

# **GLOBAL FINANCIAL CRISIS AND DETERMINANTS OF CAPITAL STRUCTURE: EVIDENCE FROM GHANAIAN NON-FINANCIAL LISTED FIRMS**

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## **ABSTRACT**

*This study uses Generalized Method of Moments (GMM) to analyze the effects of macroeconomic and firm-specific factors on the capital structure of non-financial listed firms in Ghana, for both the normal period (2006-2016) and the global financial crisis period (2008-2009). Real GDP growth, firm size, profitability, tangibility, and growth opportunities have a significant effect on varying leverage ratios of sample firms in the normal period. Inflation and real GDP growth do not significantly influence the financing choice of sample firms during the global financial crisis period. However, profitability, firm size, tangibility, liquidity, and growth opportunities have significant effects on capital structure decisions of sample firms, which could differ in periods of the global financial crisis. Our findings illuminate the possible role of the trade-off, pecking order and agency cost theories in the capital structure of sample firms despite the crisis period. The study also offers policy implications on the need for the development of capital markets as well as the ability of managers to influence corporate capital structure to remain competitive regardless of a global financial crisis event.*

**JEL:** G01, G32

**KEYWORDS:** Global Financial Crisis, Capital Structure, Macroeconomic Factors, Firm-Specific Factors, Ghana

## **INTRODUCTION**

Since corporate establishments work in a multifaceted outer condition, it is necessary to examine variations in capital structure choices over time. Adjustment in capital structure can be considered a firm's reaction to changes in non-money related factors or changes in budgetary market conditions, as a result of speculators' reaction to financial and non-monetary factors (Friedman, 1986). The changing phase of globalization could influence developments in monetary and non-financial elements. A developing country like Ghana, which functions as an open economy, has for some time been entangled in the globalization process supported by economic growth policies mostly centred on exports. A majority of these export destinations are countries which operate as participants of the Organization for Economic Co-operation and Development (OECD) (Otoo and Asafu-Adjaye, 2009). Such a level of economic integration between Ghana and advanced economies including OECD members can make Ghana susceptible to economic and financial shocks that originate from the advanced economies.

The worldwide money related and monetary emergency of the early 2,000's was the worst recession since the Great Depression in 1930. It was characterized by crumbling financial markers prompting a diminishing world yields and exchange by 2% and 13% respectively in 2009 (Brinkman, Bauer and Casley-Hayford, 2010). The reaction of different economies to the worldwide money related emergency, shifted in scope

and degree, since the idea of budgetary market improvement combined with responses to outside monetary stuns contrasts among economies. In the advent of a Global Financial Crisis, the impact of the crisis on various aspects of the Ghanaian economy was recognizable. The crisis impact in Ghana included a shift in the composition of international financial flows from private sources to official source and a decline in international remittance to Ghana by 2.4% between the end of the year 2008 and 2009 (Brinkman et al., 2010). Furthermore, the banking sector witnessed increasing non-performing loans from 6.9% in December 2007 to 14.9% in December 2009 (Bank of Ghana, 2010 c) though not exhaustive. The need to determine which factors influence the choice of financing sources by listed firms in developing countries during the 2008/2009 worldwide financial crisis cannot be overemphasized.

Some researchers have analyzed contributing macroeconomic factors of firms' financing choice (see Bokpin, 2009; Elkhaldi and Daadaa, 2015; Mensah, 2014; Mokhova and Zinecker, 2014), others have mostly focused on firm-level and institutional determinants (Abor, 2008; Lemma and Negash, 2013; Oppong-Boakye, Appiah, and Afolabi, 2013). Nonetheless, aftermath of the 2008/09 Global Financial Crisis elicited concerns for policymakers, corporate managers, and researchers to delve into crisis externalities. However, to the best of our knowledge, our review of existing studies suggests that empirics on the recent financial crisis across the globe and its interrelations with capital structure have been mostly linked to firm-specific determinant of capital structure (Zabolotna, 2013; Proença, Laureano and Laureano, 2014; Trinh and Phuong, 2015) with much focus on firms outside the Sub-Saharan economies. Examination of both macroeconomic and firm-specific factors of the capital structure of non-financial listed organizations in developing economies of Sub-Saharan Africa such as Ghana during the Global Financial Crisis remains under-researched. This study offers unique evidence at the country-specific level, with data from Ghana reflecting the distinctiveness of economic situations in inducing the capital structure of listed firms.

