Determinants of Capital Structure of Listed Firms in Ghana: Empirical Evidence Using a Dynamic System Gmm

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Abstract: The main aim of this study is to empirically investigate the factors influencing the capital structure decisions of listed firms in Ghana. In examining the determinants of capital structure, 28 firms listed on the Ghana Stock Exchange were used for a time period of 8years, spanning from 2007-2014. We employed a dynamic panel system of General Methods of Moments (GMM) in testing the hypotheses. The results from the empirical estimation revealed that listed firms in Ghana use less debt that equity and they prefer using short-term debt rather than long-term debt in financing their operations. The study also finds a significant positive relationship between tangibility of firms, liquidity, managerial ownership, firm size and long-term debt ratio. However, we find that profitability, growth opportunities, firm age, and business risk relate negatively with long-term debt ratio for listed firms in Ghana.

Keywords: capital structure; long-term debt; short-term debt; Ghana

1. Introduction

Capital structure is a very important concept in corporate world and managers take decisions daily concerning the optimal capital structure of firms that maximize the wealth of shareholders. This certainly led to the pioneering work of Modigliani and Miller (1958) on capital structure irrelevance. Since their seminal work, several theories including the trade-off theory by Modigliani and Miller (1963) and Miller (1977) and the pecking order theory by Myers and Majluf (1984) and Myers (1984) have evolved. All these subsequent theories have been conclusive and lent their supports for the relevance of capital structure contrary to the seminal works of Modigliani and Myer (1958). Despite of their massive support for the relevance of capital structure, they all have different lines of arguments. For instance while the trade-off theory places emphasis on taxes as major determinant of optimal capital structure for firms, the pecking order sees information asymmetry as a key determinant of the capital structure. These theories have been empirically tested severally.

However, most of the studies have been confined to Asia and the western world[4] to the neglect of African countries like Ghana notwithstanding the important role the subject matter plays in the corporate world. In Ghana, only few studies have delved into the subject matter[5]. These few studies have however got varied findings and hence the need for more studies on the subject matter in Ghana.

This work however departs from the previous studies carried out in Ghana in the following ways. First, unlike the previous studies, this study has employed a very robust dynamic panel system GMM to cure the problem of endogeneity which has the potential of generating inconsistent results in

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[4] See (Titman & Wessels, 1988; Sharpe, 1995; Bhaduri, 2002; Huang & Song, 2006; Delcoure, 2007, Mazur, 2007; Akhtar & Oliver, 2009; Sheikh & Wang, 2011; Abdou et al, 2012; Gomez et al, 2014; Pratheepan & Banda, 2016).
[5] See (Abor & Biekpe, 2005; Abor & Biekpe, 2009; Bokpin & Arko, 2009).

estimations. Secondly, unlike previous studies that have used only the book value measure of debt, this study has employed both the book and market measures of debt in the capital structure examination thus making our results more robust. Finally, this work is making use of more firms and time period than previous studies following the expansion of the GSE in recent times thus there is higher degree of freedom in this work which can lead to better results than previous work. The remainder of the study is structured in the following way. Section 2 reviews the theories and the empirical literature on the determinants of capital structure while section 3 focuses on the data and methodological issues. Section 4 presents the discussions on the regression results while section 5 delved with the conclusion and recommendations of the study.

2. Literature Review

This section is devoted to the review of literature relevant to capital structure. We first reviewed the theoretical literature on capital structure followed by empirical literature on the determinants of capital structure.

2.1. Theories on Capital Structure

Capital structure is the specific mixture of debt and equity finance that a firm uses in its operations (Abor, 2008). Several theories have emerged on the preference of firms for debt over equity, the right mixture or equity over debt in order to maximize shareholders' wealth. The genesis of capital theories can be traced to the seminal work of Modigliani and Miller (1958). In their theory known as "capital structure irrelevance", they believe that in perfect capital market without taxes and with no agency cost, any mixture of debt and equity is good and hence will not affect the firm's value. However, in the real world where there are imperfect market conditions, traction costs, taxes and heterogeneous expectations, this theory does not work. This means therefore that capital structure is very crucial in determining the value of firm. Based on this two major theories involved and they are explained below.

Trade-off Theory

This theory propounded by Modigliani and Miller (1963) and Miller (1977) argued that with the existence of taxes on firms, it will be advantageous for a firm to hold more debt than equity as firm stands the chance of getting tax deduction from interest on debt unlike gains from equity in the forms of dividends and capital gains that are taxable. In order to take the advantage of this tax effect, firms will be better of increasing their debt ratio. Miller (1977) and Myers (2001) indicated that in desire of firms to increase their debt portfolio, interest on debt will certainly rise thus leading to more interest cost on the firm which can however ultimately be offset by the higher interest tax deductible. The optimum capital is thus depended on the net off tax effect. The trade-off theory however has two major costs including bankruptcy cost and agency cost.

Bankruptcy costs as defined by Abor (2008) are costs which occur when the perceived probability that the firm will default is greater than zero. Bankruptcy cost is made up of direct and indirect costs. Direct costs refer to professional fees in the form of lawyers' fees, accountants' fees, other professional charges and administrative costs on bankruptcy. On the other hand, indirect costs refer to lost sales, lost profits, loss of credits or the inability to issue securities unless under unfavourable conditions. As a firm maximize its value by increasing its debt (Modigliani & Miller, 1963), its bankruptcy probability also increases as the fear that it might not be able to finance its debts (Titman,

1984). Thus the optimal capital structure represents debt level that balances bankruptcy costs and debt finance benefits (Abor, 2008).

