selected over the random effect model.

Earlier studies (Kremp et al. 1999; Ozkan 2001; LaRocca et al, 2009; Apostu, 2010) have laid emphasis on the dynamic adjustment process involved in capital structures of companies and the adjustment process involved in attaining to a target debt-to-equity ratio that has to be considered when analysing capital structure determinants of companies (Apostu, 2010). In this analysis as suggested by La Rocca et al (2009) the dynamic analysis of the model was incorporated to capture effects of prior years' debts on proceeding years' debts. Since it has been evidenced that companies present years' debt ratios are influenced by prior years' debt ratios, it was more realistic to check the contribution of such lagged debt ratio values on proceeding years' debt ratios.

The dynamic model was estimated using five different techniques: Fixed effects model estimated by the Least Squares Dummy Variable (LSDV1), Fixed effects model estimated by the Least Squares Dummy Variable (LSDV1) with clustered standard errors (CSE), Prais-Winsten regression with Panel Correlated Clustered Standard Errors (PCSE) approach and the Generalized Method of Moments (GMM) approaches using the Arellano-Bond (1991) dynamic panel-data estimation as used by La Rocca et al (2009) and Apostu (2010).

The GMM estimators are considered to be robust because: (1) they eliminate the companies' non-observable individual specific effects given the estimate in first differences, (2) they control for the possible endogeneity as the lagged values of the

endogenous explanatory variables are used as instruments, and (3) they eliminate the problem of correlation between the lags of the dependent variable and the error term. The validity of the instruments was tested using Sargan's statistic that tests for over identifying restrictions. This helped to satisfy assumption (b) which control for endogeneity problems and ensure consistent, reliable and unbiased results. La Rocca et al particularly insists that the panel-data methodology and estimation by the Generalized Method of Moments (GMM) together for studies of the dynamic nature of capital-structure decisions at the firm level help to eliminate unobservable heterogeneity and controlling for the endogeneity problem.

CHAPTER FOUR

4.0 PRESENTATION OF FINDINGS

4.1 Overview

This chapter presents the research findings based on the four objectives presented in the introduction. From objective one; the study assessed the level of variability of companies' capital structure. From objective two; it assessed level of variability of companies' product diversification while, from objective three; it assessed the effects of the conventional capital structure determinants on capital structure. Finally, from objective four; it assessed the effects of product diversification on capital structure.

To address objectives one and two, descriptive and univariate analysis statistics were employed. Furthermore, the speed of capital structure adjustments was evaluated through the dynamic regression models. To address objectives three and four both univariate and multivariate analysis were employed to inspect and justify group analysis and assess suitability of treating the different types of capital structure and product diversification separately. Regression techniques were employed to fit our data in quest of finding suitable and efficient regression models that can yield unbiased results.

4.2 Descriptive Analysis

The analysis was based on 128 observations. A panel of a total of 17 years from 1997 to 2014 was constructed. The panel was unbalanced as the availability of a sizable balanced panel was difficult to obtain. It was constructed from a total of 11 companies; 8 local companies and 3 cross-listed companies. These companies were; Precision Air Limited (PAL), Tanga Cement Limited (SIMBA), Swissport Tanzania

Public Limited Company (SWISSPORT), Tanzania Tea Packers Limited (TATEPA), Tanzania Breweries Limited (TBL), Tanzania Cigarette Company (TCC), TOL Limited (formerly Tanzania Oxygen Limited (TOL)) and Tanzania Portland Cement Limited (TWIGA); which are locally listed at the Dar es salaam stock exchange (DSE). Companies that are cross-listed are: African Barrick Gold (X_ACACIA), Kenya Airways (X_KQ) and National Media Group (X_NMG).

The analysis used the following ratios and indices to measure and represent the various factors involved. The dependent variable was TGEAR measured as the ratio of total debt over total asset. Other dependent variables symbols that were used and derived from this TGEAR, were LGEAR i.e. long term debt over total assets and SGEAR i.e. short-term debt over total assets. The independent variables included lagged variables in the dynamic model, viz. are L.TGEAR, L.LGEAR and L.SGEAR i.e. lagged dependent variables for total, long term and short term capital structure ratios respectively. Other independent variables were TDIVE, UDIVE and RDIVE i.e. total, unrelated and related product diversifications indices respectively. These were based on the entropy index discussed at length in section 3.6.2.2 of chapter three. Other independent variables were asset tangibility (TANG), firm size (SIZE), firm profitability (PROF), non-debt tax shields (NDTS), going concern (GOCO), growth opportunity (GROP) and risk of bankruptcy (RISK).

The analysis was based on these ratios and indices and the following were the results are presented in Table 4.1. The mean total capital structure ratio for the sample was 47%, long term capital structure ratio was at a mean of 19% while short term capital structure ratio was 28%. This indicates that companies were employing more of

short terms debts than long term debts, but the companies on average were moderately geared. The analysis mainly used total debts, long term debts and short-term debts because they were more reasonable in distributions.

Unrelated product diversification (UDIVE), related product diversification (RDIVE) and total product diversification (TDIVE) had means that were high i.e. 0.11, 0.45 and 0.52 respectively, indicating on average the companies at DSE were highly diversified into related and unrelated products. The product diversification trend has been increasing over time as depicted in figures (Figures 8.5 to 8.8 of Appendix III).

Table 4.1 Descriptive Analysis

	Count	Mean	Std. Dev	Min	Max	Skewness	Kurtosis
TGEAR	128	0.4690	0.2494	0.1312	1.0884	0.8157	2.4204
LGEAR	128	0.1865	0.1757	0.0000	0.6633	1.0249	2.8929
SGEAR	128	0.2826	0.1484	0.0443	0.8948	1.4372	5.7090
RDIVE	128	0.4580	0.3328	0.0000	1.6321	0.9951	4.1455
UDIVE	128	0.1148	0.2227	0.0000	0.6919	1.8074	4.7005
TDIVE	128	0.5289	0.3076	0.0000	1.6321	0.7505	4.4787
TANG	128	0.5449	0.1657	0.1953	0.8786	0.0472	2.1704
SIZE	128	24.3900	1.6830	20.6496	27.6105	-0.3940	2.3328
PROF	126	0.2884	0.2329	-0.3206	1.0910	0.2380	3.2216
GROP	116	0.1490	0.1979	-0.6870	1.1140	0.6547	9.5163
GOCO	128	39.8750	20.4104	1.0000	84.0000	0.3290	2.3327
RISK	114	-6799.2433	68998.0390	-736113.1875	10875.3662	-10.4964	111.4449
NDTS	123	0.0625	0.0530	0.0064	0.3954	4.3510	23.8608
N	128						

Source: Data analysis (2016).

4.3 Univariate Analysis

The univariate analysis was conducted through parametric test (t-tests). In this analysis observations across levels of diversifications were compared. Especially related product diversification was compared against unrelated product diversification, the latter being grouped as “unrelated” indicating that these are companies that did not follow related product diversification. Related product diversification was isolated from the rest to assess its dimensionality separately.

The results in Table 4.2 indicate that the two groups were significantly different in most of the variables' means. Theoretical arguments predict that unrelated product-diversified firms should be more geared, more profitable, have more growth opportunities, more tangible assets and lower risk (Apostu, 2010).

Table: 4.2 Test Using Parametric Method

	Means for each variable				Test statistics
Variables	Count	Related [means]	Unrelated [means]	Mean [diff.]	T-test [T]
TGEAR	128	0.383607	0.650314	-0.26671	-6.4972***
LGEAR	128	0.142385	0.279958	-0.13757	-4.4266***
SGEAR	128	0.241221	0.370355	-0.12913	-5.0102***
RDIVE	128	0.575717	0.208224	0.36749	6.7843***
UDIVE	128	0.003582	0.350849	-0.34727	-12.004***
TDIVE	128	0.579300	0.421912	0.15739	2.7708**
TANG	128	0.501945	0.635923	-0 .13398	-4.5948***
SIZE	128	24.79804	23.52403	1.27401	4.2568***
PROF	126	0.362085	0.130005	0.23208	5.8598***
GROP	116	0.152251	0.142046	0.01021	0.2577
GOCO	128	39.41379	40.85366	-1.43987	-0.3711
RISK	114	-9472.69	-1006.76	-8465.94	-0.6073
NDTS	123	0.059138	0.070455	-0 .01132	-1.0872
N	128	87	41		

$^{*}p< 0.05$, $^{**}p< 0.01$, $^{***}p< 0.001$

Source: Data analysis (2016).

The results indicated that related product diversified firms are significantly less geared, more related diversified; more profitable and riskier (Table 4.2). However, they are significantly less geared than the not related diversified, the "unrelated group". This analysis helps to have an insight into the structure of related and unrelated diversified groups, which indicated that product diversification type differentiated firms with respect to their capital structure ratio, profitability growth opportunity and bankruptcy risk.

Table 4.3 Two sample t-test for long and short term capital structure ratios

Two-sample t-test with unequal variances						
Variable	Obs.	Mean	Std. Err.	Std. Dev.	[99% Conf. Interval]	
LGEAR	128	0.1864517	0.0155267	0.1756648	0.1458479	0.2270556
SGEAR	128	0.2825846	0.0131176	0.1484092	0.2482807	0.3168885
Combined	256	0.2345181	0.0105803	0.1692851	0.2070596	0.2619767
Diff		-0.0961328	0.0203261		-0.1488937	-0.0433719
Diff = mean(LGEAR) - mean(SGEAR)						t = -4.7295
Ho: diff = 0						Welch's degrees of freedom = 248.998
		Ha: diff < 0		Ha: diff != 0		Ha: diff > 0
		Pr(T < t) = 0.0000		Pr(T > t) = 0.0000		Pr(T > t) = 1.0000

Source: Data analysis (2016).

The variability of capital structure across companies was assessed. It was found that long term capital structure ratio has more variability as compared to short term capital structure ratio with 0.17 and 0.14 standard deviations respectively (Tables 4.1, & 4.3). The level of variability is high for total capital structure ratio (Table 4.2 and Appendix II) indicating a standard deviation of 0.249. But more importantly is the fact that long term capital structure mean (0.18) was significantly lower than the short term capital structure mean (Tables 4.1, & 4.3). These findings help to warrant separate analyses based on the two capital structure ratios that is long term and short term capital structure ratios.

In appendix 8.2, the variability of capital structure ratios by types was depicted, all short term capital structure ratio, long term capital structure ratio and total capital structure ratio have been increasing over time and by companies across respective years. In Table 4.3 it can be concluded that the two types of capital structure ratios; that is long term and short term capital structure ratios means are statistically significantly different from each other, this clear distinction justify a separate analysis of the two types of capital structure ratios.

Table 4.4: Two Sample T-Test for Related and Unrelated Product Diversifications

Two-sample t-test with unequal variances						
Variable	Obs.	Mean	Std. Err.	Std. Dev.	[99% Conf. Interval]	
UDIVE	128	0.1148156	0.019685	0.2227106	0.0633374	0.1662939
RDIVE	128	0.4580047	0.029416	0.3328039	0.381079	0.5349303
Combined	256	0.2864102	0.0206747	0.3307944	0.2327543	0.340066
Diff		-0.3431891	0.0353949		-0.4351462	-0.2512319
Diff = mean(UDIVE) - mean(RDIVE)						t = -9.6960
Ho: diff = 0						Welch's degrees of freedom = 223.238
		Ha: diff < 0		Ha: diff != 0		Ha: diff > 0
		Pr(T < t) = 0.0000		Pr(T > t) = 0.0000		Pr(T > t) = 1.0000

Source: Data analysis (2016).

The variability of product diversification across companies was assessed. It was found that related product diversification (RDIVE) has more variability compared to unrelated product diversification with 0.33 and 0.22 standard deviations respectively (Table 4.4). Based on the t-test in Table 4.4 results, unrelated product diversification mean (0.11) was significantly lower compared to related product diversification mean (0.45). This finding help to warrant a separate analysis based on whether firms are following related or unrelated product diversification. The level of variability is high for total product diversification (Table 4.1 and Appendix III) indicating a standard deviation of 0.307.

In Appendix III, the variability of product diversification by types is depicted; all related product diversification, unrelated product diversification and total product diversification have been episodically increasing over time and by companies across respective years. In table 4.4 it was shown statistically that the two types of product diversifications, that is unrelated product diversification and related product diversification were statistically and significantly different from each other's for the

companies under study, thus warranting a separate treatment in the analysis.

4.4 Correlation Analysis

The correlation analysis indicates that all types of capital structure ratios are positively related to unrelated diversification and negatively related to related product diversification as expected in the hypotheses and model. The results were significant for unrelated and related product diversification. Total product diversification is positively related to all three types of capital structure ratios but the results were not statistically significant (Table 4.5).

Tangibility (TANG) is significantly and positively related to capital structure ratio as expected in the postulated hypothesis. Profitability (PROF) is also significantly and negatively related to capital structure ratio as expected. Size of the firm (SIZE) in this case is consistently negatively related to all capital structure ratios, but only significantly related with total capital structure and, short term capital structure ratios. Age of the company (GOCO) is negatively related to total (TGEAR) and long term (LGEAR) capital structure ratio but only significantly related with LGEAR, and significantly positively related to short term capital structure ratio (SGEAR). Growth opportunity (GROP) is insignificantly positively related to TGEAR, and LGEAR and insignificantly negatively related to SGEAR.

Table 4.5: Correlations Analysis

	TGEAR	LGEAR	SGEAR	RDIVE	UDIVE	TDIVE	TANG	SIZE	PROF	GROP	GOCO	RISK	NDTS
TGEAR	1												
LGEAR	0.811***	1											
SGEAR	0.721***	0.179*	1										
RDIVE	-0.225*	-0.184*	-0.160	1									
UDIVE	0.525***	0.534***	0.250**	-0.377***	1								
TDIVE	0.00869	0.00914	0.00378	0.910***	-0.0374	1							
TANG	0.484***	0.437***	0.296***	-0.327***	0.322***	-0.180*	1						
SIZE	-0.203*	-0.141	-0.174*	0.0212	-0.152	-0.0819	-0.0570	1					
PROF	-0.596***	-0.570***	-0.328***	0.297***	-0.479***	0.112	-0.397***	0.429***	1				
GROP	0.0266	0.0997	-0.0739	-0.0483	-0.0597	-0.0885	-0.0217	0.115	0.213*	1			
GOCO	-0.0983	-0.376***	0.280**	-0.0862	-0.0344	-0.0702	0.154	0.401***	0.229**	-0.0316	1		
RISK	0.0896	0.0254	0.120	-0.0948	0.0435	-0.0821	-0.00462	0.219*	0.0783	0.0739	0.167	1	
NDTS	0.138	-0.0597	0.295***	0.160	0.0287	0.204*	0.0569	-0.156	0.130	-0.0283	0.0610	0.0107	1
N	128												

*p< 0.05, **p< 0.01, ***p< 0.001

Source: Data analysis (2016).

4.5 Multivariate Analysis

4.5.1 Static Regression Analysis

Since the data exhibited presence of fixed effects, the regression analysis started by considering the fixed effect model (FEM) which employs least square dummy variable one approach (LSDV1), its name underscores its methods, in that it uses dummy variables and drops one first dummy variable in its calculations. It provides a good way to understand fixed effects (Park, 2011). The effects of the dependent variable were mediated by the differences across companies. By adding the dummy for each company, it was possible to estimate the pure effects of independent variables by controlling for the unobservable heterogeneity. Each dummy is absorbing the effects particular to each company. In Table 4.6 Model (1) accounts only for the time (year-specific) effects, model (2) accounts for the company (firm-specific) effects and model (3) accounts for both.

The perfomance of the models improved from an r^2 of 0.618, 0.806 to 0.868 as one progressively controlled for fixed effects. Thus, model (3) fitted the data more efficiently than the previous two models. The residual sum of squares errors (rmse) did as well decline progressively from 0.177, 0.122 to 0.111, because the more this ratio approaches to zero the better. The F statistic did as well improve after controlling for fixed effects, both indicating more significance of the models as one moves towards the third model. The variables' significance and directions in the three models did not differ very much.

Most of the company dummies (_ICompanyID_2 to _ICompanyID_11) in model 2 were statistically significant indicating a better fit unlike in model 1 where the year

dummies (_ITimeYear_1998 to _ITimeYear_2014) were not statistically significant (Table 4.6). Normally when dummies are statistically significant it implies that they are effectively absorbing the fixed effects.

Table 4.6 FEM Regressions Using LSDV1

	(1) LSDV1_t		(2) LSDV1_c		(3) LSDV1_b	
RDIVE	-0.4827	(0.2323)	-0.2854	(0.1681)	-0.3230	(0.1577)
UDIVE	0.0908	(0.1429)	0.0279	(0.1384)	0.0228	(0.1331)
TDIVE	0.4961	(0.2334)	0.4476*	(0.1688)	0.4720*	(0.1682)
TANG	0.1458	(0.1278)	0.1310	(0.1495)	0.0355	(0.1601)
SIZE	0.1505	(0.0136)	-0.1800	(0.0721)	-0.5459	(0.0742)
PROF	-0.4533***	(0.1097)	-0.3479***	(0.0963)	-0.1700	(0.1083)
GROP	0.1625*	(0.0968)	0.0947	(0.0731)	0.0949	(0.0758)
GOCO	-0.1367	(0.0010)	0.2505	(0.0098)	-9.9548	(0.1249)
RISK	0.1145	(0.0000)	-0.0330	(0.0000)	-0.0194	(0.0000)
NDTS	0.2589**	(0.3903)	0.0985	(0.2466)	0.1613**	(0.2552)
_ITimeYear_1998	-0.0264	(0.2196)			-0.1234	(0.1876)
_ITimeYear_1999	0.0000	(.)			0.0000	(.)
_ITimeYear_2000	0.0205	(0.2508)			0.0552	(0.2010)
_ITimeYear_2001	-0.2934	(0.2053)			-0.1543	(0.2827)
_ITimeYear_2002	-0.3179	(0.2087)			-0.0143	(0.3997)
_ITimeYear_2003	-0.2510	(0.2070)			0.1480	(0.5178)
_ITimeYear_2004	-0.2899	(0.2105)			0.1664	(0.6391)
_ITimeYear_2005	-0.2768	(0.2027)			0.3249	(0.7583)
_ITimeYear_2006	-0.3001	(0.2034)			0.4977	(0.8829)
_ITimeYear_2007	-0.3493	(0.2005)			0.6820	(1.0050)
_ITimeYear_2008	-0.3037	(0.1994)			0.9208	(1.1291)
_ITimeYear_2009	-0.3392	(0.1965)			1.1336	(1.2510)
_ITimeYear_2010	-0.3171	(0.1964)			1.3107	(1.3749)
_ITimeYear_2011	-0.3750	(0.1969)			1.5280	(1.5007)
_ITimeYear_2012	-0.3476	(0.1955)			1.7031	(1.6235)
_ITimeYear_2013	-0.3889	(0.1943)			1.8472	(1.7590)
_ITimeYear_2014	-0.2467	(0.2012)			1.7400	(1.8742)
_ICompanyID_2			-0.5607***	(0.1005)	1.1710	(1.3840)
_ICompanyID_3			-0.3961*	(0.1748)	0.1637	(0.7766)
_ICompanyID_4			-0.3800*	(0.1441)	-0.3426	(0.1972)
_ICompanyID_5			-0.6488	(0.4744)	9.6751	(7.6103)
_ICompanyID_6			-0.7682*	(0.2772)	4.2160	(3.7557)
_ICompanyID_7			-0.7117	(0.5647)	6.5427	(5.1496)
_ICompanyID_8			-0.6160**	(0.2076)	2.8314	(3.1198)
_ICompanyID_9			-0.6198***	(0.2139)	-2.5244	(2.2386)
_ICompanyID_10			-0.3109	(0.1564)	1.5159	(1.7583)
_ICompanyID_11			-0.4602	(0.4612)	2.7106	(4.0246)
N	112		112		112	
r2	0.618		0.806		0.868	
r2_a	0.501		0.764		0.804	
rmse	0.177		0.122		0.111	
mss	4.299		5.612		6.042	
rss	2.662		1.350		0.920	
F	5.279		18.92		13.69	

Standardized beta coefficients; Standard errors in parentheses
*p< 0.05, **p< 0.01, ***p< 0.001

Source: Data analysis (2016).

Since the results are sensitive to the way of computing robust standard errors, two different methods were used: clustered standard errors (CSE) by firm and panel corrected standard errors (PCSE) after applying the Prais-Winsten transformation for autocorrelation. The Prais-Winsten regression with PCSE accounts for both time and individual fixed effects in the observations as well as for heteroscedasticity, autocorrelation and contemporaneous correlation in the error term (Apostu, 2010).

Table 4.7: CSE and PSCE LSDV1 FEM Compared

	(1) LSDV1_b		(2) CSE		(3) PCSE	
RDIVE	-0.3230	(0.1577)	-0.3230*	(0.0798)	-0.2450*	(0.0717)
UDIVE	0.0228	(0.1331)	0.0228	(0.2879)	0.0599	(0.0861)
TDIVE	0.4720*	(0.1682)	0.4720*	(0.1440)	0.4023***	(0.0735)
TANG	0.0355	(0.1601)	0.0355	(0.1958)	0.0693	(0.0692)
SIZE	-0.5459	(0.0742)	-0.5459	(0.1364)	-0.5075	(0.0429)
PROF	-0.1700	(0.1083)	-0.1700**	(0.0546)	-0.2483***	(0.0623)
GROP	0.0949	(0.0758)	0.0949*	(0.0415)	0.0960***	(0.0350)
GOCO	-9.9548	(0.1249)	-9.9548*	(0.0408)	-7.4895*	(0.0436)
RISK	-0.0194	(0.0000)	-0.0194	(0.0000)	-0.0307	(0.0000)
NDTS	0.1613**	(0.2552)	0.1613*	(0.2663)	0.1062*	(0.2055)
N	112		112		112	
r2	0.868		0.868		0.825	
r2_a	0.804		0.804			
Rmse	0.111		0.111		0.0957	
Mss	6.042		6.042		3.235	
Rss	0.920		0.920		0.686	
F	13.69		.			

Standardized beta coefficients; *$p< 0.05$, **$p< 0.01$, ***$p< 0.001$ Standard errors in parentheses
Source: Data analysis (2016).

The Wooldridge test for autocorrelation indicated the presence of autocorrelations; Ho: no first-order autocorrelation F (1, 10) = 25.489 Prob.> F = 0.0005. Also the Breusch-Pagan / Cook-Weisberg test indicate the presence of heteroscedasticity. Breusch-Pagan / Cook-Weisberg test for heteroscedasticity; Ho: Constant variance; Variables: fitted values of TGEAR; chi2 (1) =12.81, Prob.> chi2 = 0.0003. After applying the CSE and PCSE treatments the fixed effect regression analysis improved a lot. More variables became significant, thus increasing the statistical evidence for

the variables and it was possible to eliminate biases that emanate from autocorrelation and heteroscedasticity, thus assumptions 3a-b in subsection 3.8.4 were satisfied.

4.5.2 Dynamic Regression Analysis

In table 4.8 the previous static fixed effects models (that used LSDV1, CSE and PCSE strategies) were compared to the dynamic fixed effects models with as well their respective robust option and find that the dynamic models have more explanatory power as compared to the static ones, for instance the r^2 changed from 0.868 to 0.937 and 0.943 for the dynamic LSDV1 (model 2) and dynamic Prais-Winsten PCSE (model 6) which is more than almost a 10% increase. The residuals sum of squares (rss) as well decreased from 0.920 to 0.442, while the F statistic increased from 13.69 to 29.50, the model sum of square (mss) have as well increased from 6.042 to 6.519 and the root mean squared error (rmse) has declined from 0.111 to 0.0773, because the more this statistic approaches to zero the better the model fit (Torres-Reyna, 2007). Such improvements in the model indicated that prior years' debt decisions have consequential effects to the proceeding years' debt.

Tests for joint significance of the variables were run for the fixed effects dynamic model. The F tests for the joint significance of company dummies, time dummies, combined company and time dummies and independent variables under the null hypotheses of no joint relationships were: for company dummies was statistically significant F(10, 74) = 3.90 with Prob.>F = 0.0003, F test for time dummies was not statistically significant = F(16, 74) = 1.65 with Prob.>F = 0.0768, F test for both company and time dummies was statistically significant F(26, 74) = 2.69 with

Prob.>F = 0.0005, and F test for the joint significant of the independent variables was statistically significant F(11, 74) = 10.57 with Prob.> F = 0.0000. The F tests for company dummies, both company & time dummies and independent variables indicated that coefficients and dummies were jointly significant thus they were playing a statically significant role in absorbing fixed effects and explaining the dependent variable.