This study considers 17 non-financial companies listed on the Ghana Stock Exchange for investigation of both macroeconomic and firm-level factors affecting the capital structure decisions. The study covers the time period of the recent worldwide financial crisis as well as the normal period that does not exclusively focus on the period of the global financial crisis. Our study uses a dynamic panel approach, specifically the system Generalized Method of Moments (GMM) to mitigate potential endogeneity. Findings indicate real GDP growth, growth opportunities, profitability, firm size, and tangibility as important determinants of leverage ratios when considering the normal period. The crisis period reveals a unique finding of a negative effect of growth opportunities on leverage ratios contrary to the normal period. Nonetheless, profitability, firm size, tangibility, and liquidity, also significantly affect leverage ratios subject to the composition and maturity of the leverage during the 2008/2009 financial crisis. Inflation and real GDP growth as macroeconomic factors do not determine the choice of financing for listed Ghanaian non-financial companies in a global financial crisis event. The subsequent sections review the relevant literature, discuss the data and methodological approach to the study, results, and offer concluding remarks.

## LITERATURE REVIEW

This section reviews relevant literature within the framework of the trade-off theories and pecking order theory. The interrelationship among capital structure, macroeconomic factors, firm-level factors, and the global financial crisis are discussed. The term trade-off theory in capital structure decisions encapsulates a range of theories that unveil the reasoning behind the merits and demerits related to debt and equity financing (Luigi and Sorin, 2009). Agency theory, tax benefits and bankruptcy costs together, constitute core theories of the trade-off theory (Frank & Goyal, 2009; Lemma & Negash, 2013; Lim, 2012). The tax/bankruptcy cost under the trade-off theory is geared towards an ideal capital structure, where the decision to exceed the optimum capital debt level could result in the marginal benefit of debt eroded by the marginal cost of equity due to financial distress (Kraus & Litzenberger, 1973; Lemma & Negash, 2013; Ross, 1977). The use of agency costs in explaining capital structure has also revealed the importance of

debt financing. The concept of agency cost, as elucidated by Jensen and Meckling (1976) provides insight into a possible disparity of interest between shareholders and managers on one side, and agency problem between shareholders and debt-holders on the other side. Grossman and Hart (1982) theorize how the use of debt in the firm's financial structure could be used to maximize profit. The authors opined that debt raises the issue of bankruptcy, which may not bode well for management. However, the cost to management of forfeiting their position during bankruptcy forces them to maximize profit with the use of debt, leading to an expectation of higher market value. Conversely, agency costs may arise between shareholders and managers. When management fails to maximize profit under no pressure, which occurs if there are no bankruptcy costs, there exists an opportunity for management to remain unpunished for a low market value (Grossman and Hart, 1982).

Whereas, attaining an optimal mix of debt and equity may be a concern for business financing decisions, the source of finance in order of preference is the focus of the pecking order theory. Myers and Majluf (1984) shed light on capital structure under the concept of information asymmetry. The pecking order theory meant firms could follow a hierarchical order of financing by using retained earnings if possible. In the absence of retained earnings, less risky debt should be raised prior to relatively more risky debt and external equity. The choice of equity issuance as the last resort of financing strategy is associated with a relatively serious degree of adverse selection (Frank & Goyal, 2009). Evidence of the pecking order theory has been confirmed by authors such as Abor (2008) who conclude that the pecking order theory dominates the capital structure of firms in Ghana, hence the need for policymakers to advance the free flow of information.