Besides the bankruptcy cost, the use of debt in financing firms also leads to agency cost. This cost stems from relationship between shareholders and managers and that between debt holders and shareholders (Jensen & Meckling, 1976). In these relationships, while managers are agents, both shareholders and debt holders are principals. Conflicts between shareholders and managers arise because in most cases the ownership of business is distinct from the management or in some cases though managers do have ownership, they do not have 100% ownership, however they have complete control over the day-to-day running of the firm and the control over all its resources. In this case, managers take decisions that will maximize their interest to the neglect of the shareholders' interest. This inefficiency tendency level is argued to reduce with increase in managers' equity in the firm (Sheikh & Wang, 2011). Conflict between debt-holders and shareholders is believed to only arise when there is a risk of default (Myers, 2001). A situation where there is no default risk debt-holders are not worried about the behavior or actions of the firm. However, where there is an eminent default risk if managers are acting in the interest of shareholders, they are likely going to take decisions that will favour the shareholders to the neglect of the debt-holders interest. For instance managers can invest in riskier ventures. In the attempt to avoid this, debt-holders will incorporate in their debt contracts terms that will increase the cost of the debt or deter managers from involving in acts that will be disastrous to the debt-holders.

Under the trade-off theory which has bankruptcy and agency costs as its basis, firms take upon debt up to a point where the tax saving from taking extra debt are equal to the costs emanating from the increased probability of finance distress(Sheikh & Wang, 2011). This certainly implies that firms in their attempt to maximize value set some optimal capital structure so as to increase shareholders wealth.

Pecking Order

This theory was propounded by Myers and Majluf (1984) and Myers (1984). The theory places emphasis on information asymmetry as a basis for the choice of capital structure by a firm. Conditions upon which this theory is based are; that managers are acting in the interest of the shareholders and that managers are more informed than outsiders about the prospects of the firm. Given that these conditions are met, firms will prefer to use retained earnings over debt if available and will prefer taking on debt also over issuing of new equities. New equities are seen as a last resort that firms will go in for as financing instrument. Thus firms that generate more profit will prefer to use internal funds and hence will use less debt. Pecking order theory also posits that with information asymmetry, higher growth opportunities in firm, means higher risks and hence such firm has the chance in raising debt. Firms with higher growth opportunities will have low debt as capital (Pratheepan & Banda, 2016).

2.2. Determinants of Capital Structure and Hypotheses Development

Following the theoretical debates on capital structure ignited by Modigliani and Miller (1958), several empirical studies have delved into the determinants of capital structure. As identified by most of the empirical studies, we have reviewed the following as the determinants of capital structure: profitability, age, size, business risk, asset structure, non-debt tax shield, growth opportunities, managerial ownership and liquidity.

Profitability

Following the seminal work of Modigliani and Miller (1958), several theories have emerged with varied views on the relationship between profitability of firm and use of debt. While the pecking order postulates that higher profit leads to low debt as internal funds are viewed to be cheaper source of capital than debt, the trade-off theories suggest to the contrary that profitable firms will take on more debts so as to maximize on their benefits of tax shields on interest payments. Several studies have established the inverse relationship between profitability and leverage thus supporting the pecking order theory[1]. It is therefore hypothesized that:

H_{1a}. Profitability is negatively related to long-term debt ratio

H_{1b}. Profitability is negatively related to short-term debt ratio

Age

Age of a firm is noted to be a measure of reputation (Diamond, 1989) thus the older a firm is the higher credit worthy it is. Older firms are believed to have built on their image over the years thus are more prudent in their investment choices than younger firms. This is also attributable to the experiences they have gained over the years through decisions making and hence they have the ability to make good choices. Using 160 SMEs in Ghana, Abor and Biekpe (2007) found that age has a significantly positive correlation with both short-term debt ratio and long-term debt ratio. These findings were supported by the works of Akhtar and Oliver (2009) using evidence from Japanese firms. Contrary to these findings, Abor (2008) established a negative relationship between age and long-term debt when he did a comparative study on quoted and unquoted firms in Ghana. Based on this the following hypotheses are formulated:

$H_{2a.}$ Age of firm is positively related to long-term debt ratio;

$H_{2b.}$ Age of firm is positively related to short-term debt ratio.

Firm Size

Arguably larger firms are noted to disclose information to outsiders more than smaller firms (Fama & Jensen, 1983; Rajan & Zingales, 1995). With the absence of information asymmetry, larger firms are able to attract long-term debt than smaller firms. Besides, with an economy of scale advantage on the part of large firms they have good bargains on credits thus getting long term debt. For these reasons it is argued that smaller firms are more likely to depend on equity while large firm use more debt (Barton et al, 1989; Sogorb-Mira, 2005). Empirically studies have confirmed this positive relationship between size and long-term debt (Huang & Song 2006; Abor & Biekpe, 2007; Akhtar & Oliver, 2009; Sheikh & Wang, 2011; Pratheepan & Banda, 2016). In contrary, however, using 469 firms in the USA Titman and Wessels (1988) found that size and short-term debt ratio have negative relationship. Following these analysis we hypothesize that:

$H_{3a.}$ Firm size is positively related long-term debt ratio;

$H_{3b.}$ Firm size is negatively related short-term debt ratio.