Table 4.8 Dynamic and static fixed effect (FEM) models

	(1) LSDV 1_b	(2) dLSDV 1_b	(3) CSE	(4) dCSE	(5) PCSE	(6) dPCSE	(7) GMM
L.TGEAR		0.6424***		0.6424***		0.6631***	0.6771***
		(0.0738)		(0.0912)		(0.0632)	(0.0588)
RDIVE	-0.3230	-0.1587	-0.3230*	-0.1587	-0.2450*	-0.1588	-0.1506*
	(0.1577)	(0.1109)	(0.0798)	(0.0540)	(0.0717)	(0.0682)	(0.0463)
UDIVE	0.0228	0.1226	0.0228	0.1226	0.0599	0.1282**	0.1246***
	(0.1331)	(0.0938)	(0.2879)	(0.0812)	(0.0861)	(0.0574)	(0.0344)
TDIVE	0.4720*	0.3215*	0.4720*	0.3215*	0.4023***	0.3165***	0.2553***
	(0.1682)	(0.1182)	(0.1440)	(0.0809)	(0.0735)	(0.0723)	(0.0311)
TANG	0.0355	0.0678	0.0355	0.0678	0.0693	0.0581	0.0806
	(0.1601)	(0.1119)	(0.1958)	(0.1487)	(0.0692)	(0.0638)	(0.0945)
SIZE	-0.5459	-0.8429*	-0.5459	-0.8429	-0.5075	-0.827***	-0.6151*
	(0.0742)	(0.0520)	(0.1364)	(0.0782)	(0.0429)	(0.0350)	(0.0398)
PROF	-0.1700	-0.3471***	-0.170**	-0.3471*	-0.248***	-0.338***	-0.3833**
	(0.1083)	(0.0784)	(0.0546)	(0.1284)	(0.0623)	(0.0664)	(0.1459)
GROP	0.0949	0.1489***	0.0949*	0.1489**	0.0960***	0.1496***	0.1634***
	(0.0758)	(0.0534)	(0.0415)	(0.0534)	(0.0350)	(0.0356)	(0.0387)
GOCO	-9.9548	-3.3308	-9.9548*	-3.3308	-7.4895*	-3.3381	0.8520*
	(0.1249)	(0.0877)	(0.0408)	(0.0287)	(0.0436)	(0.0287)	(0.0045)
RISK	-0.0194	-0.0129	-0.0194	-0.0129	-0.0307	-0.0088	-0.0086
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
NDTS	0.1613**	0.1533***	0.1613*	0.1533***	0.1062*	0.1556***	0.0974***
	(0.2552)	(0.1782)	(0.2663)	(0.1223)	(0.2055)	(0.1516)	(0.1117)
N	112	112	112	112	112	112	100
r2	0.868	0.937	0.868	0.937	0.825	0.943	
r2_a	0.804	0.905	0.804	0.905			
rmse	0.111	0.0773	0.111	0.0773	0.0957	0.0773	
mss	6.042	6.519	6.042	6.519	3.235	7.375	
rss	0.920	0.442	0.920	0.442	0.686	0.443	1.098
F	13.69	29.50	.	.			
chi2					110621.8	962815.3	251985.6

Standardized beta coefficients $^{*}p< 0.05$, $^{**}p< 0.01$, $^{***}p< 0.001$; Standard errors in parentheses

Source: Data analysis (2016).

Specification diagnostics for the GMM model was done. The Sargan test of over-identifying restrictions: H_0 over-identifying restrictions are valid, for Arellano-Bond

1991 GMM methods, was chi2 (89) = 95.91445 with Prob. > chi2 = 0.2894. The Arellano-Bond test: H_0 zero autocorrelation in first-differenced errors for first order autocorrelation was ar(1) z = -3.6609 with Prob. > z = 0.0003 and second order autocorrelation was ar(2) z = -1.7217 with Prob. > z = 0.0851. Thus the data had only first order serial correlation which was controlled for through the use of GMM model.

Thus, the dynamic fixed effect models could explain and fit the data much better and more efficiently than the static fixed effect models. The robust option in models (CSE and PCSE) was maintained which controlled for any heteroscedasticity and first order autocorrelation (ar(1)).The results improved in terms of level of significance. Additionally, the GMM model was run which control for exogeneity to satisfy assumption (b).

The dynamic regression analysis has another important advantage; it can depict the speed of capital structure ratio adjustment. Appendix VIII, explains the direction of the sign of the target-adjustment model in order to better interpret the resulting coefficients of the regressions. If the coefficient (1 - α) is close to 1, the adjustment process is slow; if it is close to 0, then adjustment occurs rapidly (LaRocca et al, 2009). The lagged total debt variable coefficient (L.TGEAR) was 0.6424 and significant at 0.001, for models 2 and 4, indicating that for a 1 unit increase in prior year's capital structure ratio there is a 0.6424 increase on proceeding years' capital structure ratio. Models 6, 7 and 8 had 0.6631, 0.6771 and 0.6465 lagged coefficients respectively. According to Moyo et al (2013) this indicates that firms have target leverages towards which they adjust over time.

Based on the procedure suggested by La Rocca et al, (2009) and Apostu (2010) (Appendix VIII) for extracting the alpha (α) which measures the speed of adjustment or transaction costs of debt, it was found to be 0.3576 (i.e. 1- α = lagged debt coefficient) thus 1-lagged debt coefficient= alpha (α) (i.e. 1-0.6424 = 0.3576). Thus based on this finding by considering the lowest and the highest alpha values in the models, alpha is in the range 0.3229-3576, below 0.5 and is approaching 0, it is evident that companies at DSE do not adjust their total debt automatically, debt also seems to stay at their precious years' values, there are high transaction costs associated with increasing total debt, the costs associated with being in disequilibrium are low and thus companies slowly adjust their total debts.

The findings indicated that total product diversification (TDIVE) was positively related to total capital structure ratio and was significant at 0.001 in the PCSE, dPCSE and GMM models. This is consistent with theory as when the two types of product diversification are combined uncorrelated cash flows reduce business risk and thereby attract lenders. Thus, a positive relationship is justifiable. Unrelated product diversification (UDIVE) was positively related to total capital structure ratio, but became significant in the dPCSE and GMM models. For the related product diversification (RDIVE) the relationship was consistently negative, but significant in some models (3, 5 &7) only.

The directions of relationships for UDIVE, RDIVE and TDIVE are all consistent with co-insurance hypothesis and transaction costs theory. The rest of the conventional variables were the same as in the static model, but some of the coefficients became significant or more so in the dynamic model (TDIVE, UDIVE,

SIZE, PROF, NDTS, and GROP) offering support to the previous analysis and theoretical postulations. The levels of significance have improved as one move toward more sophisticated models which are dynamic i.e. dLSDV1, dCSE, dPCSE and GMM. For tangibility (TANG), the findings indicated a positive but insignificant relation to total capital structure ratio. The direction of the variable is consistent with transaction cost theory, because presence of tangible assets such as plants, property and equipment make a company a good candidate for debt. Thus, more tangibility would increase debt qualification and consequently more debt financing.

Size of the firm (SIZE) was found to be negatively related to capital structure ratio in the models. Size as a variable has mixed results, a positive sign supports the position that large firms easily qualify for debt because of large assets that can cover debt obligations during bankruptcy, and on the other hand a negative relationship can be supported based on the idea that large firms may opt not to borrow due to stable profitability ensuring internal financing. Thus, it seems instead of resorting exclusively to debt for financing, firms at DSE are more using internal financing and equity as compared to debt. This is evidenced by low capital structure ratio (47%) against equity (53%), please refer to Table 4.1.

Profitability (PROF) was found to be negatively related to total capital structure ratio at 0.001 levels of significance in most models. Theoretically there are two possibilities: - firstly, if past profitability is considered a good proxy for future profitability then profitability would be positively related to capital structure ratio. But if, on the other hand firms are capable of generating sufficient profits firms may

resort to internal financing against debt, profitability would be negatively related to capital structure ratios. This later position seems to be the case in this study's sample. Thus, a one-unit increase in profitability would results in a 0.078 unit decrease in capital structure ratio. This is evidenced by the high mean profitability of 28.84%, with a minimum of -32.06% and maximum of 109.10% in Table 4.1, evidencing availability of high profits that can be used internally to finance the companies.

Non-debt tax shield (NDTS) was found to be positively related to total capital structure ratio. The result was significant at 0.001 levels in most models. If firms are capable of gaining from non-debt tax shields, they may shy away from debt. Firms that are capable of decreasing taxes by means other than interest deductions such as depreciation will employ less debt in their financing structures. Thus, one would expect a negative relationship. The findings however indicate that firms are not capable of decreasing taxes by other means (such as depreciation) than interest deductions. The positive relationship helps to highlight this fact, in Table 4.1 the non-debt tax shield (calculated as total depreciation and amortization over total assets) was very low at a mean of 0.06, such a low amount of non-debt tax shield could not guarantee a large enough reduction of taxes by means of depreciation and amortization.

Going concern (GOCO) was found to be negatively related to total capital structure ratio, but it was not significant in most models. However, it became significant in some models. Theoretically age accounts for company reputation, however the kind of reputation contained in the age of the company will depend on other factors as

well. Some companies such as TOL are very old but are loss making companies, that would be a bad reputation, while other companies such as TBL are old and profit making. The mean age in our sample (Table 4.1) was 39 years, indicating the dominance of moderately experienced companies. However, a negative relationship between age and total capital structure ratio can be due to information asymmetry, DSE being a market in a less developed economy would imply a high degree of information asymmetry in the market.

Growth opportunity (GROP) was found to be positively related to total capital structure ratio, the variable was statistically significant in most models. The companies in our sample have a mean of 14.9% growth opportunity, which is high, indicating that our sample is made of high growth opportunity firms. Such firms are characterised by high needs of funds. Risk of bankruptcy (RISK) was found to be negatively related to total capital structure ratio, but the result was not statistically significant. Theoretically a negative relationship is expected.

4.5.3 Total, Long-term and Short-term Debt Ratios Regressions Analysis

In this section, different types of capital structure ratios were regressed separately. The analysis used the dynamic Prais-Winsten regression with PCSE approach. This approach yielded better performance compared to other models. It was used to compare effects of capital structure determinants on total debt ratios, long-term debt ratios and short-term debt ratios. The sample in Table 4.3 indicated that short-term debts were significantly (at 0.001) different from long term debt in the univariate analysis. Also all total, long term and short terms debt ratios were statistically different for related and unrelated firms.

The result in the regression analysis (Table 4.9) indicates that long-term debt ratio had a better model fit performance followed by total gear and short-term gear models (rmse: 0.0604, 0.0773 and 0.0883 respectively). But, also total debt gearing had more explanatory power than long-term debt model and short term debt model (r2: 0.94, 0.92 and 0.78) respectively (Table 4.9). All of the three models have lagged capital structure ratios that were significant at 0. 001. This offers support to the previous analysis, which indicated that prior years' capital structure ratios have effects on the proceeding years' ratios. However, long term debt seems to have a relatively high adjustment speed α=0.4926 (1-0.5049) compared to short term debt ratio α=0.3369 (1-0.6631), but when compared to a 0.5 benchmark both ratios generally indicate that firms are slowly adjusting their target ratios.

Table 4.9 Comparative debt types dynamic FEM using PCSE

	(1) TotalD		(2) longD		(3) shortD	
L.TGEAR	0.6631***	(0.0632)				
L.LGEAR			0.5049***	(0.1002)		
L.SGEAR					0.6032***	(0.0934)
RDIVE	-0.1588	(0.0682)	-0.0506	(0.0922)	-0.2102	(0.0723)
UDIVE	0.1282**	(0.0574)	0.0270	(0.0759)	0.1612	(0.0680)
TDIVE	0.3165***	(0.0723)	0.1014	(0.1030)	0.3977*	(0.0753)
TANG	0.0581	(0.0638)	0.0502	(0.0631)	0.0467	(0.0686)
SIZE	-0.8273***	(0.0350)	-0.0601	(0.0395)	-1.0661*	(0.0409)
PROF	-0.3384***	(0.0664)	-0.0856	(0.0588)	-0.4540***	(0.0788)
GROP	0.1496***	(0.0356)	0.1232**	(0.0349)	0.0840	(0.0429)
GOCO	-3.3381	(0.0287)	5.0122	(0.0233)	-13.7743**	(0.0390)
RISK	-0.0088	(0.0000)	-0.0089	(0.0000)	-0.0166	(0.0000)
NDTS	0.1556***	(0.1516)	-0.0621	(0.1597)	0.3328***	(0.2081)
N	112		112		112	
r2	0.943		0.922		0.783	
rmse	0.0773		0.0604		0.0882	
mss	7.375		3.213		2.073	
rss	0.443		0.270		0.576	

Standardized beta coefficients; Standard errors in parentheses
*p< 0.05, **p< 0.01, ***p< 0.001
Source: Data analysis (2016).

This indicates that companies tend to adjust long-term capital structure ratio and short-term capital structure ratio less automatically. It also implies that there are

relatively low transaction (adjustment) costs in using long-term debt than in using short-term debt. It also implies that the cost of being in disequilibrium for long-term debts is comparatively high as compared to short term debt. Thus, companies at DSE relatively quickly adjust their long-term debt and slowly adjust their short-term debt (Table 4.9 & Appendix VIII). This is as well supported by the high standard deviation for long term capital structure ratio (0.175) compared to that of short-term capital structure ratio (0.148) (Table 4.1) (Appendix II).

Except for NDTS in the long term capital structure ratio (model 2 (longD)), the rest of the variables in the long term and short-term capital structure ratios corroborated the relationships depicted by the total gearing model. Most of the variables in the long term gearing model were not significant, but some of the significant variables in the total gearing model were also significant in the short term gearing model.

4.5.4 Groups Regression Analysis

In this section, dynamic FEM analyses were compared using clustered standard errors (CSE) when total, unrelated and related product diversification variables are considered. Thus it was explored if there were differences in performance of these three models and helped to better understand the data. The unrelated and related product diversification groups in models 2 and 3 performed better as compared to the total product diversification group in model 1 (rmse: 0.0789, 0.0460 and 0.0583), this is as well supported by a higher explanatory power, because r^2 for the unrelated and related groups models (r^2: 0.998 and 0.954), is higher than for total groups models (r^2: 0.901) respectively, Table 4.10. Additionally, DIVE became significant at 0.05.

Table 4.10: Total, Unrelated and Related Product Diversification Groups Using Dynamic FEM (LSDV1 with CSE) analysis

	(1) Total		(2) Unrelated		(3) Related	
L.TGEAR	0.6359***	(0.0647)	1.4481*	(0.2179)	0.3020*	(0.1195)
UDIVE			0.4233*	(0.0918)		
RDIVE					-0.0400	(0.0645)
TDIVE	0.1861	(0.0933)				
TANG	0.0540	(0.1458)	1.0299**	(0.1201)	0.0845	(0.1299)
SIZE	-1.0018	(0.0707)	-1.7986	(0.4189)	0.4901	(0.0335)
PROF	-0.3826**	(0.1238)	-1.1444	(0.5536)	-0.2570**	(0.0677)
GROP	0.1543*	(0.0702)	0.1516	(0.3138)	0.1081	(0.0610)
GOCO	-4.2333	(0.0337)	-1.0401	(0.0097)	-5.2249	(0.0448)
RISK	-0.0083	(0.0000)	-0.0636	(0.0000)	-0.0284	(0.0000)
NDTS	0.1627***	(0.1269)	1.2001	(2.5773)	0.1370**	(0.1614)
N	112		28		78	
r2	0.932		0.998		0.954	
r2_a	0.901		0.951		0.923	
rmse	0.0789		0.0460		0.0583	
mss	6.488		1.164		3.261	
rss	0.473		0.00211		0.156	

Standardized beta coefficients; Standard errors in parentheses
*p< 0.05, **p< 0.01, ***p< 0.001

Source: Data analysis (2016).

The analysis indicated that related product diversification group prior years' debts were positively affecting proceeding years' capital structure ratios. The coefficient was significant in both models. Related product diversification group had a higher adjustment speed 0.6980 (1-0.3020) since it approaches 1 (Appendix VIII). The related product diversified companies' variables exhibit a differentiated relationship when compared to the total product diversified companies. The coefficient for the unrelated product diversification group became significant at 0.05. This help to point to the fact that a choice between related and unrelated product diversification is dictated by the kind of resources the companies have. However, the RDIVE and TDIVE variables became more significant in the related product model. The rest of the results coefficient directions were consistent with the total product diversification model.

Table 4.11 Both, local and cross listed groups using dynamic FEM (LSDV1 with CSE) Analysis

	(1) both_listed		(2) local_listed		(3) cross_listed	
L.TGEAR	0.6424***	(0.0912)	0.7461***	(0.0577)	-0.3312	(0.4559)
UDIVE	0.1226	(0.0812)	0.0612	(0.0703)	2.4575*	(0.2998)
RDIVE	-0.1587	(0.0540)	-0.0343	(0.0854)	0.0373	(0.6764)
TDIVE	0.3215*	(0.0809)	0.0666	(0.0884)	1.2830	(1.3795)
TANG	0.0678	(0.1487)	-0.0093	(0.0805)	0.6842	(1.5481)
SIZE	-0.8429	(0.0782)	0.1094	(0.0104)	-1.9480	(0.0746)
PROF	-0.3471*	(0.1284)	-0.3089*	(0.1378)	-0.2233	(0.4328)
GROP	0.1489**	(0.0534)	0.0923*	(0.0405)	0.0607	(0.0480)
GOCO	-3.3308	(0.0287)	-0.0730	(0.0009)	3.0603	(0.0328)
RISK	-0.0129	(0.0000)	0.1089***	(0.0000)	-0.0142	(0.0000)
NDTS	0.1533***	(0.1223)	0.1359*	(0.2173)	0.1310	(1.4744)
N	112		95		17	
r2	0.937		0.879		0.993	
r2_a	0.905		0.863		0.978	
Rmse	0.0773		0.0931		0.0377	
Mss	6.519		5.211		1.024	
Rss	0.442		0.719		0.00709	

Standardized beta coefficients; Standard errors in parentheses
*p< 0.05, **p< 0.01, ***p< 0.001
Source: Data analysis (2016).

Further data analyse were done by considering two groups based on listing type. The analysis used the Prais-Winsten with PCSE approach for both listings, and the locally listed companies. The analysis indicated that the both listing group better fitted the data as compared to the locally listed firms. The cross-listed group fitted the data better than the other two groups. Both models fairly performed better with small variations (Table 4.11).

The locally listed companies seem to have a low adjustment speed 0.2669 (1-0.7331) on their total debt. Thus, their costs of being in disequilibrium are low, they adjust their debt ratio slowly, because of high transaction costs and therefore their debts tend to stay close at their previous years' levels. Most of the rest of the other coefficients for the locally listed model behaved as in the total product diversification model in terms of relationships and significance level.

4.5.5 Comparisons of Findings among Models and Groups

In this sub-section the results of all models in the analysis are compared (Table 4.12). It serves as a summary of the multivariate findings in the study and provides a condensed summary reference for inference from this chapter in the next fifth and sixth chapters. The analysis indicates that level of capital structure variability is high among listed companies at DSE. Long-term capital structure ratio is significantly different from short term capital structure ratio. The level of product diversification variability is high and there is a significant difference between related and unrelated product diversification for the companies. The static fixed effect model (FEM) that employed least square dummy variable one (LSDV1) technique was used to fitted the data. The FEM with clustered standard errors (CSE) and FEM Prais-Winsten with PCSE were introduced to further control for firms-specific effects, time-specific effects, heteroscedasticity, autocorrelation and contemporaneous correlation in the error term.

The dynamic FE and GMM models outperformed the static FE models yielding superior results and efficient estimates due to the dynamic nature of the data as proposed in theory and empirical evidences. Thus it was found that related product diversification was negatively related to capital structure ratios, while unrelated and total product diversifications were positively related to capital structure ratios. Profitability, firms' size, and going concern were negatively related to capital structure ratios while growth opportunity and non-debt tax shield were positively related to capital structure ratios. It was also found that the speed of adjustment for debt is high in long term debt compared to short term debt, high for related product

diversified companies and low for locally listed companies.

Table 4.12 Comparisons of Analysis among the Models and Groups

	(1) LSDV1_b	(2) CSE	(3) PCSE	(4) dLSDV1_b	(5) dCSE	(6) dPCSE	(7) GMM	(8) Related	(9) unrelated	(10) local_listed	(11) cross_listed	(12) longD	(13) shortD
L.TGEAR				0.642***	0.642***	0.663***	0.677***	0.232	1.448*	0.746***	-0.331		
L.LGEAR												0.505***	
L.SGEAR													0.603***
RDIVE	-0.323	-0.323*	-0.245*	-0.159	-0.159	-0.159	-0.151*	-1.95***		-0.034	0.037	-0.051	-0.210
UDIVE	0.023	0.023	0.060	0.123	0.123	0.128**	0.125***		0.423*	0.061	2.458*	0.027	0.161
TDIVE	0.472*	0.472*	0.402***	0.321*	0.321*	0.317***	0.255***	1.976***		0.067	1.283	0.101	0.398*
TANG	0.035	0.035	0.069	0.068	0.068	0.058	0.081	0.035	1.030**	-0.009	0.684	0.050	0.047
SIZE	-0.546	-0.546	-0.507	-0.843*	-0.843	-0.83***	-0.615*	0.362	-1.799	0.109	-1.948	-0.060	-1.066*
PROF	-0.170	-0.170**	-0.25***	-0.35***	-0.347*	-0.34***	-0.383**	-0.283**	-1.144	-0.309*	-0.223	-0.086	-0.45***
GROP	0.095	0.095*	0.096***	0.149***	0.149**	0.150***	0.163***	0.142**	0.152	0.092*	0.061	0.123**	0.084
GOCO	-9.955	-9.955*	-7.489*	-3.331	-3.331	-3.338	0.852*	-1.809	-1.040	-0.073	3.060	5.012	-13.77**
RISK	-0.019	-0.019	-0.031	-0.013	-0.013	-0.009	-0.009	-0.048*	-0.064	0.109***	-0.014	-0.009	-0.017
NDTS	0.161**	0.161*	0.106*	0.153***	0.153***	0.156***	0.097***	0.145**	1.200	0.136*	0.131	-0.062	0.333***
N	112	112	112	112	112	112	100	78	28	95	17	112	112
r2	0.868	0.868	0.825	0.937	0.937	0.943		0.964	0.998	0.879	0.993	0.922	0.783
r2_a	0.804	0.804		0.905	0.905			0.939	0.951	0.863	0.978		
rmse	0.111	0.111	0.0957	0.0773	0.0773	0.0773		0.0521	0.0460	0.0931	0.0377	0.0604	0.0882
mss	6.042	6.042	3.235	6.519	6.519	7.375		3.296	1.164	5.211	1.024	3.213	2.073
rss	0.920	0.920	0.686	0.442	0.442	0.443	1.098	0.122	0.00211	0.719	0.00709	0.270	0.576
F	13.69	.		29.50	.			.	.	.	.		
chi2			126207.			962815	251985					1521143	2272609

Standardized beta coefficients $^{*}p< 0.05$, $^{**}p< 0.01$, $^{***}p< 0.001$

Source: Data analysis (2016).

4.6 Prediction and Fitted Values

In this section actual values for the different levels of capital structure ratio were compared to their respective predicted values or fitted values. In Table 4.13 summary statistics of the actual values versus the predicted values for capital structure ratios are provided. The means are not very different for the paired values between the actual and predicted values. Thus, for instance the TGEAR is expected to be a bit lower compared to the previous, the LGEAR is expected to be a bit higher compared to the previous and SGEAR is expected to be a bit lower compared to the previous.

Table 4.13 Descriptive Statistics for Actual and Predicted Values for Capital Structure Ratios

	Count	Mean	Std.Dev.	Min	Max
TGEAR	128	0.4690	0.2494	0.1312	1.0884
TGEAR_predict	112	0.4699	0.2427	0.1060	1.0326
LGEAR	128	0.1865	0.1757	0.0000	0.6633
LGEAR_predict	112	0.1878	0.1667	-0.0263	0.6784
SGEAR	128	0.2826	0.1484	0.0443	0.8948
SGEAR_predict	112	0.2822	0.1336	-0.0382	0.7202
N	128				

Source: Data analysis (2016).

How good the model is depends on how well it predicts *Y* (in our case gearing), the linearity of the model and the behaviour of the residuals. One needs to expect a 45 degrees pattern in the data on the graphs. Y-axis is the observed (actual) data and x-axis the predicted data (*Yhat*) (Torres-Reyna, 2007). From the graphs below the TGEAR of our sample has the best prediction as compared to the other models in Figure 4.1 to Figure 4.3.

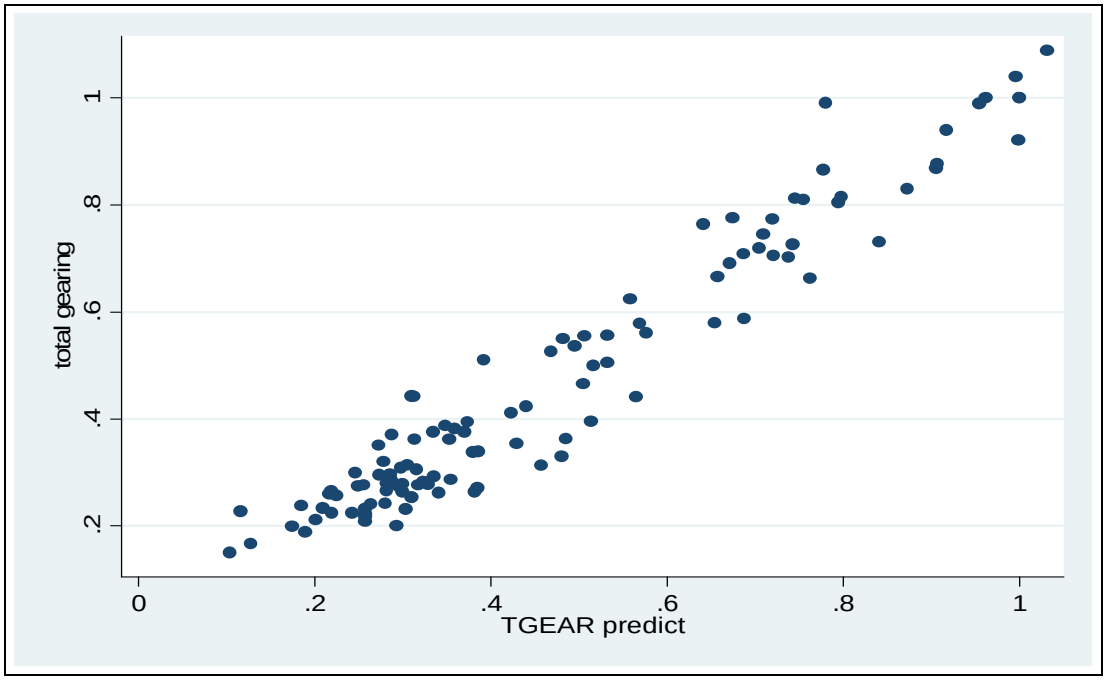

Figure 4.1 Predicted values for TGEAR

Source: Data analysis (2016).