#### Macroeconomic Factors and Capital Structure

Empirical studies have considered the possible effect of macroeconomic factors such as inflation and real GDP on the capital structure choices. The use of debt financing over equity during inflationary periods might be associated with the diminishing influence of inflation on the real cost of debt hence an increase in the real value of tax advantage of debt (DeAngelo and Masulis, 1980; Myers, 1984; Frank and Goyal, 2009) as supported by the trade-off theory. However, lenders can adjust the firm's future borrowing rate which is suitable for long-term financing (Muthama, Mbaluka, and Kalunda, 2013). However, there is no predetermination for seamless inflation adjustment on debt, making debt financing a preferable choice during inflationary periods (Mans, 2010). The tax-trade off theory predicts a positive relationship between inflation and capital structure as established empirically by Frank and Goyal (2009), Tomschick (2015) and Lemma and Negash (2013). Nonetheless, inflation can adversely affect the variability of earnings through consumer demand, increase business risk, and financial distress tendencies despite the increase in pricing power by firms. Muthama et al. (2013), and Elkaldi and Daadaa (2015) identified a negative relationship between inflation and some leverage ratios. Further, it could be argued theoretically that favourable economic growth provides the right climate for firm growth (Khanna, Srivastava, and Medury, 2015), suggesting a rise in the value of firm turnover, profitability and other assets of the company. By extension, financial distress is expected to drop with an increase in collateral value, stock prices and free cash flow (Lemma and Negash, 2013) during economic growth. Firms could, therefore, increase their debt financing, upon weighing debt gains during growth in the economy, signifying a positive relationship between economic growth and capital structure (see Mensah, 2014; Taoulaou and Giorgi, 2014). The pecking order theory suggests a negative relationship between GDP growth and capital structure due to increases in retained earnings or easy access to external equity financing during an economic boom (see Bokpin, 2009; Muthama et al., 2013; Köksal and Orman, 2014).

#### Firm-specific Determinants of Capital Structure

The ability of corporate managers to influence the financing choice of firms could be easily linked to the characteristics of the firm. Among such firm characteristics, are firm-size, profitability, asset tangibility,

liquidity, firm growth albeit not exhaustive that have been largely expounded empirically. Its implication on capital structure, however, remains diverse. Large firms are usually expanded or diversified in their operation or asset base relative to small firms. This might result in a minor possibility of non-repayment when debt as a choice of finance is contracted, thus reducing the agency cost between debt holders and shareholders (Abor, 2007). Increasing firm size is therefore associated with higher leverage (Abor, 2008; Fan, Titman, & Twite, 2012; Trinh & Phuong, 2015; Zabolotna, 2013). Profitable firms could use a great deal of retained earnings, hence, less need for external funding and, by implication, debt especially under the conditions of fixed investments and dividend (Frank & Goyal, 2009). This intuitively follows the pecking order theory. Abor (2008) realized a statistically significant negative relationship between the profitability of Ghanaian firms and leverage ratios. Profitable firms could also easily access debt financing for investment opportunities without battling with default risk yet enjoying the tax shelter associated with debt financing. Trade-off theory may postulate a positive relationship between profitability and capital structure (Oppong-Boakye et al., 2013; Wald, 1999).

With higher tangibility and collateral, firms enjoy a lower interest rate and therefore might utilize high debt levels (Bradley, Jarrell, & Kim, 1984). This conjecture follows the trade-off theory of capital structure. Previous literature demonstrates a positive effect of tangibility on capital structure (Abor, 2007; Lemma and Negash, 2013; Köksal and Orman, 2014). Tangibility, however, has been established by other authors to have a negative relationship with capital structure as lenders may consider the short duration of liabilities against the liquidity nature of collateral of the firms (Proença et al., 2014; Trinh & Phuong, 2015). Although liquidity and capital structure relationship remain varied relative to the composition of the liquid assets, this may also affect conditions in debt covenants hence the direction of relationship (Morellec, 2001). The positive relationship between liquidity and capital structure, suggests a reflection of the trade-off theory since secured liquid assets can decrease the probability of non-repayment during financial distress and increase the optimal capital structure. However, firms with high liquidity could have access to internal financing and may capitalize on the advantage of converting liquid assets to cash flow for their investment needs, instead of relying on external financing.