[1] See (Titman and Wessels, 1988; Sharpe, 1995; Huang and Song, 2006; Abor and Biekpe, 2007; Abor 2008; Akhtar and Oliver, 2009; Sheikh and Wang, 2011; Pratheepan and Banda, 2016).

Business Risk

Theoretically, the relationship between business risk of a firm and its long-term debt is varied. Generally, it is expected that the higher the risk the firm has, the lower the amount of debt the firm will have since creditors will not be willing to give out credits to such firms. Hsia (1981) however posits that as the variance rate of a firm goes up it decreases the firm's equity risk thus making the risk in totality to be low. This thus results to positive relationship between risk and leverage. In his study, Abor (2008) established negative relationship between risk and long-term debt but established positive relationship between risk and short-term debt. Other studies which also found positive relationship between leverage and business risk are Akhtar and Oliver (2009) and Sheikh and Wang (2011). Based on these we expect the following as hypotheses:

$H_{4a.}$ Business Risk is positively related to long-term debt;

$H_{4b.}$ Business Risk is positively related to short-term debt.

Asset Structure

Asset structure or tangibility is noted as one of the key determinants of capital structure. Due to the availability of collateral security for firms with higher tangibility, the lower the rates at which creditors are willing to give loans to them (Bradley et al., 1984). This has made it very easy for tangible firms to access long-term debt as against firms with low tangible assets. Many empirical studies have established the positive relationship between tangibility and long-term debt[1]. While Abor and Biekpe (2007) and Abor (2008) also established positive relationship between tangibility and long-term debt, they also realized that there is an inverse relationship between tangibility and short-term debt. On the contrary, using 160 firms in the Pakistan firms, Sheikh and Wang, (2011) found negative relationship between tangibility and long-term debt. Based on this background, we postulate that:

$H_{5a.}$ Asset Structure is positively related to long-term debt ratio;

$H_{5b.}$ Asset Structure is negatively related to short-term debt ratio.

Non-debt Tax Shield

Non-debt tax shields are the substitute of tax shields on debt financing (DAngelo & Masulis, 1980). All things being equal, firms with higher non-debt tax shields are expected to have less debt financing in its capital structure. This inverse relationship has been supported by many empirical findings[2]. Thus we hypothesis that:

$H_{6a.}$ Non-debt tax shield is negatively related to long-term debt ratio;

$H_{6b.}$ Non-debt tax shield is negatively related to short-term debt ratio.

Growth Opportunities

Both the trade-off theory and agency cost theory argued that there is a negative relationship between growth opportunities and long-term debt ratio (Sheikh & Wang, 2011). According to the trade-off theory, firms with higher growth opportunities are not able to access more debt due to their inability to collateralize their growth opportunities. Similarly, the agency cost theory predicts this negative relationship because firms with opportunities have greater chances of investing sub-optimally to the benefit of the shareholders to the detriment of the credit holders hence debt holder will be cautious in

[1] See (Huang & Song 2006; Akhtar & Oliver, 2009).
[2] See (Huang &Song, 2006; Abor, 2008; Akhtar & Oliver, 2009).

granting debt to such firms. Several empirical findings have been found to confirmed these theoretical views[1]. On the contrary, Pratheepan and Banda (2016) established positive relationship between growth opportunities and leverage on the Sri Lankans listed firms. We thus expect the following as hypotheses:

$H_{7a.}$ Growth Opportunities is negatively related to long-term debt ratio;

$H_{7b.}$ Growth Opportunities is negatively related to short-term debt ratio.

Managerial Ownership

From the agency theory, total agency cost is minimized by the use of optimal structure of leverage and ownership (Jesen & Meckling, 1976; Jesen, 1986). It is implied that there is some relationship between ownership by managers and leverage. Bokpin et al (2009) have found evidence to support this positive relationship between managerial ownership and leverage. Other empirical evidence have however established contrary findings implying that firms with higher managerial ownership have less leverage (Huang & Song, 2006; Abor, 2008). Abor (2008) however found positive relationship with short-term debt. Based on this we formulate the following hypotheses:

$H_{8a.}$ Managerial ownership is positively related to long-term debt ratio;

$H_{8b.}$ Managerial ownership is positively related to short-term debt ratio.

Liquidity

As suggested by the pecking order theory firms will prefer to use internal funds first if they are available for their activities and will only resort to debt and issuing of new equities as last resorts respectively (Myers & Majluf, 1984; Myers, 1984). This means that firms that have high liquidity will certainly have low debt ratio. One of the reasons for the negative relationship is that the firm is observed as not having long-term debt investment opportunities so as to be in need of debt (Mouamer, 2011). On the contrary, high liquidity also indicates that the firm has the ability to pay its debt and hence no risk of default. This shows a positive relationship between liquidity and leverage. Empirically, we have no evidence to prove any of these opinions hence we proposed the following hypotheses:

$H_{9a.}$ Liquidity is negatively related to long-term debt;

$H_{9b.}$ Liquidity is negatively related to short-term debt.