Table 4.14 T-Test for Total Capital Structure Ratio and Predicted Total Capital Structure Ratio

Two-sample t-test with unequal variances						
Variable	Obs.	Mean	Std. Err.	Std. Dev.	[99% Conf. Interval]	
TGEAR	128	0.4690363	0.0220435	0.2493936	0.4113904	0.5266821
TGEAR_~t	112	0.4699461	0.0229316	0.2426852	0.4098458	0.5300463
Combined	240	0.4694608	0.0158645	0.2457723	0.4282677	0.510654
Diff		-0.0009098	0.0318084		-0.0835068	0.0816872
Diff = mean(TGEAR) - mean(TGEAR_predict)						t = -0.0286
Ho: diff = 0				Welch's degrees of freedom = 237.32		
	Ha: diff < 0		Ha: diff != 0		Ha: diff > 0	
	Pr(T < t) = 0.4886		Pr(T > t) = 0.9772		Pr(T > t) = 0.5114	

Source: Data analysis (2016).

Table 4.14 summarizes the T-test for the two unpaired groups. If the test turns out to be insignificant as it is in this result's case then that would indicate that the two groups are not statistically different, thus the results help to confirm the fact that our observed (actual) values are excellent predictors, therefore the model is an efficient

predictor of capital structure ratio.

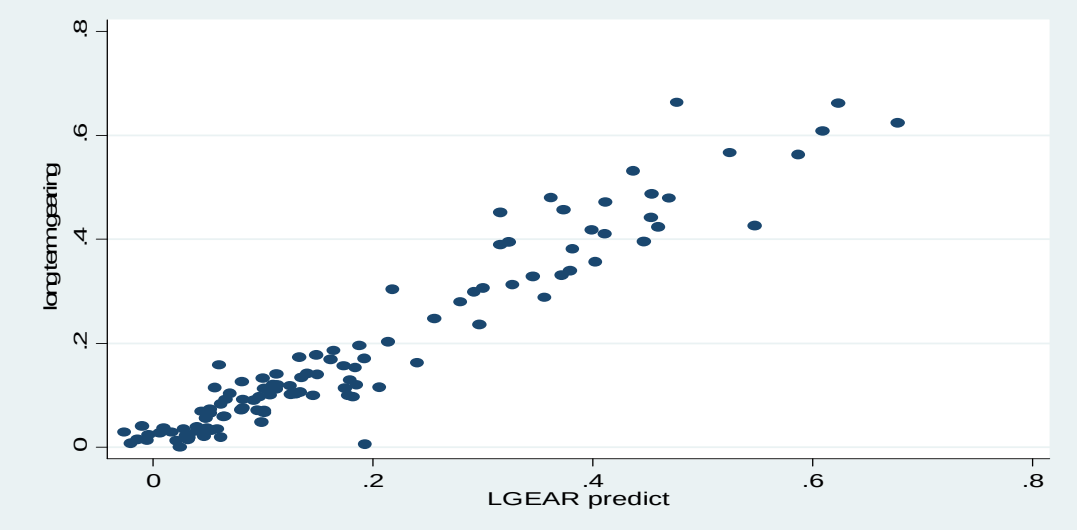

Figure 4.2 Predicted values for LGEAR

Source: Data analysis (2016).

Table 4.15 T-Test For Long Term Capital Structure Ratio and Predicted Long Term Capital Structure Ratio

Two-sample t-test with unequal variances

Variable	Obs.	Mean	Std. Err.	Std. Dev.	[99% Conf. Interval]	
LGEAR	128	0.1864517	0.0155267	0.1756648	0.1458479	0.2270556
LGEAR_~t	112	0.1878075	0.0157504	0.1666861	0.1465282	0.2290868
Combined	240	0.1870844	0.0110495	0.1711779	0.1583938	0.215775
Diff		-0.0013557	0.0221168		-0.0587843	0.0560729

Diff = mean(LGEAR) - mean(LGEAR_predict) t = -0.0613

Ho: diff = 0 Welch's degrees of freedom = 238.438

Ha: diff < 0	Ha: diff != 0	Ha: diff > 0
Pr(T < t) = 0.4756	Pr(T > t) = 0.9512	Pr(T > t) = 0.5244

Source: Data analysis (2016).

The values in Figure 4.2 indicate that long term gearing model was a good predictor as confirmed by the T-test in Table 4.15, where the T-test was not significant. The values in Figure 4.3 indicate that the short term gearing model was also a good predictor as confirmed by the T-test in Table 4.16, where the T-test was not significant. But this model did not perform very well as compared to the previous models.

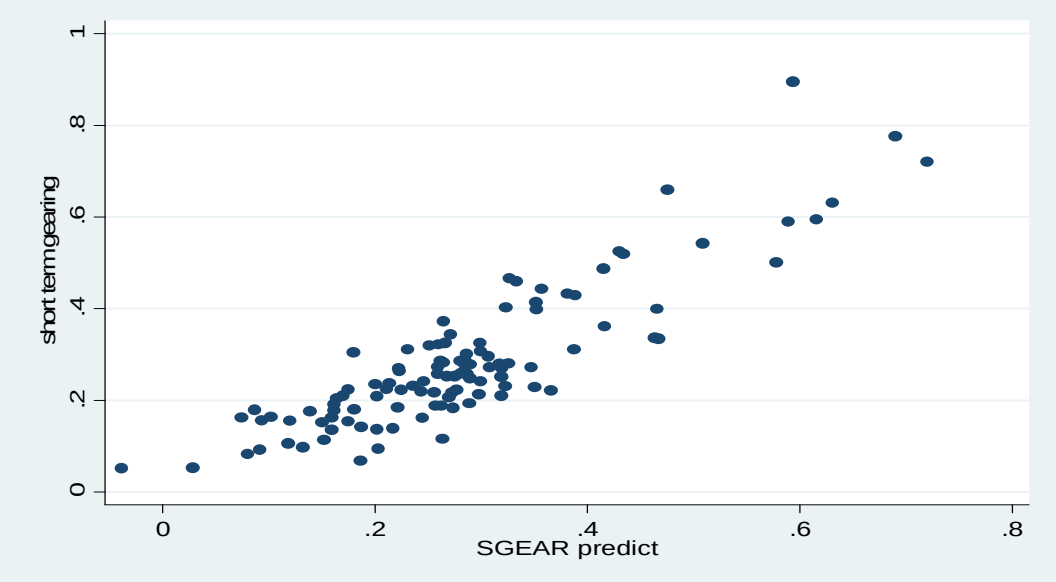

Figure 4.3 Predicted values for SGEAR
Source: Data analysis (2016).

Table 4.16 T-Test for Short Term Capital Structure Ratio and Predicted Short Term Capital Structure Ratio

Two-sample t-test with unequal variances

Variable	Obs.	Mean	Std. Err.	Std. Dev.	[99% Conf.	Interval]
SGEAR	128	0.2825846	0.0131176	0.1484092	0.2482807	0.3168885
SGEAR_~t	112	0.2821877	0.0126238	0.1335972	0.2491028	0.3152727
Combined	240	0.2823994	0.0091272	0.1413973	0.2587002	0.3060985
Diff		0.0003968	0.0182053		-0.0468729	0.0476665

Diff = mean(SGEAR) - mean(SGEAR_predict) t = 0.0218

Ho: diff = 0 Welch's degrees of freedom = 239.813

Ha: diff < 0	Ha: diff != 0	Ha: diff > 0
Pr(T < t) = 0.5087	Pr(T > t) = 0.9826	Pr(T > t) = 0.4913

Source: Data analysis (2016).

CHAPTER FIVE

5.0 DISCUSSION OF FINDINGS

5.1 Overview

This chapter discusses the research findings. It compares and contrasts theoretical postulations to findings presented in chapter four. It further compares and contrasts findings in chapter four to other related empirical findings found by other researchers. It offers rationales for consistence and deviations of findings from theory and other empirical findings. It also confirms the hypotheses used in this study and suggests improvements for the model used in this study to reflect the current findings.

5.2 Descriptive Statistics, Correlations and Univariate Results

The descriptive results were comparable to other studies. The mean total capital structure ratio for the panel was 47%, long-term capital structure ratio was at a mean of 19% while short-term capital structure ratio was 28%. This indicates that companies were employing more of short terms debts than long term debts, but the companies on average were moderately geared (Table 4.1). The panel for capital structure ratio is comparable to that of La Rocca et al. (2009) and Bundala (2012) who found that companies were moderately geared with means of 44.5% and 55.1% respectively, but the findings of Bundala indicated a wider deviation from the current study's findings. It indicated a shift in leverage by almost 10% lesser from the findings of Bundala who drew sample from the same stock market.

The correlation analysis indicates that capital structure ratio is positively related to unrelated diversification and negatively related to related diversification as expected

in the hypotheses and model and the results were significant. Total diversification is positively related to capital structure ratio (Table 4.5). Tangibility is significantly and positively related to capital structure ratio as expected in the hypothesis since the more tangible the assets are the more lenders are willing to offer debts. It is evident that firms with large amounts of tangible assets (as also manifested in the panel in Table 4.1, tangibility is 0.54) already have assets which can be used as collaterals that push them to resort to debt financing rather than equity financing, thus this theoretical underpinning supports the positive relationship manifested between firm tangibility and capital structure ratio (Table 4.5).

Profitability is also significantly and negatively related to capital structure ratios, indicating that firms are trying to obtain financing through internally generated funds (Apostu, 2010) which means firms shy away from debt if they can gain from tax shields (NDTS) Table 4.5. Size of the firm in this case is consistently negatively related to total, long-term and short-term capital structure ratios. Most studies report a positive relationship between size and capital structure ratio for instance (Abor, 2008), but this study's results are consistent with a few exceptions such as the study of Vries (2010) in which the negative relationship between size and capital structure ratio was reported. The reasoning behind it was that equity seems to be more attractive to investors than it is to debt due to low information asymmetry in the market. Age of the company (GOCO) is negatively related to capital structure ratio. Growth opportunity is positively related to capital structure ratio.

5.3 Capital Structure Ratios

Whenever panel data are available, various scholars, practitioners, and students have

been fascinated by panel data modelling for the reason that these longitudinal data have more variability and allow to investigate more issues than do cross-sectional or time-series data alone (Park, 2011). In this study's analysis the level of capital structure is evidently variable. The standard deviation of 0.249 for total capital structure ratio (TGEAR) indicates that there are variation both across companies and across years. Short term capital structure ratio (SGEAR) as well as long term capital structure ratio (LGEAR) were as well varying over companies and years (0.148 and 0.175 respectively) (See Table 4.1).

The t-test with unequal variance conducted indicated that the two types of capital structure ratios were statistically significantly different from each other indicating that the two types of capital structure ratios varied independently from each other (Table 4.3). This variability is supported by Park (2011). Baltagi (2001) specifically argues that "Panel data give more informative data, more variability, less co-linearity among the variables, more degrees of freedom and more efficiency" (p.6). The variability of 0.249 from 128 observations is close to that of La Rocca et al (2009) who found a standard deviation of 0.235 from 2085 observations. Latridis and Zaghmour (2013) based on a comparative study for Moroccan and Turkish firms find the standard deviations to be 0.1693 and 0.1741 respectively.

The findings of the present study, TGEAR was at the mean of 47% compare to the means of 9.19% reported in Latridis and Zaghmour (2013) study. Akinyomi and Olagunju (2013) based on a sample of 240 observations found a mean capital structure ratio of 57.6% and standard deviation of 0.074 for firms listed in Nigeria. Kodongo et al. (2014) based on Kenyan listed firms found the mean for capital

structure ratio was 57% with a standard deviation of 0.233. Similarly Hove and Chidodo (2012) employing 84 observations from listed companies in Zimbabwe found comparable results, where total capital structure ratio was at the mean of 23.8% with a standard deviation of 0.2187.

Thus, Tanzanian listed firms are in range with other comparable countries in terms of variability and level of capital structure ratio. This help to point to the fact that this variability in capital structure ratio is not unplanned. There are factors that can be attributed to it.

5.4 Capital Structure Ratios Speed of Adjustments

Further aspects of capital structure or gearing variability are tapped by considering the speed of adjustment of capital structure ratio across time and companies simultaneously as suggested by Abor (2007; 2008), La Rocca et al (2009) and Apostu (2010). This was done by introducing lagged capital structure ratio variable to take advantage of the fixed effects dynamic regression models. La Rocca et al (2009) particularly argue that capital structure theories are considered to have diverse implications on a firm adjustment process toward its target capital structure ratio level.

When they deviate from equilibrium level, firms normally rebalance their capital structure ratios towards the target levels. If firms follow a target optimal level of debt in their capital structure, deviations from the equilibrium level are expected to be temporary and therefore the speed of adjustment will be relatively high. On the contrary, if firms do not attribute great importance to their target leverage ratios (or

if the transaction costs are high), then an adjustment of capital structure toward the optimal level, for example in response to a shock, will be slow or even non-existent in a given year.

In findings of the present study, prior years' total capital structure ratio levels tended to influence current years' total capital structure ratio levels by between 0.6424 and 0.6771 units for each unit. Thus based on this finding by considering the lowest and the highest alpha values in the models, alpha (α) was in the range of 0.3229 - 0.3576 for whole sample analyses (Table 4.12). This is below 0.5 (Refers to Appendix VIII, Table 8.3). The speed of adjustment alpha (α) is arrived at by the following formula $\delta + \alpha = 1$, (i.e. $\alpha = 1 - \delta$) where δ= lagged debt coefficients (Refer Appendix VIII, Table 8.3).

The implications are that firms at DSE do not adjust their total debt more automatically. Capital structure levels seem to be more close to their previous years' debt levels. This is due to high transaction costs associated with increasing total debt. The costs associated with being in disequilibrium are low and thus firms tend to adjust their total debts slowly. It is possible therefore that, companies in DSE are generally slowly following their target total debt levels. It also can be argued that they are rather are faced with high transactions costs that prevent them from adjusting more easily and quickly.

When long term and short term capital structure ratios were considered separately, short-term capital structure ratios have a relatively less adjustment speed (α = 0.3369) compared to long-term capital structure ratio (α = 0.4926). This indicates

that companies adjust short-term capital structure ratio less automatically compared to long-term capital structure ratio. There are relatively more transaction (adjustment) costs in using short-term debt compared to using long-term debt. It also implies that the cost of being in disequilibrium for long-term debts is high as compared to short-term debt. Thus, companies at DSE relatively quickly adjust their long-term debt and slowly adjust their short term debt. This is as well supported by the high standard deviation for long term capital structure ratio (0.175) compared to that of short term capital structure ratio (0.148) (Table 4.1) (Appendix II).

The findings ($\alpha = 0.4926$) for long-term capital structure ratio are comparable to those of Apostu (2010) who found the adjustment coefficient (in range of $\alpha = 0.53$ to 0.61) to be relatively large (greater than 0.5) in various analyses for European companies. The findings are also comparable to the ones found by Kremp et al. (1999) for German ($\alpha = 0.47$) and Ozkan (2001) for British ($\alpha = 0.43$). One possible explanation for this adjustment speed could be that the costs of adjustment and the costs of being away from their target ratios are both important for firms. However, since the adjustment coefficient is about 0.5, it is hard to conclude on the adjustment behaviour for these long-term debt ratios.

Furthermore, for related product diversified group the adjustment speed was $\alpha = 0.7684$, this indicates that related product diversified firms adjust their debt level more quickly. Their costs of being in disequilibrium are high. The locally listed companies seem to have a low adjustment speed $\alpha = 0.2669$ on their total capital structure ratio. Thus, their costs of being in disequilibrium are low; they adjust their debt ratios slowly because of high transaction costs and therefore their debts tend to

stay close at their previous years' levels. Conversely, La Rocca et al (2009) found that firms pursuing related product diversification had low adjustment speed (α = 0.352) and firms that are undiversified had a comparatively high adjustment speed (α = 0.488). They move toward their optimum capital structure ratios more slowly while firms pursuing unrelated product diversification (α =0.706) move toward their optimum capital structure ratios more quickly. However, when total lagged values for total capital structure ratios were considered, the speed of adjustment was in the range below 0.5 (α= 0.3229 to 0.3576). This indicates that the costs of being in disequilibrium are lower than the costs of adjustment. This suggests that firms in DSE face relatively high transaction costs when they borrow loans from banks or issues bonds.

Moyo et al (2013) argue that if the speed of adjustment is zero, firms have no leverage targets and therefore do not follow an adjustment process. But in cases where speed of adjustment is greater than zero, then firms have capital structure ratio target levels that they adjust to. Companies listed in DSE seem to have target debt levels to which they strive to adjust to. These firms seem to slowly adjust to their total capital structure ratio due to their low adjustment coefficients (α= 0.3229 to 0.3576 for whole sample analysis). Moyo et al (2013) maintains that, in a perfect market, firms always sustain their target or optimal ratio; but in an imperfect market, firms merely slowly adjust because of information asymmetries, transaction and adjustment costs. This later case seems to fit an explanation for the DSE locally listed firms, which indicated an adjustment speed of 0.2669. Similar conclusion can be drawn from whole sample analyses (Table 4.12) with speed of adjustment ranging

from $\alpha = 0.3229$ to $\alpha = 0.3576$.

The DSE locally listed firms case depict the following facts which were corroborated the findings by Moyo et al (2013), that the speeds of target adjustment differ between countries, reflecting the disparity in these factors. Countries such as Tanzania, with low-quality firms, bad legal systems, unfavourable institutional features and unstable or stagnant or slowly growing economies will exhibit a low speed of adjustment. These characteristics increases adjustment costs and hence hinder faster and more frequent adjustments.

5.5 Product Diversification

From the 128 observations, findings indicated that total product diversification (TDIVE) in Table 4.1 was at a mean of 0.528 with standard deviations of 0.307 indicating a greater degrees of variability over the years. Related product diversification (RDIVE) was at a mean of 0.458 while unrelated product diversification (UDIVE) was 0.114; their respective standard deviations were 0.332 and 0.222, which indicate great variability in these types of diversification over time and between companies. La Rocca et al (2009) used 2085 observations and found that the mean for total product diversification was 0.391; related product diversification was 0.172 and for unrelated product diversification was 0.219. Their respective standard deviations were 0.445, 0.298 and 0.358 respectively.

The variability was not very different from this study's panel, indicating that product diversification has been changing over time and across companies. Such a variability helps to point to the fact that companies at DSE have been consciously choosing

product diversification strategies for various purposes and advantages which product diversification offers. These advantages are such as firm expansion, profit making, acquisitions, shareholders controlling the management, responding to market needs, reducing business risk, responding to the presence of unutilized resources in the firms, beating and timing the competition and the need to expand and grow.

In the univariate analysis in Table 4.2, companies' characteristics or factors indicated statistically significant differences. The treatment involved two groups i.e. companies that followed related product diversification and companies that followed unrelated product diversification. The differences were in terms of capital structure or capital structure ratios for total, long and short term gearing usages. The differences are in assets structures (tangibility), size of the firms and firms' profitability. Such differences point to the fact that firms embarking on related product diversifications were constrained by presence of inflexible resources which can only be transferred across similar or related business lines. On the other hand, firms that adopted unrelated product diversification were few and were only probably able to do so, as the transaction theory proposes, due to the presence of flexible resources which could be transferred across unrelated business segments.

In the multivariate analysis, the regression results indicated that total product diversification is positively related to total capital structure ratio, long term capital structure ratio and short term capital structure ratio in both the static and dynamic models. The same relationship was evidenced in the robust models and for all the groups analysed. The relationship was significant for most models (Table 4.12). This is consistent with most theoretical postulations, such as the Agency Cost Theory

(Apostu, 2010). Thus, for every one unit increase in total product diversification we would expect a 0.3215 increase in total capital structure ratio. This is contrary to the findings of La Rocca et al. (2009), Apostu (2010) and Quresh et al (2012) who found a negative and significant relationship. As noted earlier, the *agency costs theory* predicts that debt will be used to reduce the ability of a manager to undertake detrimental investments. This theory predicts a positive relationship but most empirical studies report a negative relationship. This study, on the contrary has been able to support a positive relationship as predicted in theory.

Consequently, shareholders will promote the use of debt through non-detrimental investments such as product diversification, as a device to discipline managerial behaviour up to the point when their objective is realised. Hence, we expect a positive relationship between total product diversification and capital structure ratios up to that realization. Thus, based on theoretical postulation and findings, it seems that shareholders for companies listed at DSE are not considering total diversification strategies employed as detrimental to the well-being of the firms. Similarly, based on co-insurance postulation total product diversification is a good example of investments that produce uncorrelated cash flows. Such types of cash flows reduce business risk and thereby making the firm more attractive to lenders.

Furthermore, following the methods of La Rocca et al (2009) and Apostu (2010), the univariate analysis used t-test (Table 4.2) and t-test (Table 4.3) to test for differences between related product diversification strategies. These are total and unrelated product diversification. The results indicated a significant difference for the sub-samples. The objective was to justify separate analysis for the two groups during the

regression analysis. Most of the other variables were statistically and significantly different indicating that the two sub-samples could be treated as unique groups for the analysis.

Related product diversification was negatively related to total capital structure ratio, long term capital structure ratio and short term capital structure ratio. The results were significant for related product diversification group only (Table 4.12). This finding was consistent with that of La Rocca et al (2009) and Apostu (2010). The result was also consistent with, the *co-insurance effects theory*, which suggests that, product diversification in related business segments results into correlated returns, which do not lower returns volatility. This in turn discourages lenders from offering loans, and vice versa. Thus, internal financing, (retained earnings), is associated with related product diversification. On the other hand, external financing (debt), is associated with unrelated product diversification. A negative relationship between related product diversification and capital structure ratio or gearing was expected and consequently supported by the findings. Similarly, based on transaction costs theory or argument related product diversification is only possible in the presence of excess and flexible unutilized resources in the companies.

Therefore, it was possible to demonstrate that related product diversification is based on business synergies and resource sharing. These are normally inflexible, highly specialised, excess and unutilised resources. These resources are assets, human skills and internal funds available to the companies. These are the basic reasons that reflect possibilities for these companies to invest in related product diversification. Characteristically, these assets and resources can only be transferred across similar

business products. Thus, related product diversification would be negatively related to external financing and consequently negatively related to capital structure ratios as postulated in the theory transaction cost theory.

Unrelated product diversification was consistently positively related to total capital structure ratio, long-term capital structure ratio and short term capital structure ratio. The results were significant in some of the dynamic regression models. The positive relationship helps to highlight the fact that investment in unrelated products results into uncorrelated cash flows thus reducing risk of business, thus attracting more external financing particularly debt. This is consistent with the co-insurance theory.

5.6 Capital Structure Determinants

5.6.1 Asset Tangibility

This study's findings on asset tangibility (TANG), indicated that all models had positive but insignificant relationships to total capital structure ratio, long term capital structure ratio and short term capital structure ratio except for related product diversified group which was statistically significant (Table 4.12). The direction of the variable is consistent with theory, because presence of tangible assets such as plants, property and equipment makes a company a good candidate for debt. Thus, more tangibility would increase debt qualification and consequently more debt financing (Tables 4.8 & 4.10). The mean for asset tangibility was at 0.528 (Table 4.1) indicating that more than half of the assets of the companies were properties, plant and equipment. Theoretically, tangible assets have less information asymmetry and have greater values than intangible assets during liquidation. Thus, they are capable of attracting more debt financing, thus tangibility would normally be

positively related to capital structure ratio. The finding is consistent with most empirical findings that confirm a positive relationship, for instance Titman and Wessels (1988) and Apostu (2010) in developed countries and Abor (2008), Khediri and Daadaa (2011), Hove and Chidoko (2012), Gweyi et al., (2013) and Umer (2014) in developing countries.

5.6.2 Firm Size

Size of the firm (SIZE) was found to be negatively related to capital structure ratio in all models; the dynamic models for total gearing were statistically significant. The locally listed firms indicated a positive but not statistically significant relationship to capital structure ratio (Table 4.12). Size is a controversial variable, a positive sign supports the position that large firms easily qualify for debt because of large assets that can cover debt obligations during bankruptcy. On the other hand, a negative relationship was supported based on the idea that large firms may opt not to borrow due to stable profitability, which is used as an internal financing substitute. Thus, it seems, instead of resorting exclusively to debt for financing, firms at DSE are using internal financing and equity more as compared to debt. This is evidenced by low capital structure ratio (47%), against equity (53%) (Table 4.1) coupled by high profitability with the mean of 28.84% with a max of 109.10%.