3. Data and Methodology

3.1. Source of Data

To determine the variables that influence capital structure of firms in Ghana, we used the Ghana Stock Exchange (GSE) as our source of data. Currently, the GSE has 40 firms listed on it. However, some of the firms listed do not have complete financial statements. Based on this, we used 28 firms that have complete financial information needed for our investigation. This number constitutes 70% of the total number of firms listed on the GSE. The firms cut across all sectors, ranging from the financial services sector to the extractive and manufacturing sector of the economy. Our data span from 2007 to 2014

[1] See (Huang & Song, 2006; Akhtar & Oliver, 2009).

thus giving us a total number of 224 as our panel observations. The data was extracted from Mc Gregor dataset which hosts the financial statements of all African listed firms.

3.2. Variables

Following our review of literature, we have got our dependent variables which represent capital structure to be our long-term debt ratio and short-term debt ratio. Each of these two variables is examined in two ways. We first measured long-term debt and short-term debt in terms of complete book values of debt and equity followed by a second measure where they are both examined using the book values of debt and market values of equity[1]. The independent variables here are the determinants of capital structure which we have examined above in our literature. Full description of all the variables is found on table 1 below. All the definitions of our variables follow previous empirical works[2]

Table 1. Definitions of Variables

Variables	Code	Definition
Dependent Variables		
Y_1 Long-Term Debt Ratio	LD	Long-term debt/(long-term debt + book value of equity)
Y_2 Short-Term Debt Ratio	SD	Short-term debt/(short-term debt + book value of equity)
Y_3 Market Value of Long-Term Debt	MLD	Long-term debt/(long-term debt +market value of equity)
Y_4 Market Value of Short-Term Debt	MSD	Short-term debt/(short-term debt + market value of equity)
Independent Variables		
X_1 Profitability	ROA	Profit before interest and tax/total assets
X_2 Age	AGE	Number of years since the firm incorporation
X_3 Size	SIZE	Total Assets
X_4 Business Risk	RISK	Standard deviation of profit before interest and tax
X_5 Asset Structure	TAN	Fixed assets/total assets
X_6 Non-Debt Tax Shield	NDTS	Depreciation/total assets
X_7 Growth Opportunities	GROW	(Total $assets_t$ – total $assets_{t-1}$)/ total $assets_{t-1}$
X_8 Managerial Ownership	MO	Shareholdings of directors/total equity
X_9 Liquidity	LIQ	Current assets/current liability

3.3. Empirical Model of Estimation

The use of panel data is noted to have several merits over time series or cross section data (Hsiao 2003 and Klevmarken 1989) thus we employed panel data framework in our analysis. Our basic panel model is in the form:

$$Y_{it} = \phi + X_{it}\alpha + \varepsilon_{it} \quad (1)$$

Where ϕ is a constant, $X_{i,t}$ is a K-dimensional vector of explanatory variables and $\varepsilon_{i,t}$ is the error term which is further decomposed into the following disturbance terms;

$$\varepsilon_{it} = \mu_{it} + v_{i,} \quad (2)$$

Following the works of Abor and Biekpe (2007) and Abdou et. al (2012) with modifications, we modeled our study as follows:

[1] We could not use market values for debt due the lack of data on the market values of debt. The market values for the equities were sourced from the share prices of each firm.
[2] See (Titman & Wessels, 1988; Abor & Biekpe, 2007; Akhtar & Oliver, 2009; Sheikh & Wang, 2011; Abdou et al, 2012).

$$LD_{i,t}=\beta_0+\beta_1 ROA_{i,t}+\beta_2 AGE_{i,t}+\beta_3 SIZE_{i,t}+\beta_4 RISK_{i,t}+\beta_5 TAN_{i,t}+ \beta_6 NDTS_{i,t}+ \beta_7 GROW_{i,t+} \beta_8 MO_{i,t}+\beta_9 LIQ_{i,t}+ \varepsilon_{it} \quad (3)$$

$$SD_{i,t}=\beta_0+\beta_1 ROA_{i,t}+\beta_2 AGE_{i,t}+\beta_3 SIZE_{i,t}+\beta_4 RISK_{i,t}+\beta_5 TAN_{i,t}+ \beta_6 NDTS_{i,t}+ \beta_7 GROW_{i,t+} \beta_8 MO_{i,t}+\beta_9 LIQ_{i,t}+ \varepsilon_{it} \quad (4)$$

$$MLD_{i,t}=\beta_0+\beta_1 ROA_{i,t}+\beta_2 AGE_{i,t}+\beta_3 SIZE_{i,t}+\beta_4 RISK_{i,t}+\beta_5 TAN_{i,t}+ \beta_6 NDTS_{i,t}+ \beta_7 GROW_{i,t+} \beta_8 MO_{i,t}+\beta_9 LIQ_{i,t}+ \varepsilon_{it} \quad (5)$$

$$MSD_{i,t}=\beta_0+\beta_1 ROA_{i,t}+\beta_2 AGE_{i,t}+\beta_3 SIZE_{i,t}+\beta_4 RISK_{i,t}+\beta_5 TAN_{i,t}+ \beta_6 NDTS_{i,t}+ \beta_7 GROW_{i,t+} \beta_8 MO_{i,t}+\beta_9 LIQ_{i,t}+ \varepsilon_{it} \quad (6)$$

Where $\varepsilon_{it} = \mu_{it} + v_i$ (7)

v_i = individual firm effects

Several panel estimators including OLS, fixed effect, random effect, PSCE, 2SLS and GMM could be employed in testing our hypotheses. However in estimating our model, we first of all considered the possibility of endogeneity existence as the expected determinants of capital structure could also be impacted by the capital structure. For instance, it is highly plausible that variables such as profitability, managerial ownership and liquidity could also be influenced by the capital structure thus there are a possibility of bidirectional causality and hence endogeneity caused by simultaneity is envisaged. The presence of endogeneity would make OLS, fixed effect, random effect and PSCE estimations inconsistent and produce bias results. In this instance we were left with 2SLS and GMM to use. With the absence of valid instruments which are cardinal requirements of the 2SLS, we adopted the General Method of Moments (GMM) in our estimation. Following the works of Alhassan et al (2014) which indicates that difference GMM introduced by Arellano and Bond (1991) as argued by Blundell and Bond (1998) and Alonso-Borrego and Arellano (1999) has lower predictive ability in small sample with small time period as ours we have adopted the system GMM. The system GMM of Arellano and Bover and Blundell and Bond (1998) arguably has a higher predictive ability in small time period data like our data and thus is more efficient than the difference GMM. To obtain robust results using the system GMM, the lagged values of the explanatory variables are used as instruments. The validity of the instruments in our model is checked using the Sargan test for over-identified restrictions.

4. Empirical Results

4.1. Descriptive Statistics

From our descriptive statistics shown below in table 2, on the average firms in Ghana used more equity financing than debt financing. Comparing long-term debt with short-term debt, more short – term debt is used in the financing of firms than the long term debt. On the book values, while the average short term debt ratio is 0. 43, the long term debt ratio is as low as 0. 20. The over reliance on

equity market and the short-term debt usage could be attributed to the lack of bond market in the country and possibly the high cost of debt thus firms prefer to use the equity in financing their operations. One of the variables worth analyzing is the liquidity of the firms. While we have 9. 81 being the maximum figure for the liquidity, 1. 37 is the average ratio for the liquidity. This means that most of the firms are highly liquid and that could account for the reason of lower debt than equity since they will find it cheaper using the available funds within the firm to carry out their operations as against going outside the firm to seek funding by way of debt.

On the ownership of the equity by managers, averagely only 5% of ownership belong to directors. This means that most of the firms have got ownership not majorly resting on directors. This however can lead to agency cost problems since the directors manage the day to day operations but do not have majority stake in the ownership. On the contrary side, the maximum directors' shareholding is 95% of total equity. This means that modern corporate governance principles are not adhered to completely in some of the firms thus giving way for few people to hold majority of the shares in limited liability company traded on the stock exchange. As expected, the average tangibility rate is only 27% of total assets. This can be attributed to the fact that majority of the firms in our sample belong to the financial service sector where fixed asset is not a major concern. The low tangibility could also account for the low long term debt as collateral security is a major requirement in most long-term debt. There is a great dispersion on the size of firms. While the lowest firm has GH₵323,000, the maximum size is GH₵1. 32e+12 and this has accounted for the great standard deviation of GH₵8. 93e+10. On profitability, it is realized that only 2% is earned as return on asset while 39% is the highest return on asset.

On the correlation matrix, it is realized that the highest coefficient of correlation is 0. 68 which is between non-debt tax shield and business risk. It means therefore that there is no multi-correlation problem among our dependent variables. All our variables can therefore be fitted into one model without any estimation problems.

Table 2. Descriptive Statistics

Variable	Mean	S. D	Min	Max	Obs
LD	0. 20	1. 16	-16. 04	2. 64	223
ST	0. 43	0. 36	-0. 47	0. 98	223
MLD	0. 48	0. 97	0	6. 34	180
MSD	2. 98	5. 98	0	46. 05	180
ROA	0. 02	0. 21	-2. 53	0. 39	223
AGE	34. 67	25. 14	1	118	224
SIZE	9,830,696	8. 93e+07	323	1. 32e+09	223
RISK	0. 04	0. 09	0. 0001	0. 88	194
TAN	0. 27	0. 26	0. 003	0. 86	223
NDST	0. 03	0. 03	0	0. 19	223
GROW	0. 25	0. 84	-1	10. 62	195
MO	0. 05	0. 16	0	0. 95	224
LIQ	1. 37	1. 33	0. 05	9. 81	223

Table 3. Correlation matrix

	LD	SD	MLD	MSD	ROA	NDTS	TAN	LIQ	MO	GROW	RISK	AGE	SIZE
LD	1. 00												
SD	0. 17*	1. 00											
MLD	0. 12	0. 20*	1. 00										
MSD	0. 02	0. 41*	0. 16*	1. 00									
ROA	-0. 03	-0. 31*	-0. 09	-0. 12	1. 00								
NDTS	-0. 23*	-0. 28*	-0. 06	-0. 16*	0. 07	1. 00							
TAN	-0. 13	-0. 32*	0. 09	-0. 19*	0. 12	0. 48*	1. 00						
LIQ	0. 01	-0. 42*	-0. 13	-0. 19*	0. 28*	-0. 05	-0. 06	1. 00					
MO	0. 04	0. 13	0. 21*	0. 01	0. 01	0. 01	0. 11	0. 02	1. 00				
GROW	0. 03	0. 12	-0. 01	0. 25*	0. 09	-0. 15	-0. 11	-0. 03	-0. 03	1. 00			
RISK	-0. 11	-0. 19*	-0. 11	-0. 09	-0. 68*	0. 23*	0. 04	0. 01	-0. 07	-0. 16*	1. 00		
AGE	-0. 08	-0. 12	-0. 24*	-0. 28*	0. 12	0. 01	0. 14*	0. 08	0. 16*	-0. 11	0. 04	1. 00	
SIZE	0. 01	-0. 05	0. 13	0. 06	0. 04	0. 06	0. 06	-0. 02	-0. 03	-0. 02	0. 06	0. 001	1. 00