The negative relationship is consistent with Achy (2009) who employed a panel of 550 non-listed Moroccan firms, with 2,859 observations. He used natural logarithms of sales, natural logarithms of assets and natural logarithms of employment to measure size for a robust analysis. He observes that all three measures for firm size were negatively related to long-term capital structure ratios. Vries (2010) also found

a negative relationship, he particularly unlike other researchers used natural logarithms of sale. He concludes that firms with large amounts of tangible assets already have a stable income that pushes them to resort to internal financing rather than debt financing. Also, firm size is considered to be a sign of ability to reduce information asymmetry. Less information asymmetry attract equity than debt finance for the reason that, public investors are more informed about the firms. Therefore, chances that shares are undervalued are very low, and as such investors are more willing to buy equity. As a result, such firms, at time may prefer equity relative to borrowing; hence a negative relationship is justified.

5.6.3 Firm Profitability

Profitability of the firm (PROF) was found to be negatively related to total capital structure ratio, long term capital structure ratio and short term capital structure ratio, the results were statistically significant (Table 4.12). Theoretically there are two possibilities, which have also been supported empirically. Firstly, if past profitability is considered a good proxy for future profitability then profitability would be positively related to capital structure ratio. On the other hand, if firms are capable of generating sufficient profits and are following a pecking order financial behaviour, they will resort to internal financing against debt. Thus profitability would be negatively related to capital structure ratio.

Evidences for a negative relationship to support this current study are extensive from other studies, such as Rajan and Zingales (1995), Booth, et al. (2001), Fama and Frech (2002), Abor (2008), Vries (2010), Khediri and Daadaa (2011), Hove and Chidoko (2012), Aremu et al. (2013), Latridis and Zaghmour (2013), Umer (2014),

Tarus et al. (2014). This later position seems to be the case in this present study's sample. Thus a one unit increase in profitability would results in approximately 0.3471 unit decreases in total capital structure ratio based on the dynamic model (Table 4.12). This is evidenced by the high mean profitability of 28.84% with a max of 109.10% in Table 4.1, evidencing availability of high profits that can be used internally to finance the companies.

5.6.4 Growth Opportunity

Growth opportunity (GROP) was found to be positively related to total capital structure ratio, long-term capital structure ratio and short term capital structure ratio, the results were significant (Table 4.12). The findings were consistent with many other studies in Africa. These studies indicated positive relationships of growth opportunity to capital structure ratio (Doku, et al., 2011; Hove & Chidoko, 2012; Nyamora, 2012; Ogbulu & Emeni, 2012; Bundala & Machogu, 2012; Latridis & Zaghmour, 2013; Gweyi et al., 2013; Nyanamba et al.,2013). The companies in the present study sample have a mean of 14.9% for growth opportunity (Table 4.1). This high mean indicates that the sample is made of high growth opportunity firms. High growth opportunity firms are characterised by high needs of funds.

Therefore, internal financing may not suffice their financing needs as a result they would resort into external financing. These firms are further constrained by "ownership control rights" they want to maintain their ownership thus they would normally resort to external financing. These two rationales seem to paint the picture of companies at DSE.

5.6.5 Going Concern

Going concern (GOCO) was found to be negatively related to total capital structure ratio and short term capital structure ratio, but positively related to long term capital structure ratio (Table 4.12). Theoretically, age accounts for company reputation. However, the kind of reputation contained in the age of the company will depend on other factors as well. Some companies such as TOL Limited are very old, but are loss making companies that would add to bad reputation. On the other hand, other companies such as TBL are old and profit making that would add to good reputation. Thus, a sound going concern is positively related to debt. The mean age in our sample was 39 years (Table 4.1). This indicates the dominance of experienced companies.

The negative relationship between age and short term capital structure ratio and positive relationship between age and long-term capital structure ratio was consistent with the findings of Hall et al. (2004). He established that age was negatively related to short-term capital structure ratio but was positively related to long-term capital structure ratio. But, notably Esperança et al. (2003) found that age is negatively related to both long-term and short-term capital structure ratios. The reasons for this relationship were probably due to young age and information asymmetry presented by young firms. Thus, this trend can be attributed to information asymmetry, DSE being a market in a developing economy would imply a high degree of information asymmetry in the market.

5.6.6 Bankruptcy Risk

Risk of bankruptcy (RISK) was found to be negatively related to total capital

structure ratio, long term capital structure ratio and short term capital structure ratio, the results were not statistically significant, except for the related product diversification group which was negatively related to capital structure ratio and statistically significant, and locally listed group which was positively related to capital structure ratio and was statistically significant (Table 4.12). Firms with high debt levels have higher volatility of net profit and implicitly higher bankruptcy risk. Thus, one needs to expect a negative relationship between debt and risk (Titman & Wessels, 1988; Kremp et al., 1999; Booth et al., 2001; Alonso, 2003). The locally listed firms seem to have low levels of capital structure ratios that do not threaten their quest to continue borrowing that is why they have a positive relationship is evidenced.

Research evidences indicate that firms tend to shy away from excessive debts in order to reduce their bankruptcy risk. This study's findings are consistent with studies from both developed and developing economies. These studies indicate that bankruptcy risk is negatively related to capital structure ratios (Alonso, 2003; Abor, 2008; Apostu (2010); Junior and Funchal (2013); Moyo, 2013; Umer, 2014; Gathogo & Ragui, 2014). Particularly Junior & Funchal (2013) found a negative and insignificant relationship for both the high and low risk groups in their panel. The rationalization put forward, which is adopted to support this relationship, is that bankruptcy risks emanate from both increases in direct and indirect financial distress costs. Firms with high profitability and risk averse tend to avoid debt usage by relying on internal financing in order to reduce bankruptcy risk (Vries, 2010; Abor, 2007).

5.6.7 Non-debt Tax Shields

Non-debt tax shield (NDTS) was found to be positively related to total capital structure ratio and short term capital structure ratio but negatively related to long term capital structure ratio (Table 4.12). The results were significant for total and short term gearing models. Theoretically, if firms are capable of gaining from non-debt tax shields, they may shy away from debt. Firms that are capable of decreasing taxes by means other than interest deductions such as depreciation will employ less debt in their financing structures. Debt-tax shields unlike non-debt tax shields are positively related to capital structure ratio (Umer, 2014). Conversely, one would expect a negative relationship between non-debt tax shield and capital structure ratio. This is only consistent for our long term capital structure ratio. Total and short term capital structure ratios indicate the contrary, which is a firm is not capable of decreasing taxes by other means (such as depreciation) than interest deductions.

The findings were consistent with that of Titman and Wessel (1988) and Umer (2014) except for long-term capital structure ratio. They found a positive relationship between non-debt tax shields and total capital structure ratio in developed economies and Ethiopian companies respectively. This current study adopts their explanation put forward that non-debt tax shields were not a substitute for total and short-term debt tax shields, except for long-term capital structure ratio. The rationalizations for a negative relationship for long term capital structure ratio are that; when corporate taxes increases are high, firms which are able to reduce taxes by means other than deducting interest will employ less debt in their capital structure (Vries, 2010). When non-debt tax shields are positively related to long-term capital structure ratio,

non-debt tax shields may be regarded as substitute for debt tax shields (La Rocca et al., 2009).

5.7 Hypothesis Tests and Validation

In this section the findings are compared to the hypotheses. They are confirmed to conclude the findings and results in relation to the hypothetical predictions. Based on the results hypothesis one was supported. The findings were consistent with the postulations that there is a negative relationship between related product diversification and capital structures of listed companies in Tanzania. When the related product diversification group only was dealt with the results turned out to be significant at 0.001. The findings were thus consistent with both the transaction cost theory and co-insurance hypothesis. Thus first hypothesis was supported which stated;

> **H_1:** Related product diversification negatively affects capital structure of companies listed in Tanzania

The findings were consistent with the second hypothesis. The second hypothesis was supported, that unrelated product diversification is positively related to capital structure. The positive direction was consistent for all the models and became significant at 0.01 in the dynamic Prais-Winsten with PCSE. This offers support to the second hypothesis and is consistent with both the co-insurance hypothesis and transaction cost theory which postulated that;

> **H_2:** Unrelated product diversification positively affects capital structure of companies listed in Tanzania

The results supported a positive relationship between total product diversification and capital structure. The results were consistently significant with a few exceptions

in some models, such as the locally listed group, cross listed group and the long debt group. The findings were consistent with the agency theory, which imply that managements were endorsing product diversification projects to promote debt usage. This offered support to the third hypothesis, which stated thus;

> **H_3:** Total product diversification positively affects capital structure of companies listed in Tanzania

Asset tangibility was consistently shown to be positively related to capital structure ratio. The findings were not significant. This is consistent with other researchers' findings and theoretical postulations. Thus we were able to confirm a positive relationship but unable to statistically support it.

> **H_4:** Tangibility of the firm positively affects capital structure of companies listed in Tanzania.

The fifth hypothesis dealt with size of the firm. It indicated two possibilities. The related product diversified group had a positive relationship with capital structure. The models except for related product diversification indicated a consistently negative relationship to capital structure. The findings were statistically significant in some models, thus lending support for our fifth hypothesis that;

> **H_5:** Size of the firm negatively affects capital structure of companies listed in Tanzania

For the sixth hypothesis, the results supported a negative relationship. The results were statistically significant in most models. This relationship is consistent with theories and empirical findings. Thus it was possible to support a negative relationship that;

> **H_6:** Profitability of the firm negatively affects capital structure of companies listed in Tanzania

Growth opportunity is a contentious factor, which may indicate a positive or negative relationship. The results supported a positive relationship, which is consistent with both theory and other empirical findings. The relationship was statistically significant and thus it was possible to support a positive relationship thus;

> **H_7:** Growth opportunity of the firm positively affects capital structure of companies listed in Tanzania

In the eighth hypothesis, against the postulations, the results supported a negative relationship for the whole sample but a positive relationship for long-term gearing and the GMM model. Some of the models were statistically significant lending support to both other researchers' empirical findings and theoretical postulations. Thus the eighth hypothesis was supported thus;

> **H_8:** Going concern of the firm affects capital structure of companies listed in Tanzania

For the ninth hypothesis, the findings supported a negative relationship between risk and capital structure for both listings group, but indicated a positive relationship for the locally listed firms. These findings are consistent with both empirical and theoretical postulations. They were also statistically significant for both related and locally listed firms.

> **H_9:** Bankruptcy risk of the firm affect capital structure of companies listed in Tanzania

In the tenth hypothesis, against the postulation, it was possible to support a positive relationship between non-debt tax shields and capital structure except for long term debt group where a negative relationship was found consistent with the postulation.

The findings were statistically significant for a positive relationship. Thus, it was possible to support a positive relationship that;

> **H_{10}:** Tax shield of the firm positively affects capital structure of companies listed in Tanzania

5.8 Model Improvements

Based on the findings from data analysis output the hypotheses are restated and a new model's variables relationships are depicted in Figure 5.1. In this model the dynamic nature of our findings was introduced and the lagged debt ($GEAR_{(i,t-1)}$) effects on capital structure ($GEAR_{(i,t)}$) were taken into account to reflect the dynamic nature of the model as proposed in theory and findings.

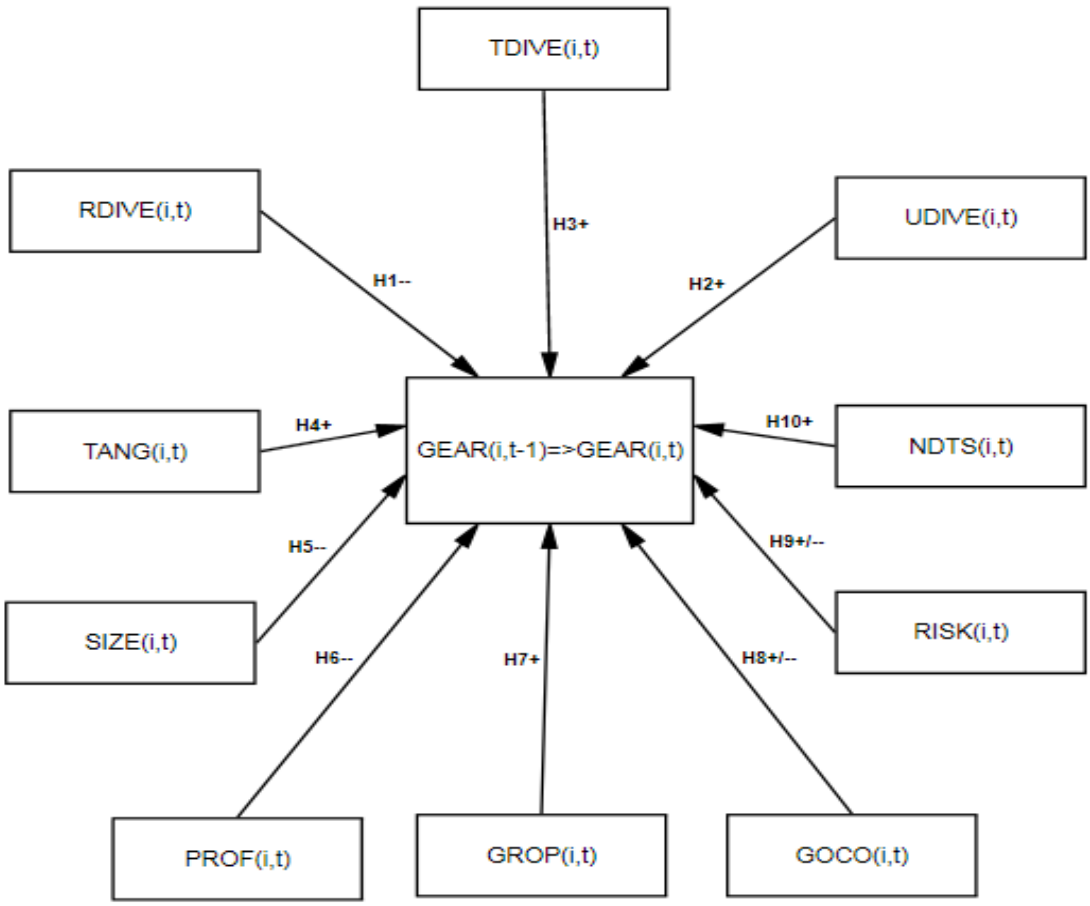

Figure 5.1 Modified conceptual model
Source: Researcher's own Design (2016).

The findings indicated that capital structure ratios of firms are varying over time and across companies. Product diversification in its various types showed variability over time and across firms. The results are generally consistent with the three theories and tended to differ from some empirical results. Total product diversification and unrelated product diversification are positively related to capital structure ratios. Related product diversification was negatively related to capital structure ratios. The conventional variables; asset tangibility and growth opportunity are positively and significantly related to capital structure. Non-debt tax shield, risk of bankruptcy and going concern are either positively or negatively related to capital structure depending on the group of analysis involved. Profitability and size of the firm were negatively related to capital structure ratios. Firms follow dynamic adjustments in their capital structures.

Thus based on these findings the following improvements in the previous model (Figure 2.1) are done and reflected in the new improved model (Figure 5.1). TDIVE postulated a general relationship on GEAR; but the results supported a positive relationship. RDIVE postulated a negative relationship; the results maintained the same negative relationship. UDIVE postulated a positive relationship; the results maintained the same positive relationship. TANG postulated a positive relationship; the results maintained the same positive relationship. SIZE postulated a general relationship; the results maintained a negative relationship.

PROF postulated a general relationship; the results supported a negative relationship. GROP postulated a general relationship; the results supported a positive relationship. GOCO postulated a positive relationship; the results supported a general

relationship. RISK postulated a negative relationship; the results supported a general relationship. NDTS postulated a negative relationship; the results supported a positive relationship. These improvements are reflected fully in the model (Figure 5.1). As it can be noticed, these variables affect both prior years capital structure ratios {$GEAR_{(i,\ t-1)}$} and current years capital structure ratios {$GEAR_{(i,\ t)}$} in the central box of the model. But, it is worth noting that $GEAR_{(i,\ t-1)}$ also affects $GEAR_{(i,\ t)}$ as indicated by the central arrow in the model's central box.

5.9 Summary of Discussion of Findings

The results indicated that capital structures of firms at DSE are varying over time and across companies. Firms are slowly adjusting their capital structure ratios towards their targets. Product diversification in its various types indicated variability over time and across firms. The results are generally consistent with theory and partly consistent with other researchers' empirical findings and partly differ from other researchers' empirical findings. Both total product diversification and unrelated product diversification are positively and statistically significantly related to capital structure ratios. Related product diversification is statistically significantly negatively related to capital structure ratio.

The conventional variables; asset tangibility and growth opportunity are positively and statistically significantly related to capital structure ratio. Non-debt tax shield, risk of bankruptcy and going concern are either positively or negatively related to capital structure depending on the group of analysis involved. Profitability and firm size were statistically significantly negatively related to capital structure ratio. These sets of factors account for a large share of these independent variables in explaining

the dependent variable capital structure ratio. It is also found that firms follow dynamic adjustments in their capital structure ratios in efforts to attain their target capital structure ratios.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Overview

This chapter deals with the conclusions derived from the analysis and findings and guided by the research objectives. It also points out recommendations and implications from the study for the listed firms, investors, policy makers and the economy.

6.2 Conclusions

Specifically, the research objectives are addressed here in order to summarize and conclude the extent to which it was possible to attain them. A summary of the general objective is "to evaluate capital structure variability as influenced by product diversification amidst conventional factors for firms listed in Tanzania." the conclusions of the study's findings based on specific objectives follow below; The first objective was to assess capital structure variability of firms listed in Tanzania. In the results capital structure is manifestly variable. The standard deviation of 0.249 for total capital structure ratio (TGEAR), 0.148 for short term capital structure ratio (SGEAR) and 0.175 for long term capital structure ratio (LGEAR) indicate that there are variations across companies and across years for all types of capital structure ratios.

Further, based on adjustment speeds by considering the lowest and the highest alpha values in the models, alpha (α) is in the range 0.3229-0.3576 indicating that firms at DSE do not adjust their total debt more automatically. Capital structure levels seems to be more close to their previous years' debt levels because of high transaction costs

associated with increasing total debt. The costs associated with being in disequilibrium are low and thus firms tend to adjust their total debts slowly.

The second objective was to assess product diversification variability of firms listed in Tanzania. After isolating related and unrelated product diversifications, it was found that total, related and unrelated product diversifications are varying over time and across firms. Findings indicated that total product diversification (TDIVE), related product diversification (RDIVE) and unrelated product diversification (UDIVE) had standard deviations of 0.307, 0.332 and 0.222 respectively indicating greater degrees of variability over the years and across firms.

Such degrees of variability help to point to the fact that companies at DSE have been consciously choosing product diversification strategies. This is for various purposes and advantages which product diversification offers. Such purposes and advantages are firm expansion, profit making, acquisitions, shareholders controlling the management, responding to market needs, reducing business risk, responding to the presence of unutilised resources in the firms, beating and timing the competition and the need to expand and grow.

The third objective was to assess effects of conventional factors such as assets tangibility, firm size, firm profitability, growth opportunity, going concern, bankruptcy risk and non-debt tax shields on capital structure variability of firms listed in Tanzania. The results indicated that conventional factors; asset tangibility, growth opportunity and non-debt tax shield are positively related to capital structure ratio, while size, profitability and going concern are negatively related to capital

structure ratio, while risk of bankruptcy was negatively related to total capital structure ratio and positively related to long term capital structure ratio.

The fourth objective was to analyse the effects of product diversification on capital structure variability of firms listed in Tanzania. The results indicated that both total product diversification and unrelated product diversification were positively related to capital structure ratio while related product diversification was negatively related to capital structure ratio.

6.3 Implications and Recommendations

This sub-section points out implications and recommendations of our study. It helps to link findings to practical usefulness of the study.

6.3.1 Implications

The findings point to the importance of product diversification in its various types in influencing financing choices of firms at DSE. Accordingly, it contributes to the understanding of rationales behind firms financing. The difference in the directions of effects for related and unrelated product diversification helps to points to the fact that the type of product diversification adopted by the firm matters in capital structure choices.

The differentiated effects of related and unrelated product diversification on capital structure help to point to the facts that the nature of resources available to a firm dictates the kind of diversification adopted by a particular firm. Thus, it was possible to establish and substantiate that related product diversification is mostly possible in companies with excess, unutilised, inflexible resources available to the firm and

internal financing. This was due to a statistically significant negative relationship between related product diversification and capital structure ratios. On the other hand, unrelated product diversification is mostly possible in companies with excess, unutilised, flexible resources and external financing. This was due to a statistically significant positive relationship between unrelated product diversification and capital structure ratios. These relationships are in line with Transaction Cost Theory and Co-insurance Effect Hypothesis. Further it points to the fact that product diversification is possible due to the presence of business synergy and resources sharing in these companies.

The negative relationship between related product diversification and capital structure indicate that related product diversification is related to internal financing; such as retained earnings. Firms are forced to use internal financing to finance related product diversification investments. Such investments do not attract lenders due to high risks resulting from highly correlated returns. These investments discourage managers to borrow due to high debt transaction costs reflected by debt markets. The high costs are due to high risks from such correlated investments. Conversely, the positive relationship between unrelated product diversification and capital structure helps to point to the fact that, the presence of uncorrelated cash flows projected by unrelated product diversification investments reduces a firm risk profile thus attracting more debt financing among such firms.

The varying and increasing levels of product diversification over time and across firms help to point to the presence of conscious diversification strategies employed by firms to take advantages of various benefits that diversification entails, such as

business risk reduction, staying competitive, expansion motives and trying to grow big among others.

Capital structure ratios variability points to the fact that firms are trying to adjust their capital structure to reflect the costs, risks and advantages of each financing choice. The speed of adjustment helps to depict the fact that firms are trying to move their capital structures towards optimum or target capital structure ratios. The low speed of adjustment of capital structure ratios indicates that the cost of adjustment is rather high among DSE firms. Thus, transaction costs (such as legal, litigation, interests, listing and information) both direct and indirect seem to be high among DSE companies. Prior years' capital structure ratios are closely predicting proceeding years' debt levels. As noted previously firms are cautiously adjusting their debt levels, keeping them in line with prior years' levels. Such capital structure ratios are adjusted so cautiously towards optimum ones due to the risk eminent from debt usage.

Total, long term and short term capital structure ratios display differentiated profiles. This indicates that the type of gearing matters in capital structure choices in relation to capital structure determinants. Particularly companies seem to favour more short term debt over long term debt. But also the levels of debt or capital structure ratios have been increasing over time. This indicates that firms are consciously adjusting their capital structures over time. Further, prior years' debt levels are good predictors of proceeding years' debts. Thus, firms at DSE closely regulated their proceeding years' debt levels in line with their prior year's debt levels. These reflect the facts that capital structure ratios adjustment speeds are slow. This is due to high

transaction costs associated with debt financing in Tanzania.

Presence of tangible assets such as plants, property and equipment dictate the ability for a firm to borrow and hence adjust its capital structure both in the short run and long run. Presence of large amounts of retained profits facilitated by big firm size and high growth opportunities as supported by the results help firms at DSE resort to internal financing. This is evidenced by the negative relationship for size and profitability and positive relationship for growth opportunity to capital structure. Firms at DSE are capable of decreasing taxes by means other than interest deductions such as depreciation as a result they employ less debt in their financing structures as indicated by the modest long term debt levels in the panel.

The reputation of firms at DSE did not account for positive effects on capital structure ratios. This indicates as suggested by other researchers, the presence of information asymmetry at DSE that makes lenders ignore age in screening candidates for debts. Bankruptcy risks emanate from both increases in direct and indirect financial distress costs. Firms at DSE with high profitability and risk averse tend to avoid debt usage by relying on internal financing in order to reduce bankruptcy risk.

The large r^2 in the range of 0.825—0.964 and the adjusted r^2 in the range of 0.804—0.939 (Table 4.12) account for a very large and substantial effects of these factors under study on capital structure ratios. So far this is a large amount of contribution that can be attributed to a combination of these factors at DSE. This evidences the importance of these factors during capital structure decisions. Thus, managements,

policy makers, regulators and investors need to account for these factors when making policy, regulating the financial markets, and investing in these listed companies.

6.3.2 Policy Makers, Regulators and DSE

Due to high transaction costs that are indicative from the dynamic adjustment analysis, it is important that transaction cost resulting from information asymmetry, listing requirements, information flow, legal litigation and interests' obligations be studied and monitored to reduce transaction costs, to improve transparency, to improve flow of correct and reliable information to investors and lenders. This will help firms easily adjust their capital structure ratios to maximize from their financing choices.

6.3.3 Investors

Companies at DSE are evidently product diversified. Specifically, they are following both related and unrelated product diversification strategies. Thus, investors need to invest among firms that are embarking on unrelated product diversification due to reduced business risk from uncorrelated cash flows. But, similarly when constructing their investment portfolios, it is significant that they choose firms according to a combination of related and unrelated product diversification, rather than investing only on companies with only related product diversified firms, because that would indicate high risk in their investments portfolios.

Companies that are well diversified in unrelated products normally exhibit uncorrelated cash flows, which normally result into low business risk and high

profitability. Thus, banks and lenders need to consider product diversification as a criterion for screening debt candidates.

6.3.4 Companies

Investments through product diversifications have both implicit and explicit effects on capital structure of firms. Therefore, the management needs to undertake such investments with informed practices on how product diversification and its types affect their companies' capital structure and consequently cash flow, profitability and value. Consequently, the types of product diversification adopted by the management matters in capital structure choices.