4.3. Discussion of Regression Results

Presented below in table 4 are the regression results of our dynamic system GMM. The results are categorized into two i. e the results based on the book values of debt and again based on market values of debt ratio. From our results, all lagged values of our dependent variables are statistically significant implying that dependent variables are influenced by their previous year performances. Expectedly, profitability is negatively significant with long-term debt but not significant with short term debt using the book values measure. Using the market measure however, profitability is negatively significant with both long-term debt and short-term debt ratio hence we are not able to reject both hypotheses H_{1a} and $H_{1b.}$ This is in line with the pecking order theory which argues that firms with available retained earnings will prefer using that for their operations as against going outside for debt. The results serve as confirmation of previous empirical findings[1].

Non-debt tax shield is found to be significant with only short-term debt but not significant with long-term debt. Thus we are not able to reject our hypothesis H_{6b}. We however have no evidence to accept or reject hypothesis $H_{6a.}$ We are therefore not able to find any evidence to support previous studies that established that non-debt tax shield is negatively significant with long-term debt (Abor, 2008; Akhtar & Oliver, 2009). Asset structure is also found to strongly influence debt ratio. As expected, firms with higher fixed assets have high long-term debt while firms with low fixed assets have high short-term debt. This is in line with theory and supported previous studies that firms with fixed assets are able to collateralize their assets for long-term debt and hence has the chance of getting long-term debt. Surprisingly, liquidity is found to be positively significant with long-term debt but has a negative relationship with short-term debt. This is contrary to the pecking order theory which argues that firms with available funds will prefer to use internal funds as against the usage of debt. It however implies that firms with high liquidity are seen as credit worthy firms so credit holders are willing to grant such firms long-term debt. The inverse relationship between liquidity and short-term debt implies that firms that have high liquidity will not go in for short-term debt but rather will go in for long-term debt. It thus means that most firms probably go in for short-term debt to enable them settle current liabilities but use long-term debt for long term investment.

[1] See (Titman & Wessels, 1988; Sharpe, 1995; Huang & Song, 2006; Abor & Biekpe, 2007; Abor, 2008; Akhtar & Oliver, 2009; Sheikh & Wang, 2011; Pratheepan & Banda, 2016).

Managerial ownership is also established to be positively significant with debt using both the long term and the short term measures of debt. These findings thus support the agency cost theory by Jesen and Meckling (1976) and Jesen (1976) who argued that with the presence of managerial ownership in equity, sub-optimal investments are avoided thus credit holders are willing to grant debts to firms with higher managers ownership. While our findings support the work of Bokpin et al. (2009), they however contradict some previous findings (Huang & Song, 2006; Abor, 2008). Our findings again indicate that growth opportunity is a key determinant of capital structure. From the findings we are not able to reject our hypotheses that growth relates negatively with long-term debt. This lends support to the argument of both the trade-off and agency theory that growing firms do not collateralize their assets and also permit sub-optimal investment choices by managers thus are not able to attract debt especially long-term debt. While it confirmed the works of Akhtar and Oliver (2009) and Huang and Song (2006), it contradicts the findings of Pratheepan and Banda (2016) who established positive relationship between leverage and growth opportunities on the listed firms of Sri Lanka.

Business risk is realized to have a significant inverse relationship with short-term debt. This implies that as the risk of the firm increases its long-term debt decreases while the short-term debt rises. It is a strong confirmation of Abor (2008) who found negative relationship with the long-term debt but had a positive relationship with short-term debt. In direct contradiction of theory and the findings of Abor (2008), we have found that age of a firm has negative correlation with both short-term and long-term debt. This could be attributed to old firms' ability to rely on their retained earnings or have higher reputation to raise equity cheaper than younger firms hence the neglect of debt as source of financing their operations. Expectedly, size of a firm is found to significantly influence both long term and short-term debt positively. The bigger a firm is in terms of asset, the higher the amount of debt it has. This is possible as big firms are more transparent with information and hence have higher trust worthiness than smaller firms that are usually associated with information asymmetry problems. This support several previous studies (Huang & Song 2006; Abor & Biekpe, 2007; Akhtar & Oliver, 2009; Sheikh & Wang, 2011; Pratheepan & Banda, 2016).