Presence of excess, unutilised and inflexible resources can best be employed in advancing related product diversification. Thus firms may opt for such a strategy if they have more of these types of resources. On the other hand, firms with presence of excess, unutilised flexible resources should resort on unrelated product diversification, since that would help to produce uncorrelated cash flows resulting in reduced business risk. The study recommends that companies should diversify across projects as a way to make cash flows more predictable thereby decreasing the agency costs of decision-making prudence.

Further, possibility of business synergies and resources sharing in the presence of resources such as skills, machineries, equipment and finance; companies should not hesitate to diversify their business as that would mean more returns to their firms. But, equally important is the fact that related product diversification is more related to internal financing while unrelated product diversification in more related to

external financing. Thus it is prudent to finance related product diversification with internal financing and finance unrelated product diversification with external financing.

Firm-specific factors, such as product diversification, tangibility, size, profitability, non-debt tax shield, going concern, growth opportunity and business risk seem to account for a large share for variability on capital structures of these firms. Thus, these factors need to be taken into serious account when considering capital structure decisions.

6.4 Areas for Future Studies

The following are recommendations for future research in this area. These are areas in which the study was not able to cover due to limitations of time, resources and they were out of scope of this study, but these are areas that emanated from our study's research process.

i. Studies need to focus on companies that are not listed in the Dar es salaam stock exchange and assess the effects of product diversification on capital structure
ii. Researches need to focus on SMEs, and assess the role of product diversification on capital structures
iii. Researches need to focus on how product diversification influence profitability of companies listed at DSE
iv. Researches need to focus on the effects of product diversification on firm value; cases may be drawn from listed companies, unlisted companies and or SMEs.

v. Comparative studies by sectors such as SMEs, telecommunication, beverages, agricultural and mining may be conducted to compare the role of product diversification on capital structure, profitability, cash flows and firms' value.

vi. Comparative studies need to focus on the roles of product diversification and international diversification on capital structure, profitability, liquidity and firm value

vii. Since there are several measures of diversification, comparative studies on measures of diversification could be done to compare results statistically.

viii. More advanced methods of measurements and regression could be used such as structural equation modelling (SEM) to assess effects of product diversification on capital structure, profitability, cash flows and firm value.

ix. Since this study focused on firm-specific variables, other studies need to incorporate industry-specific and macro-economic variables effects on capital structures, profitability, cash flows and firm value of listed companies at DSE, unlisted companies and among SMEs.

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APPENDICES

Appendix I Comparable samples and model specification

Table 8.1 Comparable studies sampling

Researcher [a]	Location /area [b]	Nature of population [c]	population under study [d]	Inclusion criteria into sample [e]	Sampled number firms [f]	Number of sampled years [g]	Number of Observation: firm-years[h]	% of sample [i]=[f/d]	Methodology [j]
Barine (2012)	Nigeria	214 Listed	18	Financial firms excluded	18	2008-2010 [3 years]	54	100 %	Panel data, 9 IV, OLS regression
Gweyi et al. (2013)	Kenya	Non-listed	40	Only SACCOs included	40	2010-2012 [3 years]	120	100 %	Panel data, 5 IV, OLS regression
Tarus et al. (2014)	Kenya	238 Listed & unlisted	60	Financial firms, missing data firms excluded	60	2006-2012 [7 years]	420	100 %	Panel data, 3 IV, OLS regression
Chechet et al. (2013)	Nigeria	214 Listed	19	chemical and paints only included, firms with missing data excluded	12	2005-2009 [5 years]	60	63%	Panel data, 5 IV, OLS regression
Akinyomi & Olagunju (2013)	Nigeria	214 Listed	86	Manufacturing firms included, excluding firms with missing data	24	2003-2012 [10 years]	240	28%	Panel data, 5 IV, OLS regression
Aremu et al. (2013)	Nigeria	214 Listed	5	Banks only are included	5	2006-2010 [5 years]	25	100 %	Panel data, 7 IV pooled OLS regression,
Hassan (2011)	Nigeria	214 Listed	32	Insurance firms only are included	15	2001-2010 [10 years]	150	47%	Panel data, 5 IV, FE regression
Muritala (2012)	Nigeria	214 Listed	86	Manufacturing firms only, financials and missing data firms excluded	10	2006-2010 [5 years]	50	12%	Panel data, 6 IV, PLS (OLS) Regression
Jambawo (2014)	Zimbabwe	71 Listed	71	Financial firms excluded, missing data firms excluded	24	2009-2012 [4 years]	96	34%	Panel data, 4 IV, OLS, regression
Researcher [a]	**Location /area**	**Nature of populatio**	**population**	**Inclusion criteria into**	**Sampled number**	**Number of**	**Number of**	**% of**	**Methodology [j]**

	[b]	**n [c]**	**under study [d]**	**sample [e]**	**firms [f]**	**sampled years [g]**	**Observation: firm-years[h]**	**sample [i]=[f/d]**	
Hove & Chidodo (2012)	Zimbabwe	71 Listed	23	Highly regulated and financial firms excluded	21	2000-2008 [9 years]	189	91%	Panel data, 8 IV, OLS, ***pooled sample***
Umer (2014)	Ethiopia	76 Listed & unlisted	76	Large taxpayer companies, excluded banks and insurance firms	37	2006-2010 [6 Years]	222	49%	Panel data, 9 IV, RE regression,
Doku, et al. (2011)	Ghana	Listed	21	All firms and sectors were included	21	1995-2005 [11 Years]	231`	100 %	Panel data, 12 IV, pooling regression, lagged DV
Khediri & Daadaa (2011)	Tunisia	Listed	44	All financials were excluded	23	2000-2009 [10 years]	230	52%	Panel data, 9 IV, pooling, RE and FE regression,
Marobhe (2014)	Tanzania and Kenya	253 Listed & unlisted	15	Manufacturing firms only, excluded financials, missing data firms	12	2005-2012 [7 years]	84	80%	Panel data, 7 IV, OLS regression,
Bundala & Machogu (2012)	Tanzania	15 Listed	8	All manufacturing firms, exclude financials and cross listed	8	2011 [1 year]	8	100 %	Cross sectional data, 7 IV, Multiple regression,
The current Study	**Tanzania**	**22 listed, 1 delisted**	**23**	**Exclude all financials, delisted, missing data firms.Include only that have been listed.**	**11**	**1997-2014 [17 years]**	**128**	**50%**	**Panel data, 8 IV, Pooling, OLS, FE, RE, lagged DV, GMM, CSE, PCSE, LSDV1 regressions.**

Source: Researcher's own compilation (2015).

Key: IV independent variable, DV dependent variable, FE fixed effect regression model, RE rundom effect regression model, OLS ordinary least square regression model.

Table 8.2: Models specifications and construction

Variables for the Regression Model				
Variables	**Definitions**	**Measurement**	**Symbols**	**Researchers who used the variables and measures**
Dependent variable:				
Capital Structure (ALTENATIVE MEASURES)	Capital structure ratio, the ratio of book value of total debt (D) to total assets (TA)	D/TA	(1) $GEAR_{i,t}$	Kochhar & Hitt (1998), Alonso (2003), La Rocca et al. (2009).
	Capital structure ratio, the ratio of book value of total debt (D) to market value of equity (E)	D/E	(2) $GEAR_{i,t}$	Kochhar & Hitt (1998), Alonso (2003), La Rocca et al. (2009), Apostu, (2010).
Independent variables:				
Product Diversification (ALTENATIVE MEASURES)	Commercial/Product diversification may be measured by BARRY-HERFINDAL index for firm i in year t	$HI_{i,t}=1-\sum(S/\sum S)^2$ Where: HI $_{i,t}$: sales revenue according to BARRY-HERFINDAL indicator for firm i in year t. S: sell a certain portion of the company to define a product $\sum$S: The total sales (ie, the total sales of parts/products)	$TDIVE_{i,t}$	Markowitz (1952), Sharpe (1964), Barnea & Logue (1973), Jacquemin & Berry (1979), Palepu (1985), Varadarajan and Ramanujam (1987), Kochhar & Hitt (1998), Chatterjee &Wemerfelt (1991), Hendrikse & Oijen (2002), Alonso (2003), Singh et al. (2003), Kranenburg et al. (2004),La Rocca et al. (2009), Apostu (2010), García et al. (2013), Oh et al. (2014).
	Or may be measured by; Categorical Measure, as developed specifically by Varadarajan and Ramanujam	Broad spectrum Diversification (BSD) as number of 2-digit SIC codes a firms operates, Mean Narrow Spectrum Diversification (MNSD) as number of 4-digit SIC codes a firm operates divided by BSD	$TDIVE_{i,t}$	
	Or Efficient diversification measure, Which uses the following proxies; standard deviation of the residuals σ(ε) and determination coefficient R^2 to measure product diversification	$R_{i,t} = \alpha + \beta_i R_{m,t} + \varepsilon_{i,t}$ Where $R_{it}$is the profitability of firm i in period t, $R_{m,t}$is the market profitability in period t, $\beta_i$is the systematic risk and $\varepsilon_{i,t}$is the random disturbance.	$TDIVE_{i,t}$	
Independent variables:				
	Or may be measured by;	Calculated as $\sum P_j * \ln(1/P_j)$, where P	$TDIVE_{i,t}$	

Variables for the Regression Model				
Variables	**Definitions**	**Measurement**	**Symbols**	**Researchers who used the variables and measures**
	Entropy measure, which is weighted number of business segments/products to control	refers to the proportion of sales in business segment j and $\ln(1/P_j)$ is the weight for that segment. Total diversification in this measure is capable of being decomposed into related and unrelated product diversification as under.		
	Unrelated diversification measure is involvement of a firm concurrently in more than one business segment within the first 2 digits of SIC codes or first 3 digits NAICS codes.	$UDIVE_{it} = \sum_{j=1}^{n} S_j \ln\left(1/S_j\right)$; Where S_j is the proportion of business (sales) of segment j defined according to the first 2 digits of the SIC code or 3 digit of the NAICS codes	$UDIVE_{i,t}$	
	Related product diversification measure is involvement of a firm concurrently in more than one business segment within the first 4 digits of SIC codes or first 6 digits NAICS codes.	$RDIVE_{i,t} = TDIVE_{i,t} - UDIVE_{i,t}$	$RDIVE_{i,t}$	
Tangibility	The ratio of total non-current assets (NCA ot PPE) to the book value of total assets (TA)	(NCA/TA) Or (PPE/TA)	$TANG_{i,t}$	Jensen and Meckling (1976), Titman and Wessels (1988); Rajan and Zingales (1995), Kochhar and Hitt (1998), Alonso (2003), La Rocca et al. (2009), Apostu, 2010).
Size	natural logarithms of sales revenue Or natural logarithms of total assests	In natural logarithms (ln) of total assets values Or ln(Sales) Or ln(TA)	$SIZE_{i,t}$	Titman and Wessels (1988); Rajan and Zingales (1995), Kochhar and Hitt (1998), Alonso (2003), La Rocca et al. (2009)
Profitability	The ratio of earnings before interest, taxes, depreciation and amortization (EBITDA) to the book value of total asset ratio	EBITDA/TA Or EBIT/TA	$PROF_{i,t}$	Titman and Wessels (1988), Harris & Raviv (1991), Rajan & Zingales (1995), Kochhar & Hitt (1998), La Frank & Goyal (2002), Alonso

Variables for the Regression Model				
Variables	**Definitions**	**Measurement**	**Symbols**	**Researchers who used the variables and measures**
				(2003), Rocca et al. (2009), Frank & Goyal (2004), Apostu, (2010), Vries (2010), Oh et al. (2014).
Growth Opportunities	Research and development (R&D)to sales ratio (S) Or sales annual growth	R&D/S or **Sales annual growth (**%ΔSales)	(1) $GROP_{i,t}$	Kochhar & Hitt (1998), Alonso (2003), La Rocca et al. (2009), Apostu, (2010).
	Market value of Equity /Book value of Equity Or Equity Market Timing	MVE / BE	(2) $GROP_{i,t}$	Rajan & Zingales (1995), Alonso (2003), La Rocca et al. (2009), Jairo (2006),Apostu (2010),Oh et al. (2014).
Going Concern	Age of the company	The number of years in operations	$GOCO_{i,t}$	Kochhar & Hitt (1998), Alonso (2003), La Rocca et al. (2009), Apostu (2010).
Non-debt Tax Shield	Depreciation and Amortization (DA) divided by total assets (TA)	DA/TA	$NDTS_{i,t}$	Myers (1984), Titman & Wessels (1988), Kremp et al. (1999), Booth et al. (2001), Alonso (2003), La Rocca et al. (2009), Apostu (2010).
Bankruptcy Risk/Financial Distress	Earnings volatility as a percentage change of earnings (operating incomes) Or Earnings change as percentage	%Δ(EBITDA) or ΔEBITDA/%ΔSales	$RISK_{i,t}$	Alonso (2003), La Rocca et al. (2009), Apostu (2010).

Source: Researcher's own design (2015).

Appendix II: Comparable capital structure capital structure levels

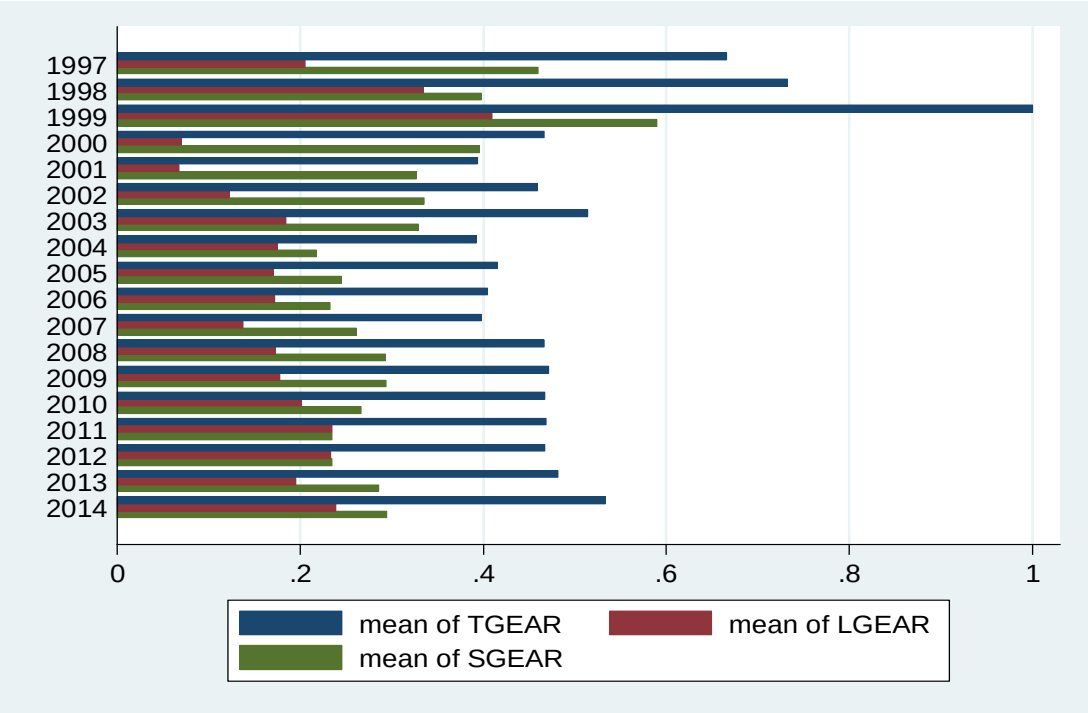

Figure 8.1Capital structure ratio: means for capital structure ratios by years
Source: Data analysis (2016).

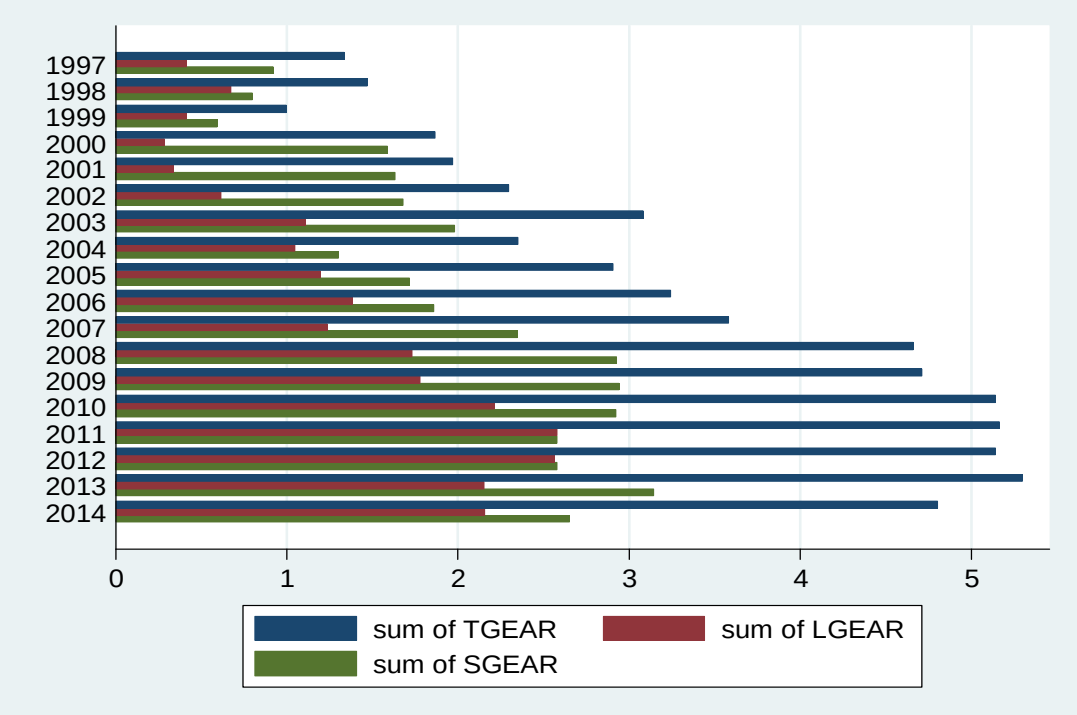

Figure 8.2 Capital structure ratio: sum for capital structure ratios by years
Source: Data analysis (2016).

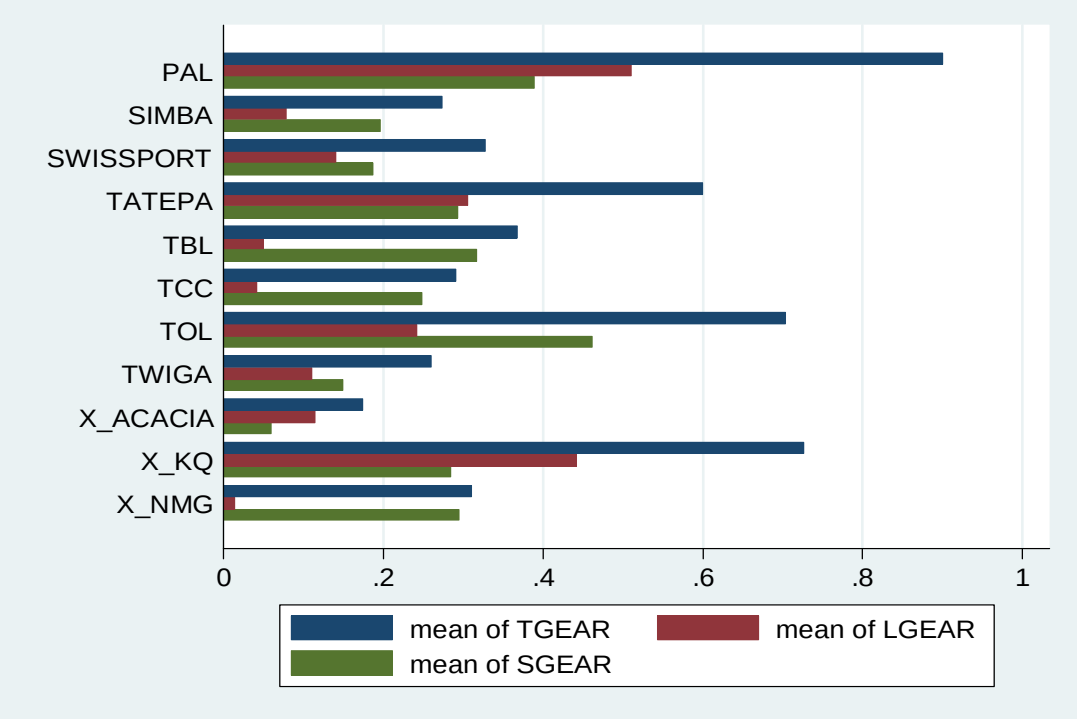

Figure 8.3:Capital structure ratio: means for capital structure ratios by companies

Source: Data analysis (2016).

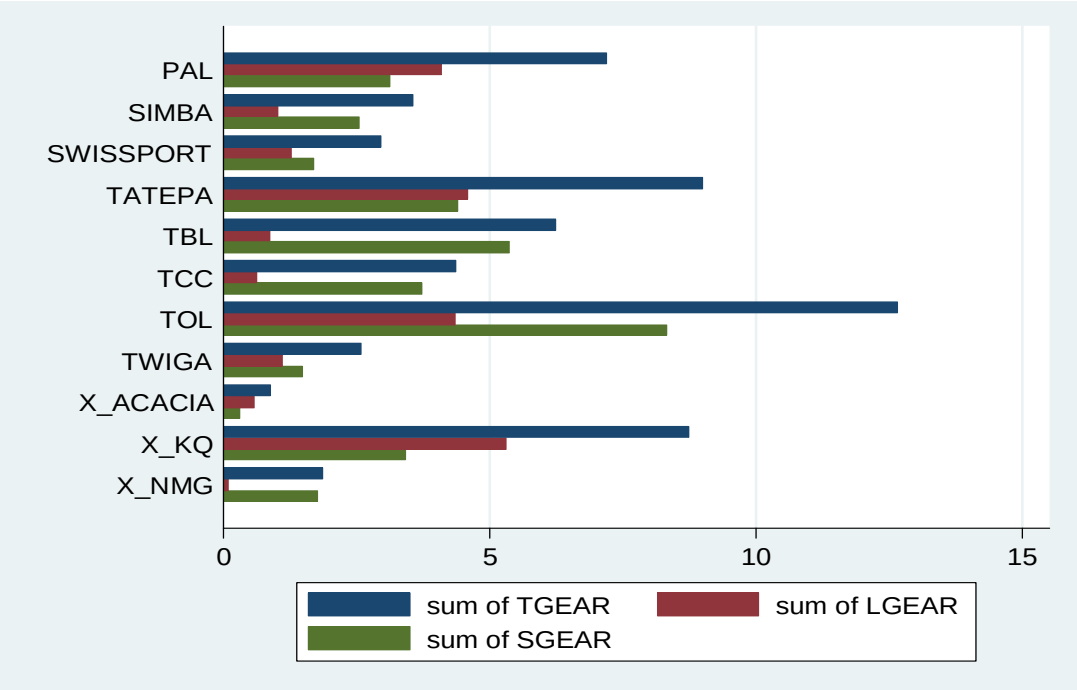

Figure 8.4 Capital structure ratio: sum for capital structure ratios by companies

Source: Data analysis (2016).

Appendix III: Comparable product diversification levels

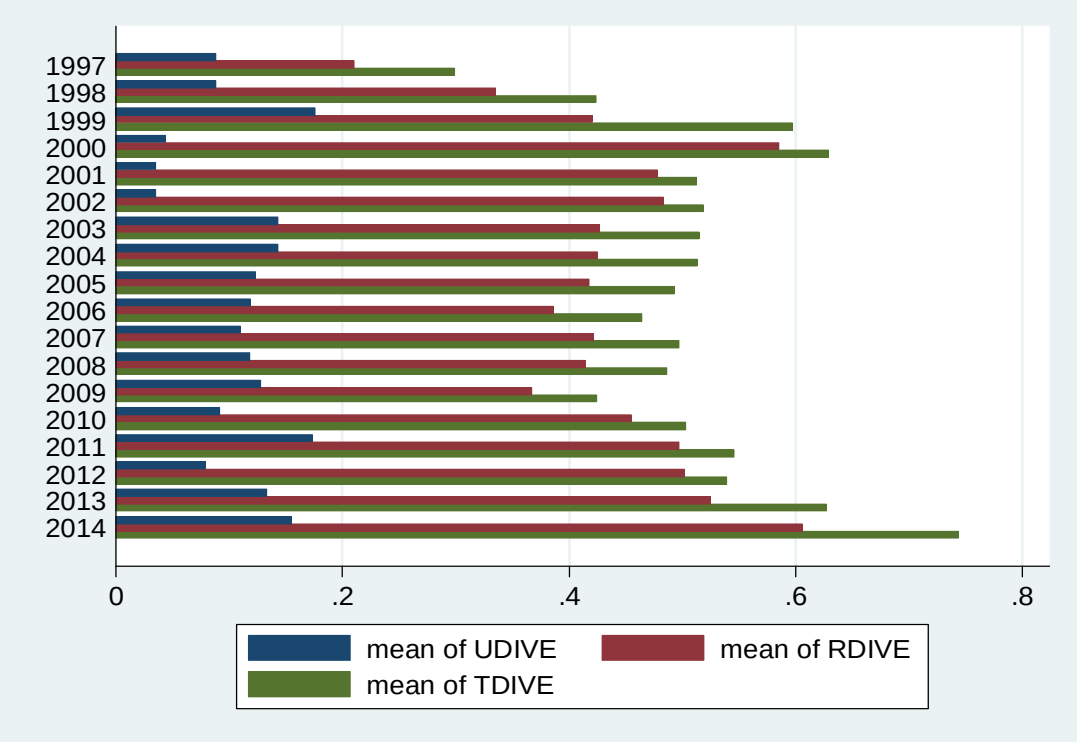

Figure 8.5: Product diversification: means for product diversification by years
Source: Data analysis (2016).