Table 4. System GMM Regression Results

Independent Variables	**Dependent Variables**			
	Book Values		Market Values	
	LD	SD	MLD	MSD
LD lagged(-1)	-0. 371***			
	(0. 00848)			
SD lagged(-1)		0. 452***		
		(0. 0369)		
MLD lagged(-1)			0. 164***	
			(0. 0122)	
MSD lagged(-1)				0. 359***
				(0. 0106)
ROA	-1. 641***	0. 107	-0. 560***	-0. 953***
	(0. 384)	(0. 0738)	(0. 177)	(0. 290)
NDTS	-1. 580	1. 801***	-0. 866	-2. 358**
	(1. 338)	(0. 374)	(0. 588)	(0. 946)
TAN	0. 471**	-0. 705***	1. 445***	0. 477
	(0. 201)	(0. 136)	(0. 276)	(1. 105)
LIQ	0. 332***	-0. 0721***	0. 236***	0. 362***
	(0. 0475)	(0. 0143)	(0. 0672)	(0. 119)
MO	0. 282***	0. 384***	2. 671***	2. 089***

	(0. 0667)	(0. 104)	(0. 142)	(0. 513)
GROW	-0. 0739***	0. 00136	-0. 0481***	0. 380***
	(0. 0196)	(0. 00377)	(0. 00907)	(0. 0417)
RISK	-3. 412***	0. 474***	-0. 284	0. 748
	(0. 937)	(0. 0654)	(0. 325)	(1. 032)
Log of AGE	-0. 695**	-0. 202***	-0. 346*	0. 491
	(0. 274)	(0. 0498)	(0. 193)	(1. 643)
Log (SIZE)	0. 201**	0. 0879***	0. 391***	0. 722***
	(0. 0889)	(0. 0253)	(0. 0547)	(0. 229)
Constant	-0. 183	-0. 0448	-3. 990***	-9. 761**
	(0. 448)	(0. 194)	(0. 477)	(4. 786)
Waldχ^2	25440817[0. 0000]	19916. 14[0. 0000]	217744. 91[0. 0000]	34044. 92[0. 0000]
Sargan Test:				
Prob> χ^2	0. 6769	0. 8337	0. 1686	0. 4311
AR(1) p-value	0. 3035	0. 0082***	0. 1514	0. 1750
AR(2)p-value	0. 3467	0. 1132	0. 1200	0. 2461
Observations	166	166	126	126
Number of Firm	28	28	27	27

Standard errors in parentheses

*** p<0. 01, ** p<0. 05, * p<0. 1

4.4. Robustness Checks

We have recognized the critical influence endogeneity, autocorrelation and heteroscesdasticity presence in a model have on results produced from such models and hence we have employed one of the best possible procedures in our analysis so as to obtain robust results. We employed the system GMM in our estimation. System GMM has the predictive power in small time period data as against the difference GMM. Besides, the system GMM is able to produce efficient and consistent results in the presence of endogeneity, autocorrelation and heteroscedasticity. Before using the system GMM, we first of performed instruments validity check by using the Sargan test and as indicated in table 4, the Prob> χ^2 values are all greater than 10% and thus we are not able to reject the null hypothesis that over identifying restrictions are valid. We again performed Arellano-Bond test to determine if there is second order autocorrelation in our model. As indicated in table 4, AR (2) p-values are all above 10% and thus the null hypothesis cannot also be rejected that there are no second order autocorrelation. This implies that the model is properly specified and hence is robust for the estimation. Besides, we have collaborated our results of the book value measure of our debt with the market value measure of the debt. Most previous studies have only examined the capital structure by using only the book value measure of the debt. We however examined the capital structure using both book and market measures and as indicated in table 4, with the exception of business risk which is statistically significant with debt on the book value but is not significant with debt on the market value, all other variables have almost the same results thus making our estimation more robust and devoid of biasness.

5. Conclusion and Policy Recommendations

The study investigated empirically the determinants of capital structure on Ghanaian listed firms. Using a robust dynamic panel system GMM, the study established that all our independent variables are important elements in determining the capital structure of a listed firm in Ghana. First we realized that firms in Ghana use less debt than equity and use more short-term debt than long-term debt in their

operations. Secondly, we realized that the tangibility of firms, liquidity, managerial ownership and size of a firm have got positive relationship with long-term debt ratio. This indicates that firms in Ghana that have high fixed assets, high liquidity, large amount of assets and higher management ownership have high long-term debt ratio. This means that collateralization and trust on managers' ability on wise investment are crucial for accessing long-term debt.

Thirdly, we established that profitability, growth opportunities, age and business risk have inverse relationship with long-term debt. This indicates that firms that have growth opportunities and are more distress are risky firms hence have low attraction of long-term debt. Furthermore, older and profitable firms prefer to rely on their retained earnings to finance their operation as against debt. This is directly in line with the pecking order theory. Finally, we noted that non-debt tax shield, managerial ownership, business risk and size have direct significant relationship with short-term debt whereas tangibility, liquidity and age are found to have negative significant relationship with short-term debt in Ghana. Based on these we recommend the following:

Government and policy makers should endeavor to develop our bond and other long term debt markets to enable firms that have the ability and want to balance their capital structure with debt to be able to do so. Currently, it is the government alone that issues bonds mostly into foreign countries due to the undeveloped nature of our bond market. Issuing bond into foreign country may be too costly for private firms to do so hence there is the need to develop our local bond market for firms to have choices in their financing.

Secondly, Ghana is one of the countries in Africa with high interest rates and this has negative implications on cost of borrowing. Higher cost of borrowing has made some firms to avoid debt in their operations. This could be averted if Bank of Ghana puts in critical monetary policies so as to stabilize the economy and hence reduce our cost of borrowing to give way for many firms to engage in debt as alternative or supplementary sources of finance as capital is one of the cardinal determinants of firm success in developing countries. Thirdly, as noted above managerial ownership has been very crucial to capital structure. We therefore recommend policy makers on code of governance should make binding for all directors of firms to have ownership in the firm so as to avoid sub-optimal investment which is negative to debt attraction.