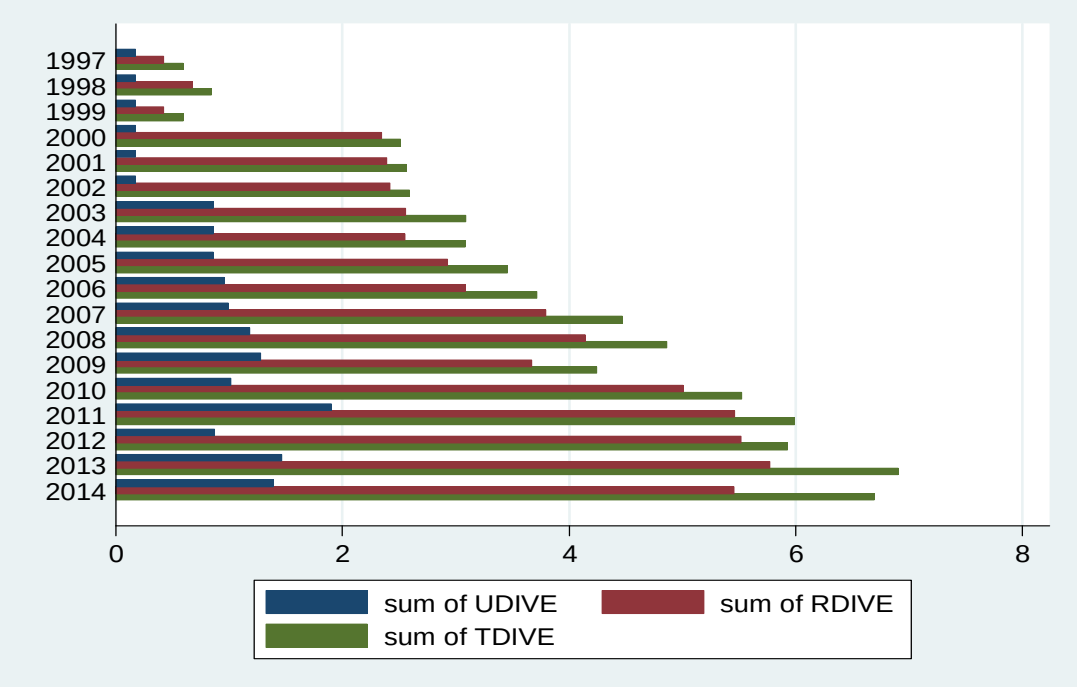

Figure 8.6 Product diversification: sums for product diversification by years
Source: Data analysis (2016).

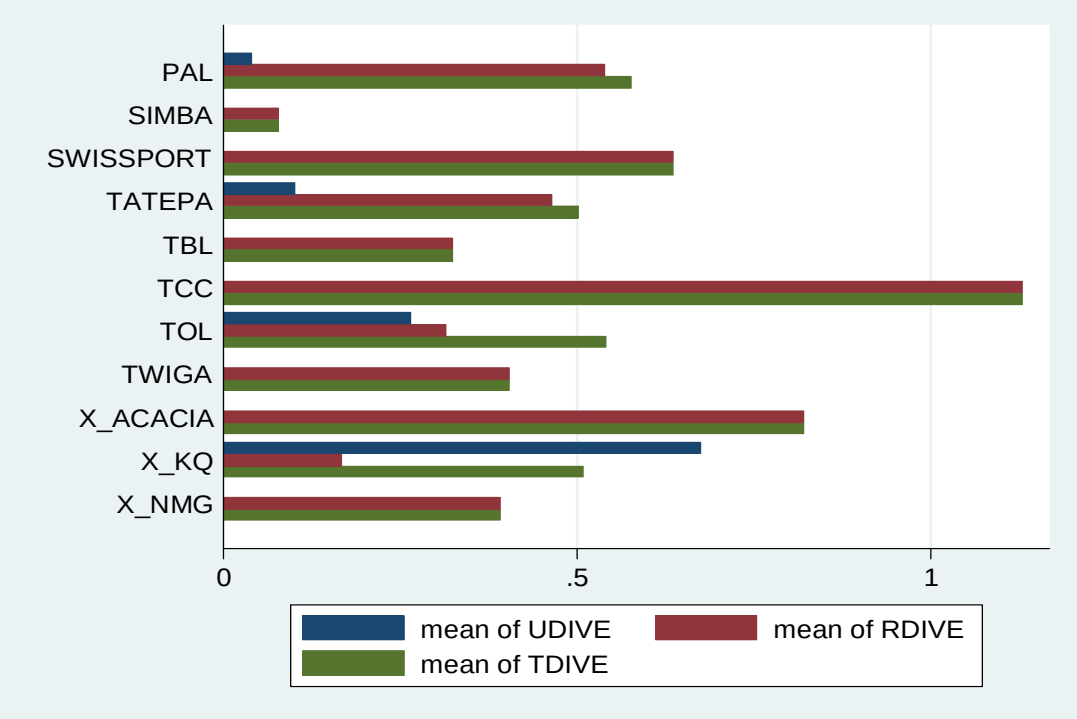

Figure 8.7: Product diversification: means for product diversification by companies
Source: Data analysis (2016).

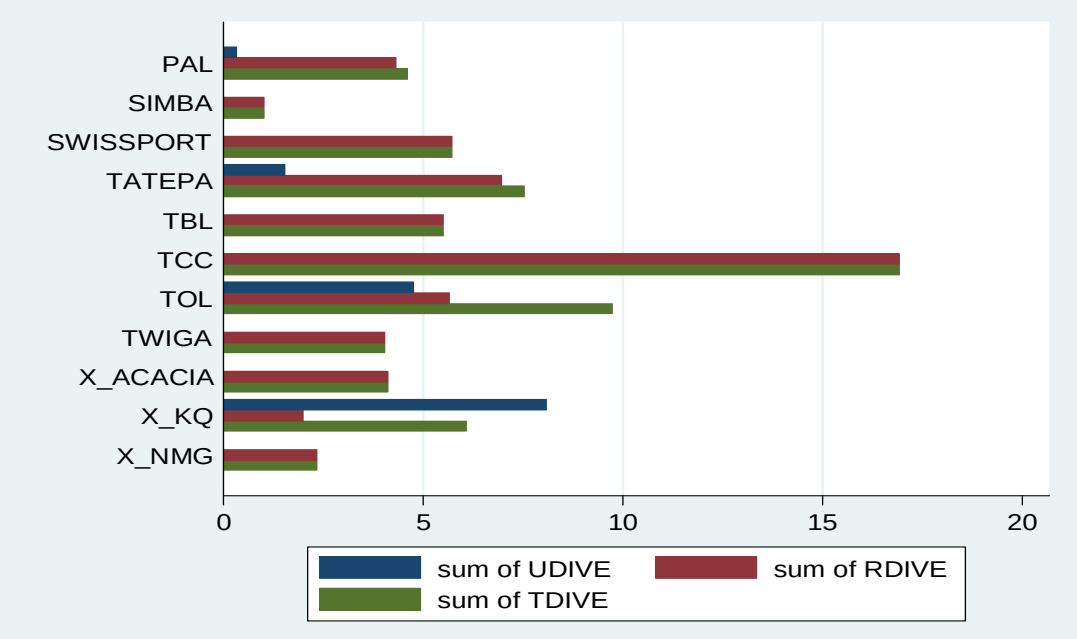

Figure 8.8 Product diversification: sums for product diversification by companies
Source: Data analysis (2016).

Appendix IV: Comparable capital structure conventional factors levels

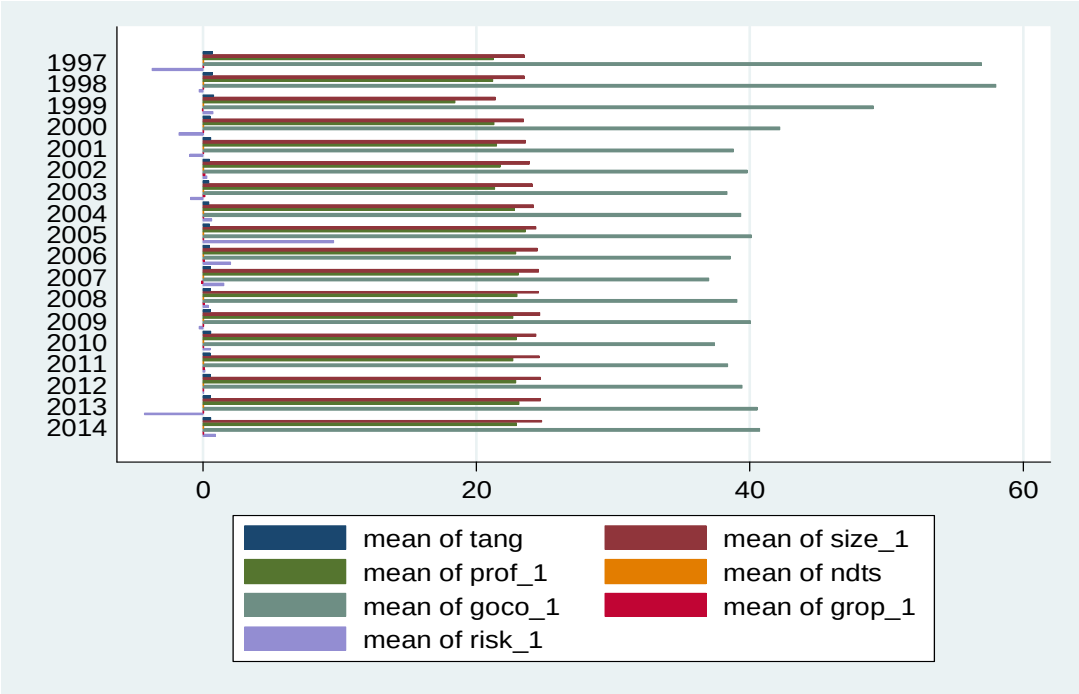

Figure 8.9 Conventional factors: means for conventional by years

Source: Data analysis (2016).

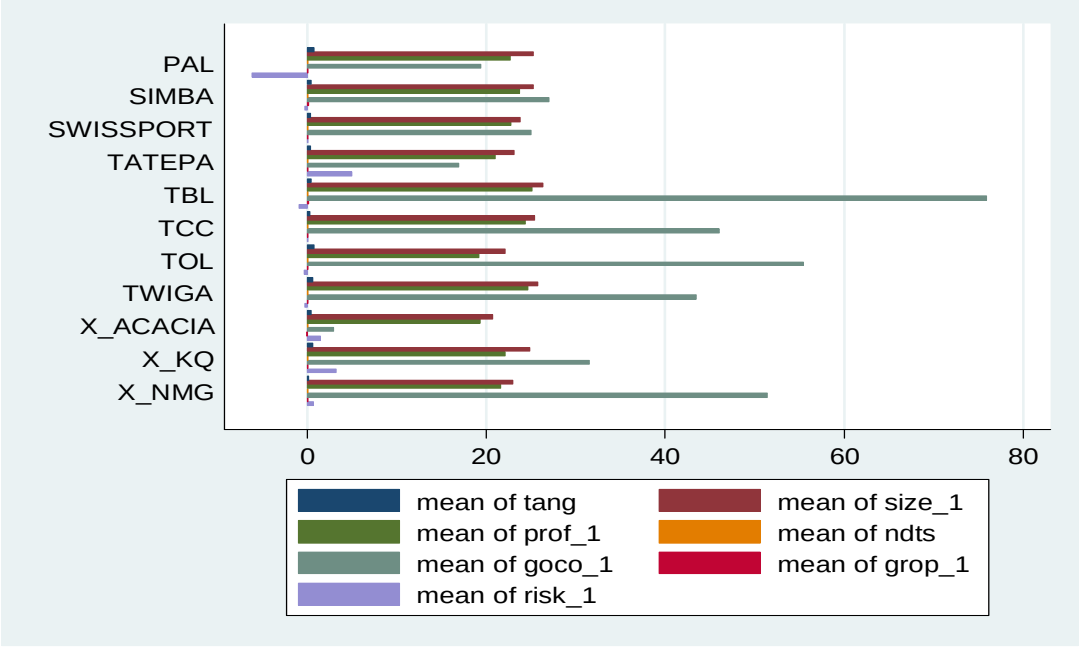

Figure 8.10: Conventional factors: means for conventionals by companies

Source: Data analysis (2016).

Appendix V: Variables' linearity assumptions checks

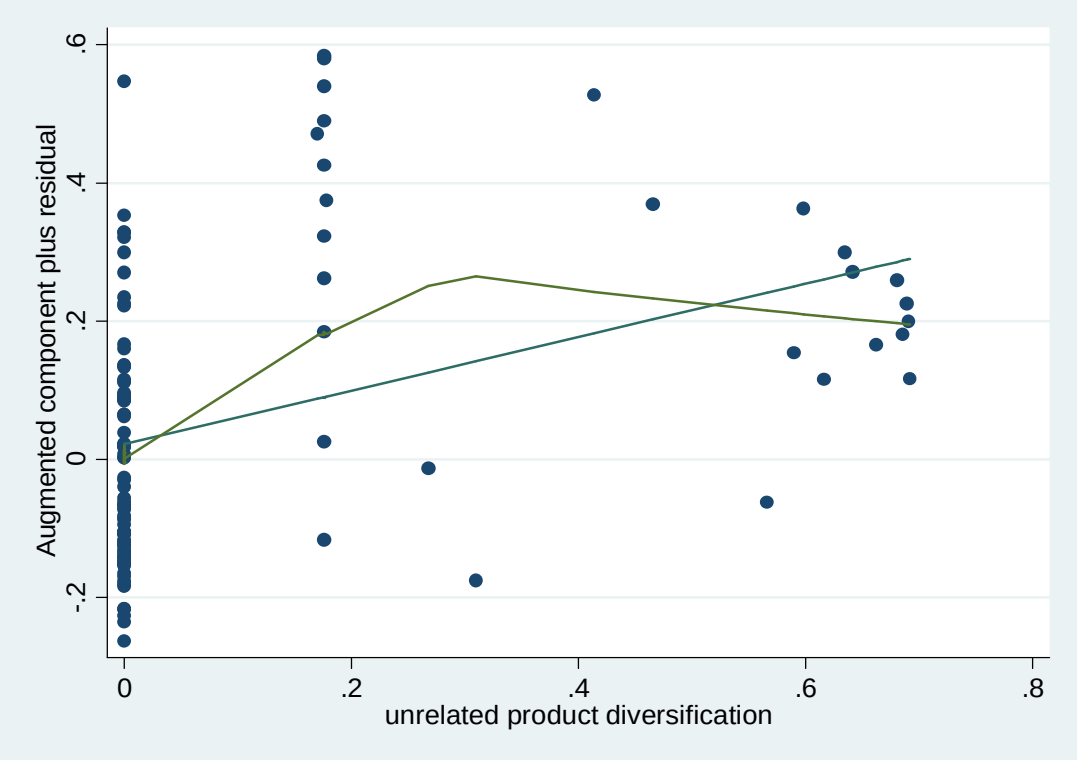

Figure 8.11 Linearity: unrelated diversification
Source: Data analysis (2016).

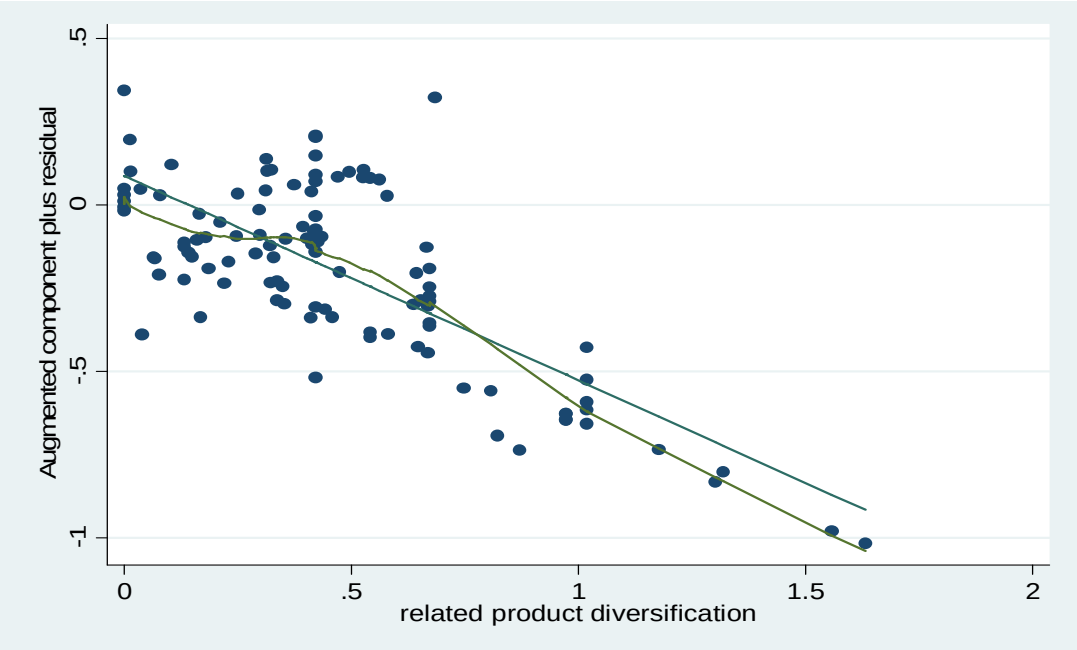

Figure 8.12 Linearity: related diversification

Source: Data analysis (2016).

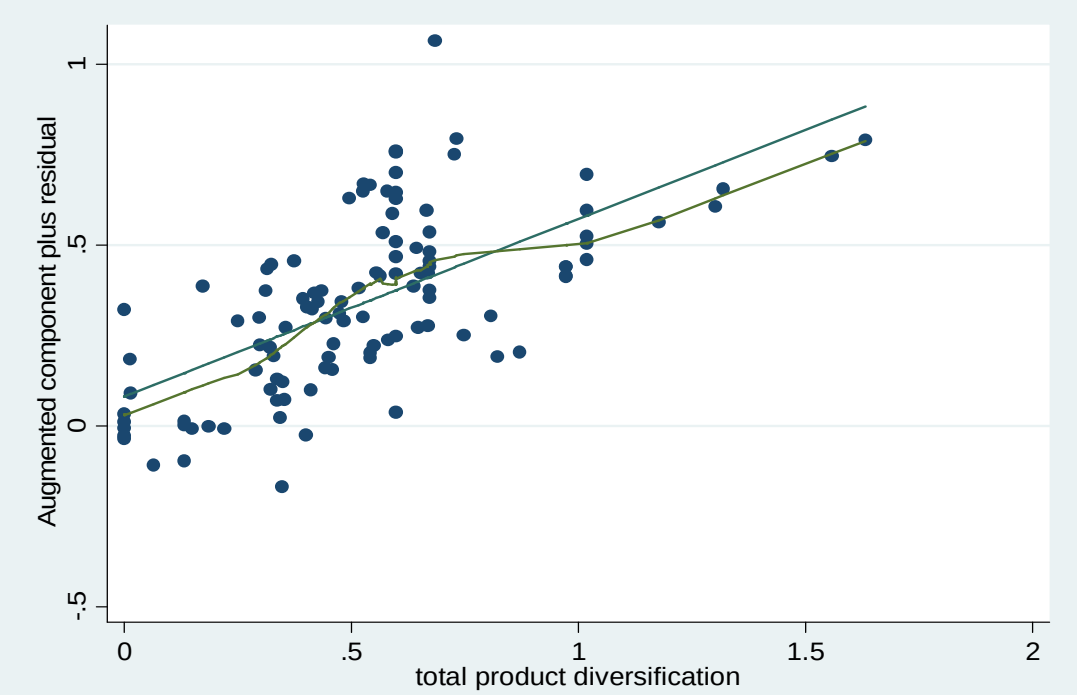

Figure 8.13 Linearity: total diversification
Source: Data analysis (2016).

Figure 8.14 Linearity: asset tangibility
Source: Data analysis (2016).

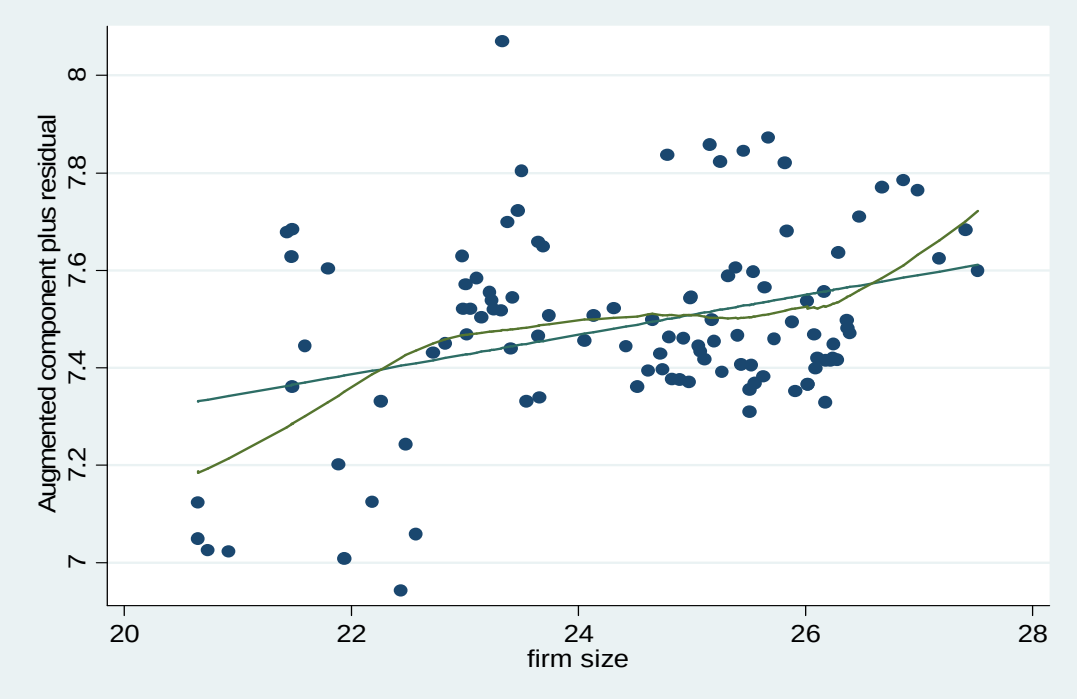

Figure 8.15 Linearity: firm size
Source: Data analysis (2016).

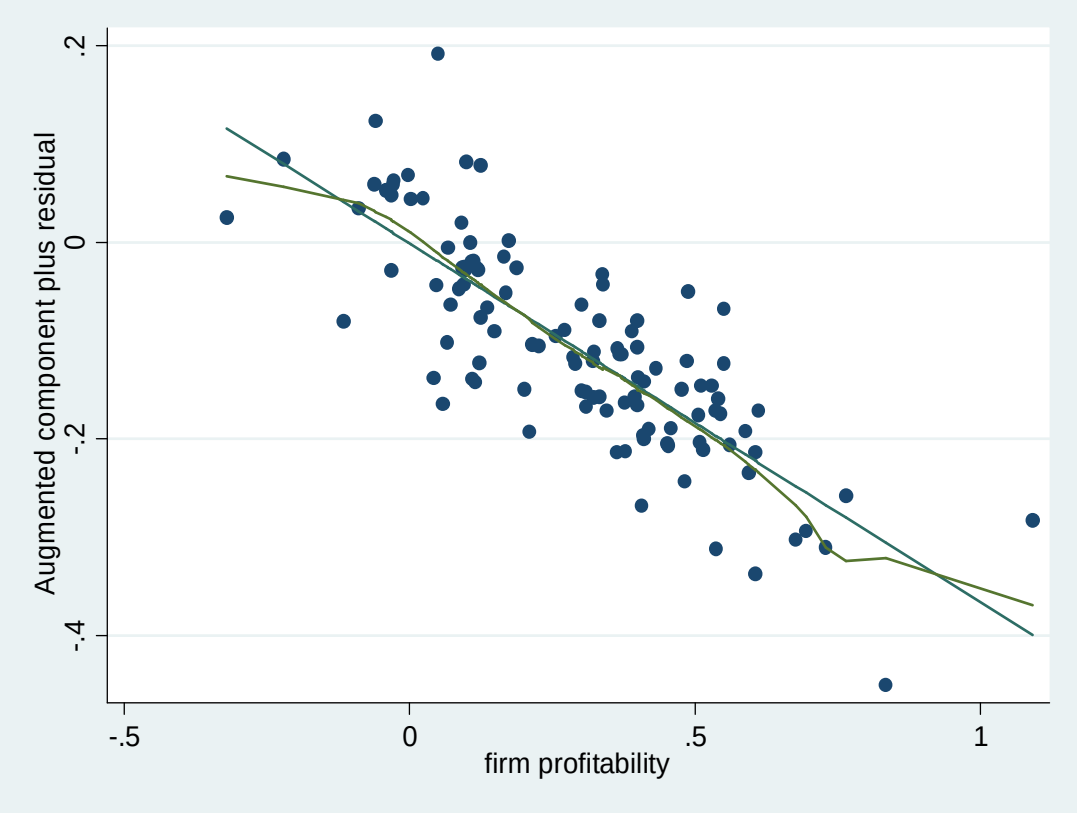

Figure 8.16 Linearity: firm profitability
Source: Data analysis (2016).

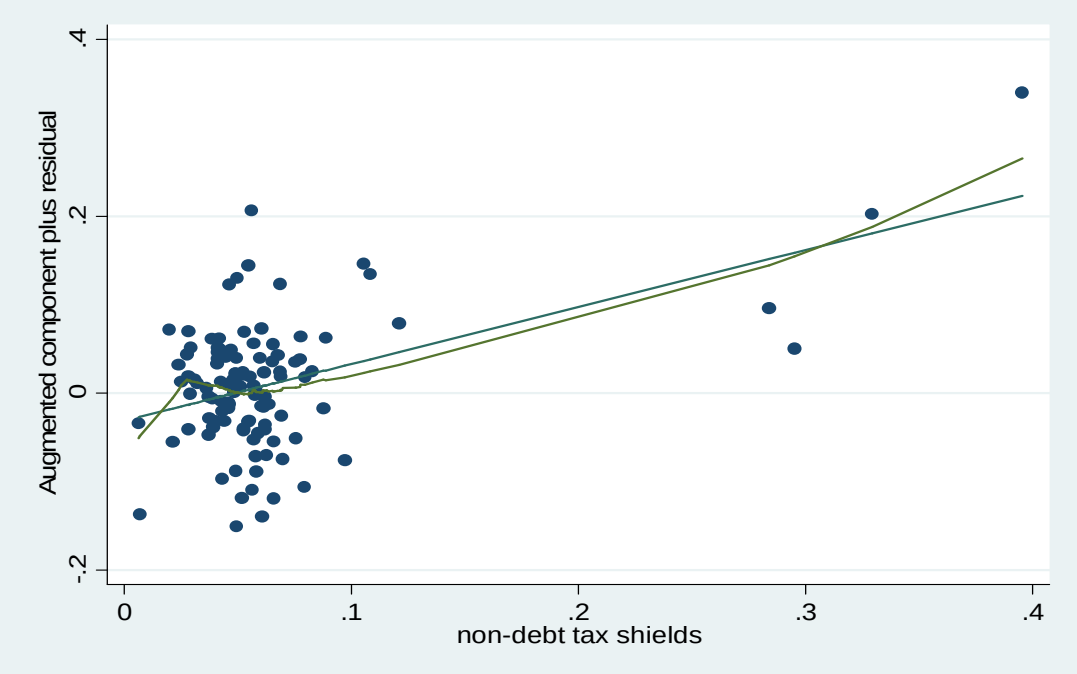

Figure 8.17 Linearity: non-tax depreciation shield
Source: Data analysis (2016).

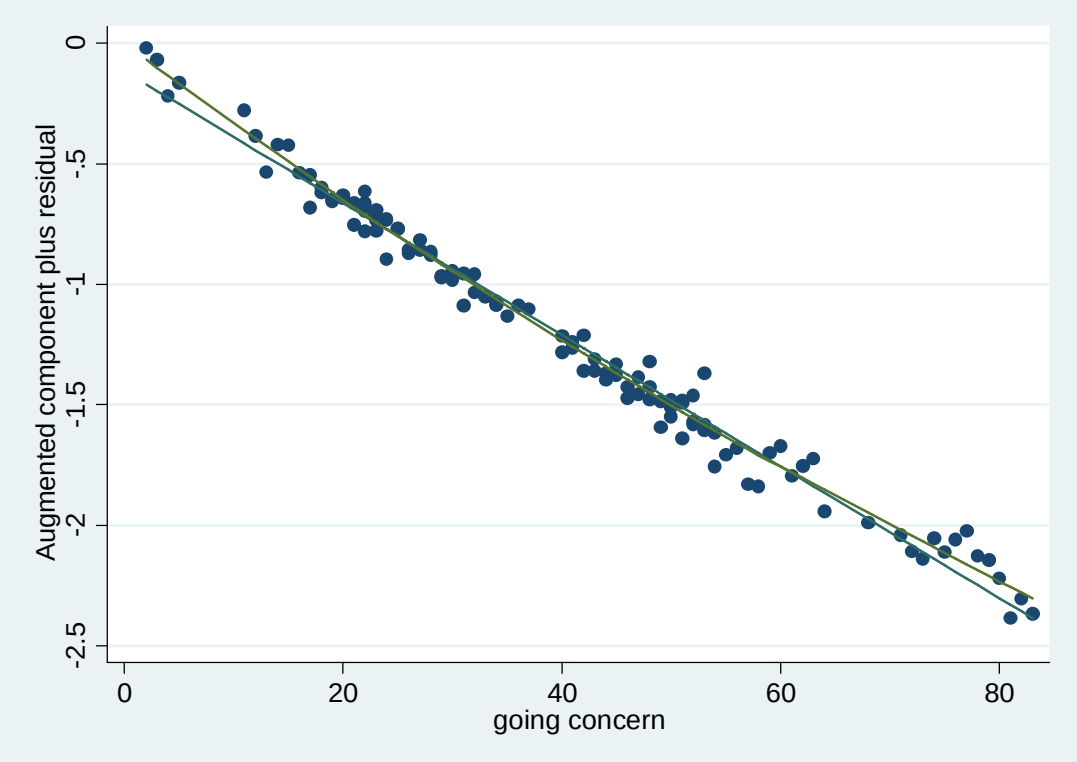

Figure 8.18: Linearity: going concern
Source: Data analysis (2016).

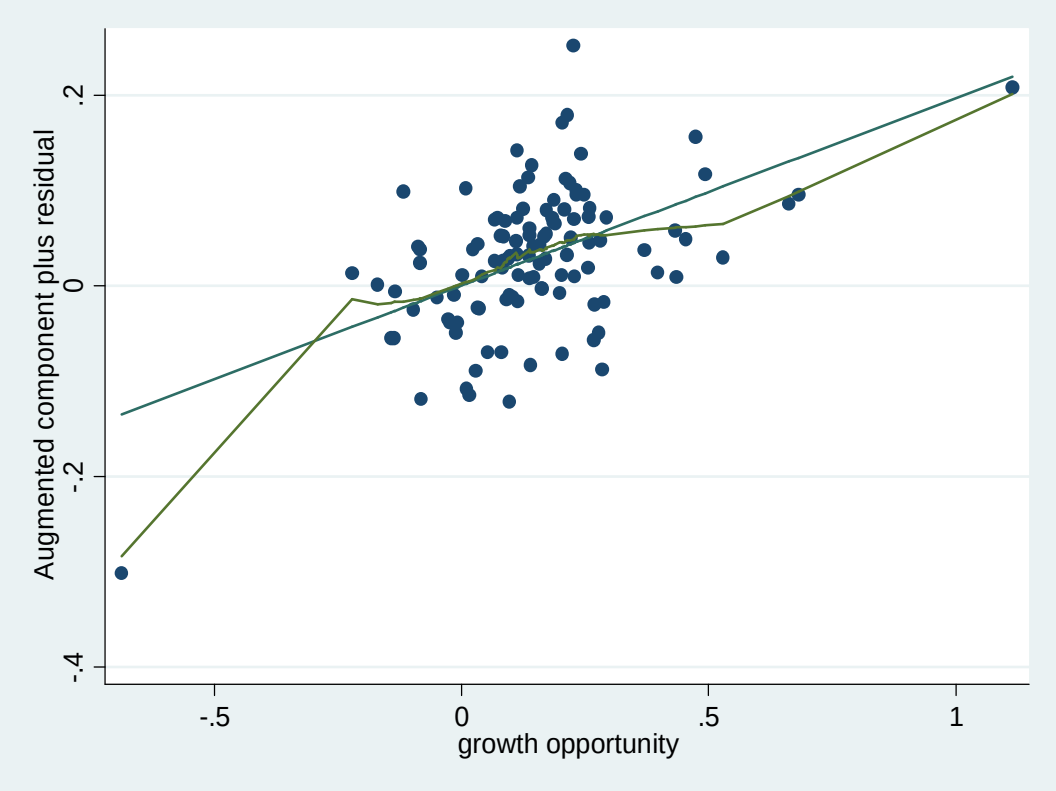

Figure 8.19: Linearity: growth opportunity
Source: Data analysis (2016).

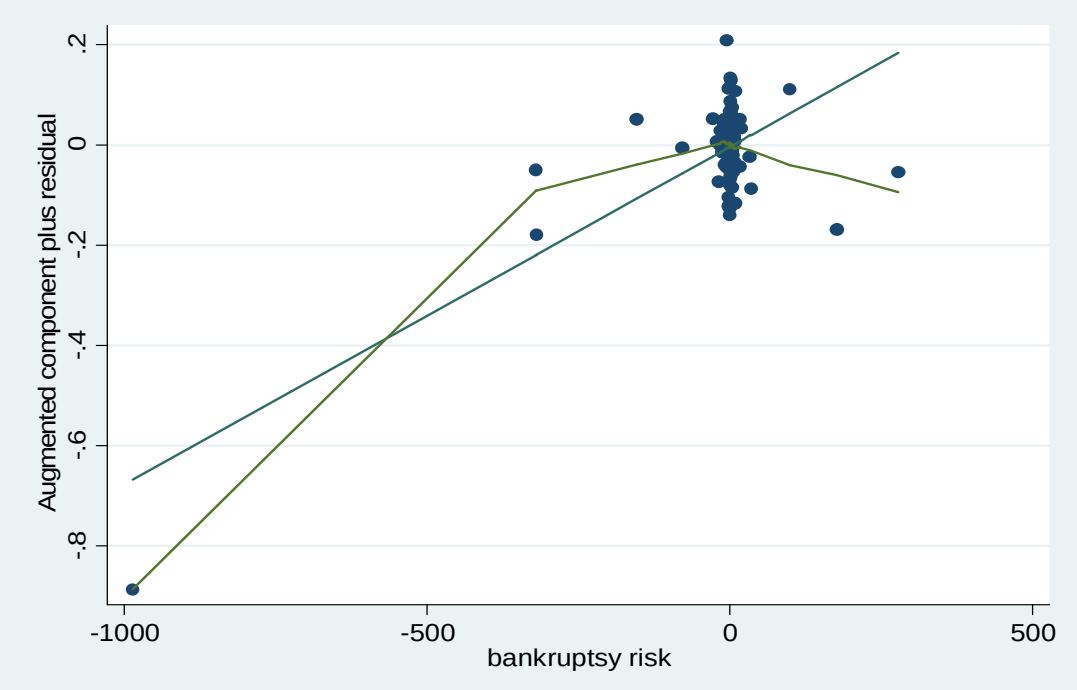

Figure 8.20 Linearity: risk of bankruptcy
Source: Data analysis (2016).

Appendix VI Various normality graphs checks

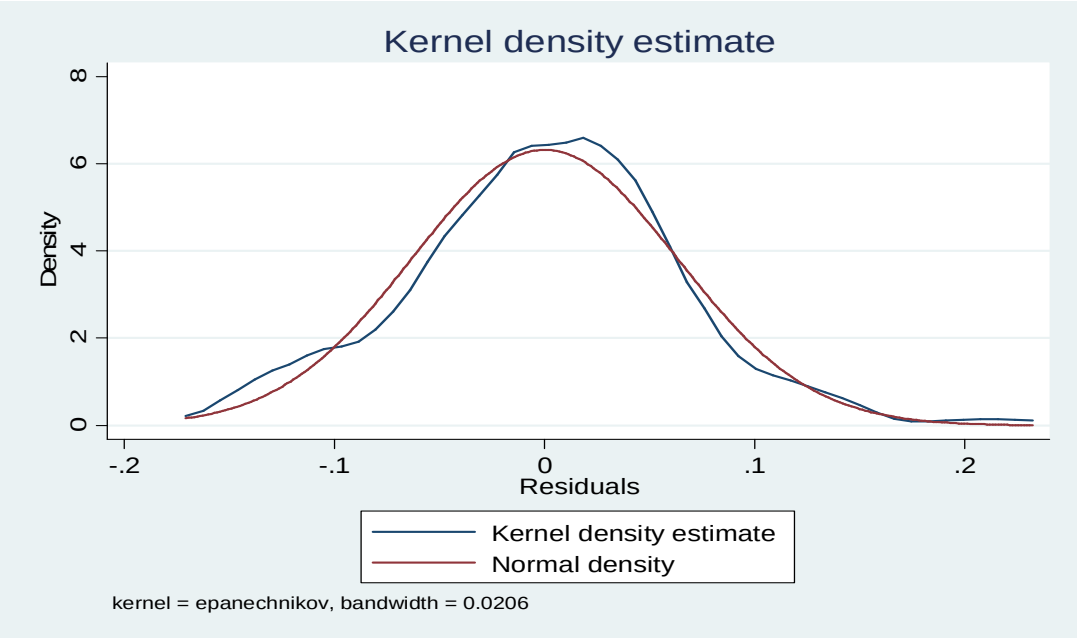

Figure 8.21 Normality check: kernel density estimate

Source: Data analysis (2016).

A kernel density plot produces a kind of histogram for the residuals, the option normal overlays a normal distribution to compare. Here residuals seem to follow a normal distribution.

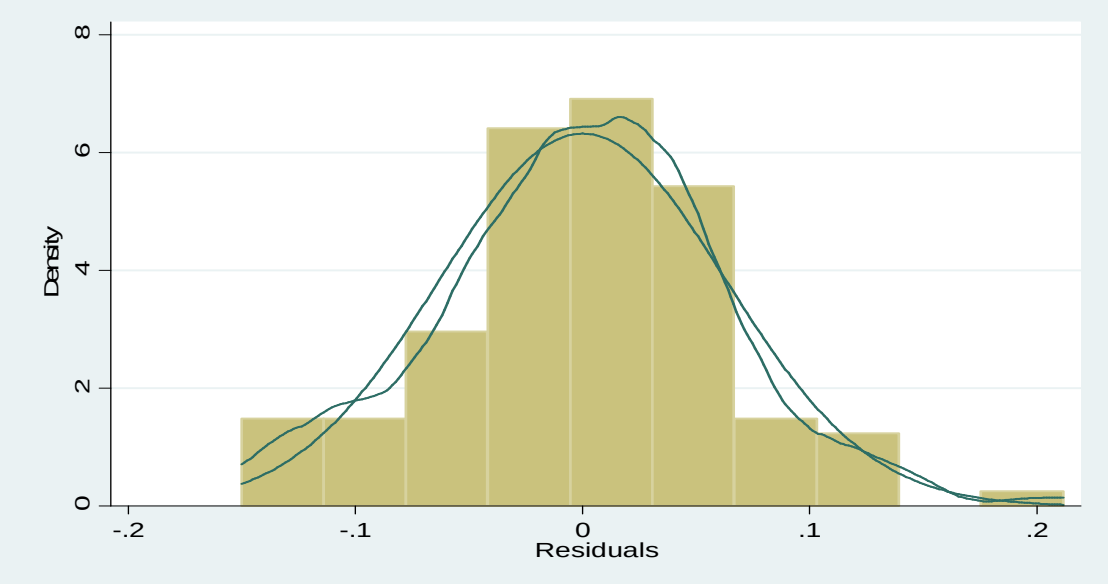

Figure 8.22 Normality check: normal residuals

Source: Data analysis (2016).

Standardize normal probability plot (*pnorm*) checks for non-normality in the middle range of residuals. Again, slightly off the line but looks ok.

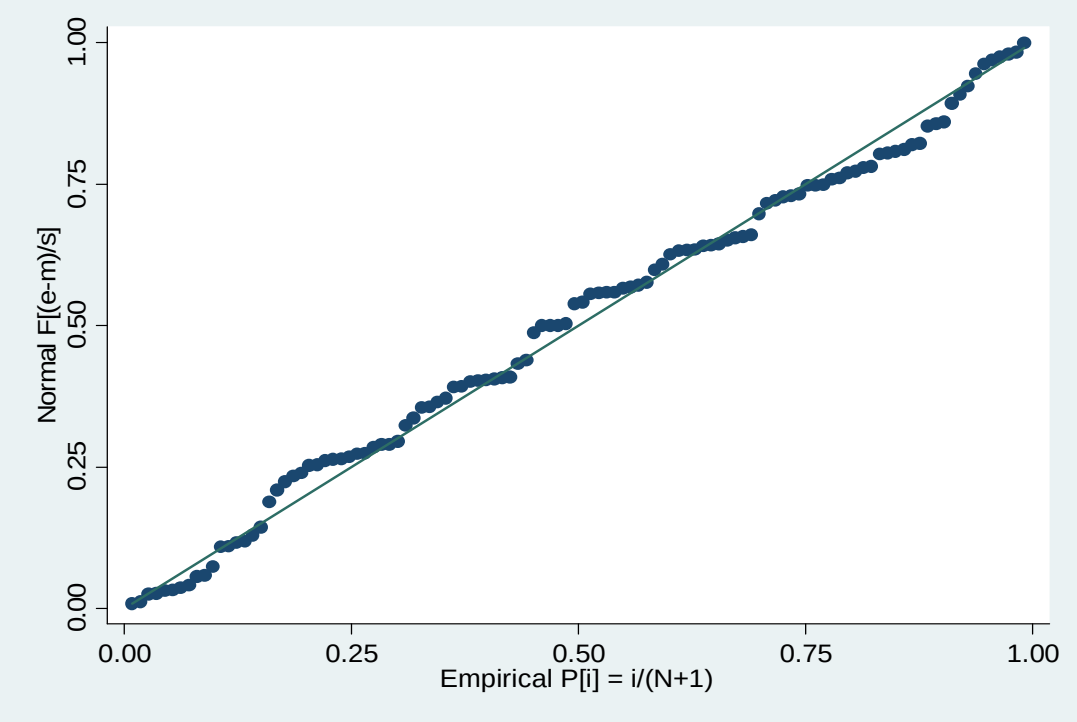

Figure 8.23 Normality check: standardize normal probability plot (*pnorm*)
Source: Data analysis (2016).

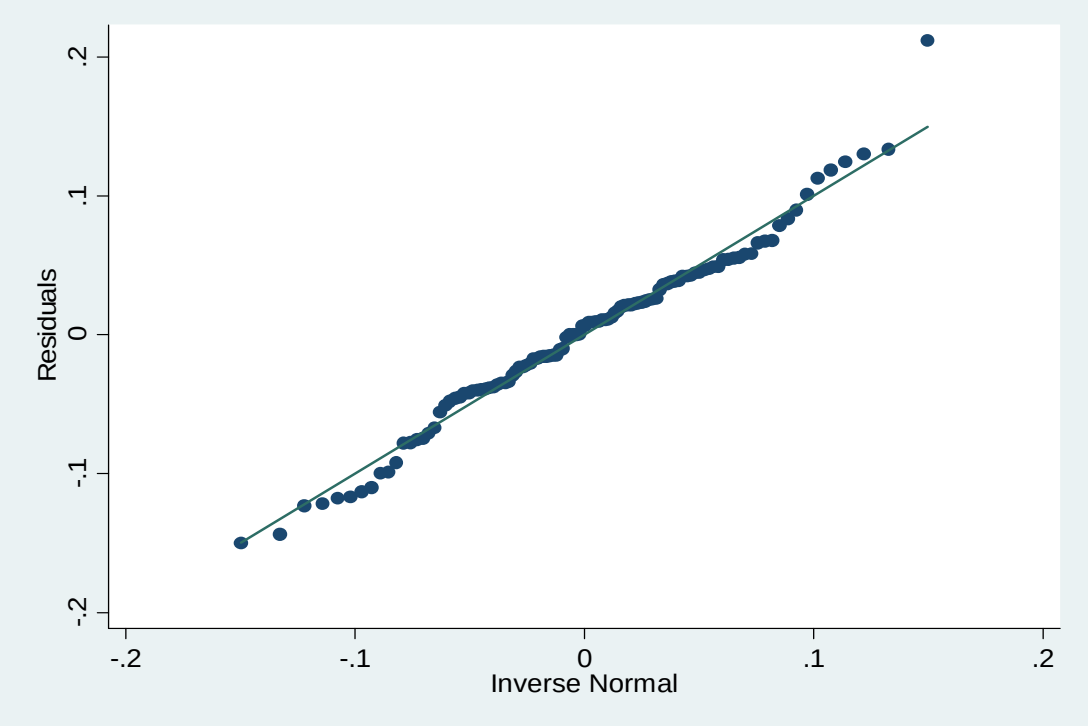

Figure 8.24 Normality check: quintile-normal plots (*qnorm*)
Source: Data analysis (2016).

Quintile-normal plots (qnorm) check for non-normality in the extremes of the data (tails). It plots quintiles of residuals vs. quintiles of a normal distribution. Tails are a bit off the normal.

Appendix VII: Assessment of heterogeneity

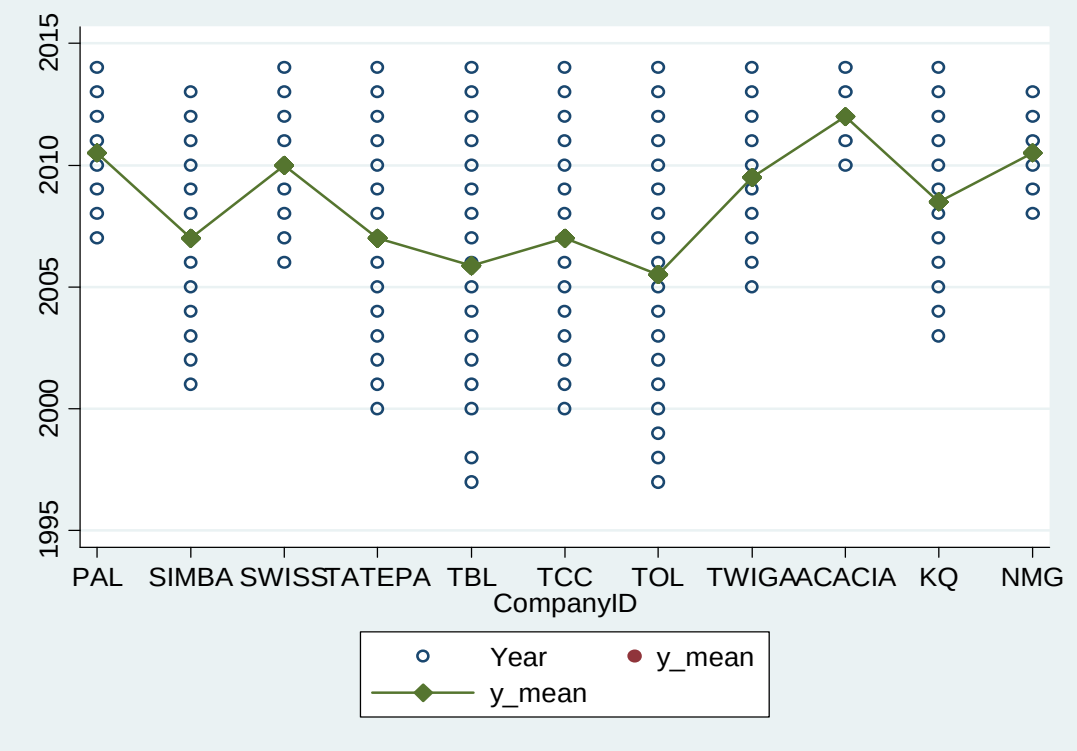

Figure 8.25 Fixed effects: assessing heterogeneity across companies
Source: Data analysis (2016).

Appendix VIII: Guide for target adjustment coefficients models interpretations

Table 8.3 Interpretations of the coefficients of the target adjustment models

$(1 - \alpha) = 1$ or equivalent to: $\alpha = 0$	$(1 - \alpha) = 0$ or equivalent to: $\alpha = 1$
- Firms do not adjust; - Debt stays at the previous year's value; - There are high (transaction) adjustment costs; - The costs associated with being in disequilibrium are low.	- Firms automatically adjust; - Debt is instantaneously adjusted to the previous year's value; - There are low (transaction) adjustment costs; - The costs associated with being in disequilibrium are high.
$(1 - \alpha)$ *close* to 1 or equivalent to: α *close* to 0	$(1 - \alpha)$ *close* to 0 or equivalent to: α *close* to 1
- Firms slowly adjust.	- Firms quickly adjust.

Source: La Rocca (2009).