6. Bibliography

Abdou, A.H.; Kuzmic, A.; Pointon, J. & Lister, R.J. (2012). Determinants of capital structure in the UK retail industry: a comparison of multiple regression and generalized regression neutral network. *Intelligent Systems in Accounting, Finance and Management*, Vol. 19, pp. 151-169.

Abor, J. (2008). Determinants of the capital structure of Ghanaian firms. *African Research Consortium*, Nairobi, Research Paper, 176.

Abor, J. & Biekpe, N. (2005). What determines the capital structure of listed firms in Ghana. *African Finance Journal*, Vol. 7, No. 1, pp. 37-48.

Abor, J. & Biekpe, N. (2009). How do we explain the capital structure of SMEs in Sub–Saharan Africa? *Journal of Economic Studies*, Vol. 36, pp. 83-97.

Abu Mouamer, F.M. (2011). The determinants of capital structure of Palestine-listed companies. *The Journal of Risk Finance*, Vol. 12, No. 3, pp. 226-241.

Akhtar, S. & Oliver, B. (2009). The determinants of capital structure for Japanese multinational and domestic corporations. *International Review of Finance*, Vol. 9, No. 1-2, pp. 1-26.

Alhassan, A.L.; Kyereboah-Coleman, A. & Andoh, C. (2014). Asset quality in a crisis period; an empirical examination of Ghanaian banks, *Review of Development Finance*, Vol. 4, pp. 50-65.

Arellano, M. & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economics Studies*, Vol. 58, pp. 277–297.

Arellano, M. & Bover, O. (1995). Another look at the instrumental-variable estimation of error-components. *Journal of Economics*, Vol. 68, pp. 29–52.

Bokpin, G.A. & Arko, A.C. (2009). Ownership structure, corporate governance and capital structure decisions of firms: Empirical evidence from Ghana. *Studies in Economics and Finance*. Vol. 26, no. 4, pp. 246-256.

Bhaduri, S.N. (2002). Determinants of capital structure choice: a study of the Indian corporate sector. *Applied Financial Economics*, Vol. 12, No. 9, pp. 655-665.

Bradley, M.; Jarrel, G.A. & Han, K.E. (1984). On the existence of an optimal capital structure: theory and evidence. *The Journal of Finance*, Vol. 39, No. 3, pp. 857-80.

Blundell, R. & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, Vol. 87, pp. 115–143.

DeAngelo & Masulis (1980). Optimal capital structure under corporate and personal taxation. *Journal of financial economics*, Vol. 8, pp. 3-29.

Delcoure, N. (2007). The determinants of capital structure in transitional economies. *International Review of Economics and Finance*, Vol. 16, pp. 400-415.

Diamond, D.W. (1989). Reputation acquisition in debt markets. *Journal of Political Economy*, Vol. 97, No. 4, pp. 828-62.

Fama, E.F. & Jensen, M. (1983). Agency problem and residual claims. *Journal of Law and Economics*, Vol. 26, pp. 327–349.

Gomez, G.; Rivas, A.N. & Balanos, E.R.L. (2014). The determinants of capital structure in Peru. *Academia Revista Latinoamericana de Administration*, Vol. 27, No. 3, pp. 341-354.

Hsia, C.C. (1981). Coherence of the modern theories of finance. *Financial Review*, pp. 27–42.

Huang, G. & Song, F.M. (2006). The determinants of capital structure: Evidence from China. *China Economic Review*, Vol. 17, pp. 14-36.

Lambert, H. de Wet & Gossel, S.J. (2016). South African capital structure decision: a survey of listed companies. *Journal of African Business*, Vol. 17, No. 2, pp. 167-187.

Mazur, K. (2007). The determinants of capital structure choice: evidence from Polish companies. *International Advances in Economic Research*, Vol. 13, pp. 495-514.

Miller, M.H. (1977). Debt and Taxes. *The Journal of Finance*, Vol. 32, pp. 261-275.

Modigliani, F. & Miller, M. (1958). The cost of capital, corporate finance and the theory of investment. *American Economic Review*, Vol. 48, pp. 261-297.

Myers, S.C. (1977). Determinants of corporate borrowing. *Journal of Financial Economics*, Vol. 5, pp. 147-175.

Myers, S.C. (1984). The Capital structure puzzle. *The Journal of Finance*, Vol. 39, pp. 575-592.

Myers, S.C. & Majluf, N.S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, Vol. 13, pp. 187–221.

Rajan, R.G. & Zingales, L. (1995). What do we know about capital structure: Some evidence from international data. *Journal of Finance*, Vol. 50, pp. 1421-1460.

Sharpe, I. G. (1995). Determinants of capital structure of Australian trading banks. *Asia Pacific Journal of Management*, Vol. 12, No. 2, pp. 97-121.

Sheikh, N.A. & Wang, Z. (2011). Determinants of capital structure: An empirical study of firms in manufacturing industry of Pakistan. *Managerial Finance*, Vol. 37, pp. 117-133.

Sogorb-Mira, F. & How, S.M.E. (2005). Uniqueness affects capital structure: evidence from a 1994-1998 Spanish data panel. *Small Business Economics*, Vol. 25, No. 5, pp. 447-57.

Titman, S. & Wessels, R. (1988). The determinants of capital structure choice. *The Journal of Finance*, Vol. 43, pp. 1-19.