Appendix IX: List of Stata commands used and notes

//panel data exploration//

xtline y

xtline y, overlay

//FEM:Heterogeneity accross companies/entities//

bysort CompanyID:egen y_mean=mean(y)

twoway scatter y* CompanyID, msymbol (circle_hollow)||connected y_mean CompanyID,msymbol(diamond)||, xlabel(1 "PAL" 2 "SIMBA" 3 "SWISS" 4 "TATEPA" 5 "TBL" 6 "TCC" 7 "TOL" 8 "TWIGA" 9 "ACACIA" 10 "KQ" 11 "NMG")

//FEM:Heterogeneity accross years/time//

bysort TimeYear:egen y_mean1=mean(y)

twoway scatter y* TimeYear, msymbol (circle_hollow)||connected y_mean1 TimeYear,msymbol(diamond)||, xlabel(1997(2)2014)

//OLS Regression//variables to be discarded because they were not projecting the expected signs or were not significant(size_2 prof_2 grop 1 RISK risk_3 risk_4)//

regress TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS

twoway scatter y* UDIVE, ||lfit y* UDIVE, clstyle(p.5) //not rondom enough

twoway scatter y* RDIVE, ||lfit y* RDIVE, clstyle(p.5)//rondom

twoway scatter y* TDIVE, ||lfit y* TDIVE, clstyle(p.5) //rondom

twoway scatter y* TANG, ||lfit y* TANG, clstyle(p.5) //rondom

twoway scatter y* SIZE, ||lfit y* SIZE, clstyle(p.5) //both not very rondom

twoway scatter y* PROF, ||lfit y* PROF, clstyle(p.5) //both rondom

twoway scatter y* NDTS, ||lfit y* NDTS, clstyle(p.5) //not rondom

twoway scatter y* GOCO, ||lfit y* GOCO, clstyle(p.5) //all goco variables are problematic they lack rondomness

twoway scatter y* GROP, ||lfit y* GROP, clstyle(p.5)

twoway scatter y* RISK, ||lfit y* RISK, clstyle(p.5)

//FE ==> LSDV1 without a dummy//

xi:regress TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS

xi:regress TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.CompanyID

predict TGEARhat

separate TGEARhat, by(CompanyID)

twoway connected TGEARhat1-TGEARhat11 UDIVE, msymbol(none diamond_hollow+circle_hollow x)msize(medium) mcolor(black black black black black black black black black black black)||lfit TGEAR UDIVE, clwidth(thick)clcolor(black)

xi:regress TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.CompanyID, robust //to control for homoskedasticity we add robust)

//FE ==> LSDV2 includes all dummies but without the intercept//

regress TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS _ICompanyID_1-_ICompanyID_11, noconstant

```
//FE ==> LSDV3 includes all dummies and the intercept with a restriction//
constraint define 1 _ICompanyID_1+_ICompanyID_2+_ICompanyID_3+_ICompanyID_4+_ICompanyID_5+_ICompanyID_6+_ICompanyID_7+_ICompanyID_8+_ICompanyID_9+_ICompanyID_10+_ICompanyID_11=0
cnsreg TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS _ICompanyID_1-_ICompanyID_11, constraint(1)

//outreg2 command for publication tables//
outreg2 [model1 model2] TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS _ICompanyID_1-_ICompanyID_11 using "C:\Documents and Settings\User\Desktop\PhD Analaysis and Strategy\MERGE 2016 Analysis.dta" , append ctitle(Odds ratio) eform

///*****************************************************************
*///
///analysis for the final results///
//descriptive analsis///
estpost summarize TGEAR LGEAR SGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS
esttab, cell("count mean sd min max")
esttab, cell("count mean(fmt(4)) sd (fmt(4)) min (fmt(4)) max (fmt(4))")
```

```
estpost summarize TGEAR LGEAR SGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS, detail
esttab .,cell("count mean(fmt(4)) sd (fmt(4)) min (fmt(4)) max (fmt(4)) skewness (fmt(4)) kurtosis (fmt(4))")nonumbers
esttab using TGEAR.rtf,cell("count mean(fmt(4)) sd (fmt(4)) min (fmt(4)) max (fmt(4)) skewness (fmt(4)) kurtosis (fmt(4))")nonumbers //to export table to word document

graph hbar (mean) TGEAR LGEAR SGEAR, over(TimeYear) // graphs capital structure ratios
graph hbar (sum) TGEAR LGEAR SGEAR, over(TimeYear) // graphs capital structure ratios
graph hbar (mean) TGEAR LGEAR SGEAR, over(CompanyID) // graphs capital structure ratios
graph hbar (sum) TGEAR LGEAR SGEAR, over(CompanyID) // graphs capital structure ratios

graph hbar (mean) UDIVE RDIVE TDIVE, over(TimeYear) // graphs diversification
graph hbar (sum) UDIVE RDIVE TDIVE, over(TimeYear) // graphs diversification
graph hbar (mean) UDIVE RDIVE TDIVE, over(CompanyID) // graphs diversification
```

graph hbar (sum) UDIVE RDIVE TDIVE, over(CompanyID) // graphs diversification

graph hbar (mean) TANG SIZE PROF NDTS GOCO GROP, over(CompanyID) // graphs controls

graph hbar (mean) TANG SIZE PROF NDTS GOCO GROP, over(TimeYear) // graphs controls

graph hbar (mean) RISK, over(CompanyID) // graphs controls

graph hbar (mean) RISK, over(TimeYear) // graphs controls

//Univariate analysis// for ==> TGEAR LGEAR SGEAR debtequity_ratio UDIVE RDIVE TDIVE TANG TANG_sq SIZE PROF NDTS GOCO GROP RISK

estpost ttest TGEAR LGEAR SGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS, by(r_u_g)

ttest LGEAR== SGEAR, unpaired unequal welch level(99) //unpaired ttest for long term and short term capital structure ratios

ttest UDIVE==RDIVE, unpaired unequal welch level(99) //unpaired ttest for unrelated and related

//correlations//

```
pwcorr TGEAR LGEAR SGEAR UDIVE RDIVE TDIVE TANG SIZE  PROF NDTS GOCO GROP RISK, star(0.05) bonferroni
corr TGEAR LGEAR SGEAR debtequity_ratio UDIVE RDIVE TDIVE TANG TANG_sq SIZE  PROF NDTS GOCO GROP RISK, wrap
set linesize 255
corr TGEAR LGEAR SGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS

estpost correlate TGEAR LGEAR SGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS, matrix

set linesize 255

esttab ., not unstack compress noobs nonumbers
esttab using correlation.rtf, not unstack compress nonumbers
//regression diagnostics and assumption test//
xi:regress TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS

vif //variance infaltion factor

//linearity check//
acprplot UDIVE, lowess
acprplot RDIVE, lowess
```

```
acprplot TDIVE, lowess

acprplot TANG, lowess

acprplot SIZE, lowess

acprplot PROF, lowess

acprplot NDTS, lowess

acprplot GOCO, lowess

acprplot GROP, lowess

acprplot RISK, lowess


//Outliers detections//

hadimvo  TGEAR, generate(newvar1) p(0.05)

hadimvo  LGEAR, generate(newvar2) p(0.05)

hadimvo  SGEAR, generate(newvar3) p(0.05)

hadimvo  TDIVE, generate(newvar4) p(0.05)

hadimvo  UDIVE, generate(newvar5) p(0.05)

hadimvo  RDIVE, generate(newvar6) p(0.05)

hadimvo  TANG, generate(newvar7) p(0.05)

hadimvo  SIZE, generate(newvar8) p(0.05)

hadimvo  PROD, generate(newvar9) p(0.05)

hadimvo  NDTS, generate(newvar10) p(0.05)

hadimvo  GOCO, generate(newvar11) p(0.05)

hadimvo  GROP, generate(newvar12) p(0.05)

hadimvo  RISK, generate(newvar13) p(0.05)
```

```
//normality check//
predict e, residual
kdensity e, normal
histogram e, kdensity normal
pnorm e
qnorm e

//test of heteroskedasticity//
regress TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK
NDTS
estat hettest

//specification test//
xi:regress TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK
NDTS i.CompanyID i.TimeYear,  robust
ovtest
linktest
xi:regress TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK
NDTS

//vif test//
vif

//autocorrelation test//
```

xtserial TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS

xtregar TGEAR L.TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS, fe

xi:xtregar TGEAR L.TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS, fe //autocorrelated with AR(1) ie first order autocorrelation

//testing for serial autocorrelations//

xtserial TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS

//FEM using LSDV1 //

xi:regress TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.TimeYear //to control for homoskedasticity may add robust)

estimate store LSDV1_t

xi:regress TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.CompanyID //to control for homoskedasticity may add robust)

estimate store LSDV1_c

xi:regress TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.CompanyID i.TimeYear //to control for homoskedasticity may add robust)

estimate store LSDV1_b

esttab LSDV1_t LSDV1_c LSDV1_b, beta(%8.4f) se (%8.4f) scalars(r2 r2_a rmse mss rss F) order(_cons UDIVE RDIVE TDIVE) wide compress mtitles //GOOD FOR COMPREHENISVE TABLE

esttab LSDV1_t LSDV1_c LSDV1_b using FEM.rtf, beta(%8.4f) se (%8.4f) scalars(r2 r2_a rmse mss rss F) order(_cons UDIVE RDIVE TDIVE) wide compress mtitles //EXPORTING THE TABLE TO MS-WORD

//FEM using LSDV1 CSE and PCSE//

xi:regress TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.CompanyID i.TimeYear //to control for homoskedasticity may add robust)

estimate store LSDV1_b

xi:regress TGEAR UDIVE RDIVE TDIVE TANG SIZE PROF NDTS GOCO GROP RISK i.CompanyID i.TimeYear, cluster(CompanyID) //Stata output for the static model, using LSDV with clustered standard errors//

estimate store CSE

xi: xtpcse TGEAR UDIVE RDIVE TDIVE TANG SIZE PROF NDTS GOCO GROP RISK i.CompanyID i.TimeYear, correlation(ar1) //Stata output for the static model estimated by Prais-Winsten regression with PCSE//

estimate store PCSE

esttab LSDV1_b CSE PCSE, beta(%8.4f) se (%8.4f) scalars(r2 r2_a rmse mss rss F) order(_cons RDIVE UDIVE TDIVE) wide compress mtitles keep(RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS) //GOOD FOR COMPREHENISVE TABLE

esttab LSDV1_b CSE PCSE using CSE_PCSE.rtf, beta(%8.4f) se (%8.4f) scalars(r2 r2_a rmse mss rss F) order(_cons RDIVE UDIVE TDIVE) wide compress mtitles keep(RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS) //EXPORTING TABLE TO MS-WORD

```
//F test//
regress TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK
NDTS
test RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS //for
the F test

//REM using GLS//
xtgls TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK
NDTS //random model
//OR
xtreg  TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK
NDTS, re robust //random model
//or

xtreg TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK
NDTS, re i( CompanyID) robust //random model
estimate store RE_GLS
xttest0  //Testing the REM

esttab RE_GLS LSDV1_b, beta(%8.4f) se (%8.4f) scalars(r2_w r2_b r2_o r2 r2_a
chi2 rmse mss rss) order(_cons RDIVE UDIVE TDIVE) wide mtitles keep(_cons
RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS)
//comparing the FE and          GLS

//dynamic panel// the static and dynamic models are compared
xi:regress TGEAR L.TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP
```

GOCO RISK NDTS i.CompanyID i.TimeYear //dynamic

estimate store dLSDV1_b

xi:regress TGEAR L.TGEAR UDIVE RDIVE TDIVE TANG SIZE PROF NDTS GOCO GROP RISK i.CompanyID i.TimeYear, cluster(CompanyID) //Stata output for the dynamic model, using LSDV with clustered standard errors//

estimate store dCSE

xi:xtpcse TGEAR L.TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.CompanyID i.TimeYear, correlation(ar1) //Stata output for the dynamic model estimated by Prais-Winsten regression with PCSE//

estimate store dPCSE

xtabond TGEAR UDIVE RDIVE TDIVE TANG SIZE PROF NDTS GOCO GROP RISK , noconstant lags(1) artests(2) vce(robust) //GMM arelano and bond (1991) estimations with exoginous regressors

estimate store GMM_ab

xtdpdsys TGEAR UDIVE RDIVE TDIVE TANG SIZE PROF NDTS GOCO GROP RISK, noconstant lags(1) artests(2) //Stata output for the dynamic model estimated by GMM(1998)with exogenous regressors

estimate store GMM_bb

xi:regress TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.CompanyID i.TimeYear //to control for homoskedasticity may add robust)

estimate store LSDV1_b

xi:regress TGEAR UDIVE RDIVE TDIVE TANG SIZE PROF NDTS GOCO GROP RISK i.CompanyID i.TimeYear, cluster(CompanyID) //Stata output for the static model, using LSDV with clustered standard errors//

```
estimate store CSE
xi:xtpcse TGEAR UDIVE RDIVE TDIVE TANG SIZE  PROF NDTS GOCO GROP  RISK i.CompanyID i.TimeYear, correlation(ar1) //Stata output for the static model estimated by Prais-Winsten regression with PCSE//
estimate store PCSE
esttab LSDV1_b dLSDV1_b CSE dCSE PCSE dPCSE GMM_ab GMM_bb, beta(%8.4f) se (%8.4f) scalars(r2 r2_a rmse mss rss F chi2 sargan) addnotes("Sargan test of overidentifying restrictions; H0: overidentifying restrictions are valid, for GMM_ab(1991)" "chi2(89)= 95.91445; Prob > chi2=0.2894, Arellano-Bond test for zero autocorrelation in first-differenced errors," "for GMM_ab(1991), ar(1) z=-3.6609, Prob>z = 0.0003 and ar(2) z = -1.7217, Prob>z = 0.0851; H0:no autocorrelation" "Sargan test of overidentifying restrictions, H0: overidentifying restrictions are valid was chi2(103)=105.7978," "Prob > chi2 = 0.4053. Wald tests 1, 2, 3 and 4 test the joint significance of company dummies, time dummies," "combined company and time dummies under the null hypothesis of no relationship were wald 1*** = F(10, 74) = 3.90," "Prob > F = 0.0003, wald 2 not significant= F(16, 74)= 1.65,Prob > F = 0.0768, wald 3*** = F(26, 74)= 2.69," "Prob > F = 0.0005, wald 4*** = F(10, 74) = 4.88,Prob > F = 0.0000. significance levels are interpreted as:")  compress mtitles order(_cons L.TGEAR RDIVE UDIVE TDIVE) keep(_cons L.TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS) //table
esttab LSDV1_b dLSDV1_b CSE dCSE PCSE dPCSE GMM_ab GMM_bb using static_dynamic.rtf, beta(%8.4f) se (%8.4f) scalars(r2 r2_a rmse mss rss F chi2 sargan) addnotes("Sargan test of overidentifying restrictions; H0: overidentifying
```

restrictions are valid, for GMM_ab(1991)" "chi2(89)= 95.91445; Prob > chi2=0.2894, Arellano-Bond test for zero autocorrelation in first-differenced errors," "for GMM_ab(1991), ar(1) z=-3.6609, Prob>z = 0.0003 and ar(2) z = -1.7217, Prob>z = 0.0851; H0:no autocorrelation" "Sargan test of overidentifying restrictions, H0: overidentifying restrictions are valid was chi2(103)=105.7978," "Prob > chi2 = 0.4053. Wald tests 1, 2, 3 and 4 test the joint significance of company dummies, time dummies," "combined company and time dummies under the null hypothesis of no relationship were wald 1*** = F(10, 74) = 3.90," "Prob > F = 0.0003, wald 2 not significant= F(16, 74)= 1.65,Prob > F = 0.0768, wald 3*** = F(26, 74)= 2.69," "Prob > F = 0.0005, wald 4*** = F(10, 74) = 4.88,Prob > F = 0.0000. significance levels are interpreted as:") compress mtitles order(_cons L.TGEAR RDIVE UDIVE TDIVE) keep(_cons L.TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS) //EXPORT TO MS-WORD

//sargan and wald1(chi2) tests//

xtabond TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS , noconstant lags(1) artests(2) //GMM arelano and bond (1991) estimations with exoginous regressors

estat sargan //for overidentification

estat abond //for serial correlation ar(1)and ar(2)

xtdpdsys TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS, noconstant lags(1) artests(2) //Stata output for the dynamic model estimated by GMM(1998)with exogenous regressors

estat sargan

```
xi:regress TGEAR L.TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.CompanyID i.TimeYear
testparm _ICompanyID_2- _ICompanyID_11  //wald 1
testparm _ITimeYear_1998- _ITimeYear_2014  //wald 2
testparm _ICompanyID_2- _ITimeYear_2014 //wald 3
testparm RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS //test for joint significant of independent variables wald 4

//analsys based on long term short term and total capital structure ratios//
xi:xtpcse TGEAR L.TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.CompanyID i.TimeYear, correlation(ar1) //tatal debt
estimate store totalD
xi:xtpcse LGEAR L.LGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.CompanyID i.TimeYear,correlation(ar1) //long debt
estimate store longD
xi:xtpcse SGEAR L.SGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.CompanyID i.TimeYear,correlation(ar1)  //short debt
estimate store shortD
esttab totalD longD shortD, beta(%8.4f) se (%8.4f) scalars(r2 rmse mss rss) wide compress mtitles order(_cons L.TGEAR L.LGEAR L.SGEAR RDIVE UDIVE TDIVE)keep(_cons L.TGEAR L.LGEAR L.SGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS) //tables
esttab totalD longD shortD using debt_types.rtf, beta(%8.4f) se (%8.4f) scalars(r2 rmse mss rss) wide compress mtitles order(_cons L.TGEAR L.LGEAR L.SGEAR
```

RDIVE UDIVE TDIVE)keep(_cons L.TGEAR L.LGEAR L.SGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS) //EXPORT TABLE TO MS-WORD

//group analysis: related, unrelated and total//

xi:regress TGEAR L.TGEAR TDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.CompanyID i.TimeYear, cluster(CompanyID) //total model

estimate store total

xi:regress TGEAR L.TGEAR UDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.CompanyID i.TimeYear if dive_subsamples==1, cluster(CompanyID) //unrelated model

estimate store unrelated

xi:regress TGEAR L.TGEAR RDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.CompanyID i.TimeYear if dive_subsamples==2, cluster(CompanyID) //related model

estimate store related

esttab total unrelated related , beta(%8.4f) se (%8.4f) scalars(r2 r2_a rmse mss rss)wide mtitles order(_cons L.TGEAR UDIVE RDIVE TDIVE)keep(_cons L.TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS) //tables

esttab total unrelated related using productrelatedness.rtf, beta(%8.4f) se (%8.4f) scalars(r2 r2_a rmse mss rss)wide mtitles order(_cons L.TGEAR UDIVE RDIVE TDIVE)keep(_cons L.TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS) //EXPORT TABLE TO MS-WORD

```
//group analysis: cross listed vs locally listed// 0 if locally and 1 if cross listed
xi:regress TGEAR L.TGEAR TDIVE RDIVE UDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.CompanyID i.TimeYear, cluster(CompanyID)  //both listed
estimate store both_listing
xi:regress TGEAR L.TGEAR TDIVE RDIVE UDIVE TANG SIZE PROF GROP GOCO RISK NDTS if listing_subsample==1, cluster(CompanyID) //cross listed
estimate store cross_listed
xi:regress TGEAR L.TGEAR TDIVE RDIVE UDIVE TANG SIZE PROF GROP GOCO RISK NDTS if listing_subsample==0, cluster(CompanyID) //locally listed
estimate store local_listed
esttab both_listing local_listed cross_listed, beta(%8.4f) se (%8.4f) scalars(r2 r2_a rmse mss rss) wide mtitles order(_cons L.TGEAR UDIVE RDIVE TDIVE)keep(_cons L.TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS) //tables
esttab both_listing local_listed cross_listed using listing_all.rtf, beta(%8.4f) se (%8.4f) scalars(r2 r2_a rmse mss rss) wide mtitles order(_cons L.TGEAR UDIVE RDIVE TDIVE)keep(_cons L.TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS) //EXPORT TABLE TO MS-WORD

///PREDICTED MODEL: ///
xi:xtpcse TGEAR L.TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.CompanyID i.TimeYear, correlation(ar1)  //prediction
predict TGEAR_predict
```

label variable TGEAR_predict "TGEAR predict"

scatter TGEAR TGEAR_predict

xi:xtpcse LGEAR L.LGEAR UDIVE RDIVE TDIVE TANG SIZE PROF NDTS GOCO GROP RISK i.CompanyID i.TimeYear, correlation(ar1) //prediction

predict LGEAR_predict

label variable LGEAR_predict "LGEAR predict"

scatter LGEAR LGEAR_predict

xi:xtpcse SGEAR L.SGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.CompanyID i.TimeYear, correlation(ar1) //prediction

predict SGEAR_predict

label variable SGEAR_predict "SGEAR predict"

scatter SGEAR SGEAR_predict

estpost summarize TGEAR TGEAR_predict LGEAR LGEAR_predict SGEAR SGEAR_predict

esttab, cell("count mean sd min max")no numbers label

esttab ., cell("count mean(fmt(4)) sd (fmt(4)) min (fmt(4)) max (fmt(4))")

esttab using TGEAR_predict.rtf, cell("count mean(fmt(4)) sd (fmt(4)) min (fmt(4)) max (fmt(4))")nonumbers

ttest TGEAR== TGEAR_predict, unpaired unequal welch level(99) //unpaired ttest for total and predicted values

ttest LGEAR== LGEAR_predict, unpaired unequal welch level(99) // unpaired ttest for long term and predicted values

ttest SGEAR== SGEAR_predict, unpaired unequal welch level(99) //unpaired ttest for short term and predicted values

//combined table//

xi:regress TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.CompanyID i.TimeYear //to control for homoskedasticity may add robust)

estimate store LSDV1_b

xi:regress TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.CompanyID i.TimeYear, cluster(CompanyID) //Stata output for the static model, using LSDV with clustered standard errors//

estimate store CSE

xi: xtpcse TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.CompanyID i.TimeYear, correlation(ar1) //Stata output for the static model estimated by Prais-Winsten regression with PCSE//

estimate store PCSE

xi:regress TGEAR L.TGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.CompanyID i.TimeYear //dynamic

estimate store dLSDV1_b

xi:regress TGEAR L.TGEAR UDIVE RDIVE TDIVE TANG SIZE PROF NDTS GOCO GROP RISK i.CompanyID i.TimeYear, cluster(CompanyID) //Stata output for the dynamic model, using LSDV with clustered standard errors//

estimate store dCSE

```
xi: xtpcse TGEAR L.TGEAR UDIVE RDIVE TDIVE TANG SIZE  PROF NDTS GOCO GROP  RISK i.CompanyID i.TimeYear, correlation(ar1) //Stata output for the dynamic model estimated by Prais-Winsten regression with PCSE//
estimate store dPCSE
xtabond TGEAR UDIVE RDIVE TDIVE TANG SIZE  PROF NDTS GOCO GROP RISK , noconstant lags(1) artests(2) vce(robust) //GMM arelano and bond (1991) estimations with exoginous regressors
estimate store GMM_ab
xi:xtdpdsys TGEAR UDIVE RDIVE TDIVE TANG SIZE  PROF NDTS GOCO GROP  RISK, noconstant lags(1) artests(2) vce(robust) //Stata output for the dynamic model estimated by GMM(1998)with exogenous regressors
estimate store GMM_bb
xi:regress TGEAR L.TGEAR RDIVE TDIVE TANG  SIZE  PROF NDTS GOCO GROP RISK i.CompanyID i.TimeYear if dive_subsamples==2, cluster(CompanyID) //related model
estimate store related
xi:regress TGEAR L.TGEAR UDIVE TANG SIZE PROF GROP GOCO RISK NDTS i.CompanyID i.TimeYear if dive_subsamples==1, cluster(CompanyID) //unrelated model
estimate store unrelated
xi:regress TGEAR L.TGEAR TDIVE RDIVE UDIVE TANG SIZE PROF GROP GOCO RISK NDTS if listing_subsample==0, cluster(CompanyID) //locally listed
estimate store local_listed
```

```
xi:regress TGEAR L.TGEAR TDIVE RDIVE UDIVE TANG SIZE PROF GROP GOCO RISK NDTS if listing_subsample==1, cluster(CompanyID) //cross listed
estimate store cross_listed
xi:xtpcse LGEAR L.LGEAR UDIVE RDIVE TDIVE TANG  SIZE  PROF NDTS GOCO GROP RISK i.CompanyID i.TimeYear,correlation(ar1) //long debt
estimate store longD
xi:xtpcse SGEAR L.SGEAR UDIVE RDIVE TDIVE TANG  SIZE  PROF NDTS GOCO GROP RISK i.CompanyID i.TimeYear,correlation(ar1)  //short debt
estimate store shortD

set linesize 255
esttab LSDV1_b CSE PCSE dLSDV1_b dCSE dPCSE GMM_ab GMM_bb related unrelated local_listed cross_listed longD shortD, beta(%8.4f) se(%8.2f) scalars(r2 r2_a rmse mss rss F chi2 sargan) compress  mtitles order(_cons L.TGEAR L.LGEAR L.SGEAR RDIVE UDIVE TDIVE)keep(_cons L.TGEAR L.LGEAR L.SGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS) //tables
esttab LSDV1_b CSE PCSE dLSDV1_b dCSE dPCSE GMM_ab GMM_bb related unrelated local_listed cross_listed longD shortD, beta(%8.4f) not scalars(r2 r2_a rmse mss rss F chi2) compress  mtitles order(_cons L.TGEAR L.LGEAR L.SGEAR RDIVE UDIVE TDIVE)keep(_cons L.TGEAR L.LGEAR L.SGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS) //tables

esttab LSDV1_b CSE PCSE dLSDV1_b dCSE dPCSE GMM_ab GMM_bb related unrelated local_listed cross_listed longD shortD using combined_table3.rtf,
```

beta(%8.3f) not scalars(r2 r2_a rmse mss rss F chi2) compress mtitles order(_cons L.TGEAR L.LGEAR L.SGEAR RDIVE UDIVE TDIVE)keep(_cons L.TGEAR L.LGEAR L.SGEAR RDIVE UDIVE TDIVE TANG SIZE PROF GROP GOCO RISK NDTS) //EXPORT TABLE TO MS-WORD