Nonetheless, a negative relationship between liquidity (current ratio) and debt ratios were observed in a study of Malaysian listed firms (Ghasemi and Razak, 2016). Similarly, Proença, Laureano, and Laureano (2014) observed a negative relationship between liquidity and debt ratios (short-term debt and total debt ratio), but a positive relationship with long-term debt for Portuguese SME's firms. As argued by Ross (1977), an opportunity for firm growth reveals the identity of the firm as less likely to avoid debt repayment. This allows firms to obtain favorable terms of credit hence a positive relationship. Furthermore, firms with high growth opportunities may require additional external financing to augment the inadequate internal funds available to the firm (Michaelas, Chittenden, and Poutziouris, 1999; Muijs, 2015) hence providing support for the pecking order theory. Proença, Laureano, and Laureano (2014) therefore observed a positive relationship between firm growth and capital structure (Long-term debt and short-term debt ratios) of Portuguese firms. Notwithstanding the above arguments, empirical evidence also supports a negative relationship between growth opportunities and capital structure (Demirguc-Kunt, Martinez-peria, and Tressel 2015; Iqbal & Kume, 2014) supporting moral hazard reasoning (Myers, 1977).

### Global Financial Crisis and Capital Structure

The effect of the global financial crisis on both advanced and developing economies offer an insightful transmission of the financial crisis on the capital structure decisions for both listed and unlisted firms by several authors. Empirical evidence on the effects of the Global Financial Crisis using the ordinary least squares regression analysis on firm-specific variables of Ukrainian firms was observed by Zabolotna (2013). Variables such as firm size, profitability, tangibility, liquidity, and growth proved a significant relationship when the average values of variables in the long pre-crisis period (the year 2001 to 2007) were compared to the crisis period (the year 2008 to 2009). Nevertheless, profitability was the only identifiable

variable that showed a significant influence on leverage ratios when the pre-crisis period was shortened to the year 2006-2007 (Zabolotna, 2013). Relating the effect of the Global Financial Crisis on the short-term debt financing, Fosberg (2013) documents that firms increased their short-term debt from 1.3% of their assets in the year 2006 to 2.2% in 2008 which later declined by the end of the year 2009. The rise in short-term debt financing during the 2008 crisis period by firms, was nearly ascribed to a decrease in accounts payable financing from suppliers, long-term finance, equity, and asset sales. Proença, Laureano, and Laureano (2014) observed a downward tendency in the debt ratios of Portuguese SMEs, considering the effect of the 2007/2008 global financial crisis on the capital structure of listed firms using the Ordinary Least Square regression analysis. The study also considered profitability, liquidity, and asset structure as significant determinants of capital structure.

A study by Iqbal and Kume (2014) provides evidence of the 2008/2009 financial crisis' impact on leverage ratios for both the market-based UK economy and bank-based German and French economy. The authors observed that debt ratios increased from the pre-crisis period (2006-2007) to the crisis period (2008-2009) and later decreased in the post-crisis (2010-2011) period. They also observed the significance of firm-level characteristics such as profitability, firm size, firm growth and tangibility in determining the capital structure of UK, German and French firms. Trinh and Phuong (2015) conducted a study on capital structure determinants including financial crisis dummies on listed firms together with other firm-level determinants of capital structure. The authors concluded there was no significant change in the capital structure of listed firms in Vietnam during the financial crisis period. Nonetheless, they found a statistically significant effect of profitability, size, and tangibility on the capital structure of Vietnamese listed firms within a sample period of 2006 to 2013. Dermiguc-Kunt, Martinez-Peria, and Tressel (2015) revealed a significant reduction in leverage and debt maturity of both developed and developing countries during the period of the global financial crisis using the feasible generalized least square estimator in their cross-country study. Findings were limited to privately held firms and small and medium enterprises. The same could not be said for publicly listed firms with weaker evidence of a significant decline in leverage.

## DATA AND METHODOLOGY

### Model Specification

Our study uses a balanced panel framework to investigate macroeconomic and firm-specific factors which could influence the financing mix of Ghanaian listed non-financial business entities. This is critical in the current study owing to the inadequate number of observations because a balanced panel reduces the noise introduced by firm heterogeneity. Panel data has an added advantage of controlling for individual heterogeneities (Baltagi, 1998). Nevertheless, this added advantage can only be harnessed if the appropriate technique is used (Park, 2011). The study is conducted for a full sample period from the year 2006 to 2016, signifying a normal period, and the sub-sample period from the year 2008 to 2009, which accounts for the global financial crisis period. For robustness checks of the empirical results, we employ more than one estimation technique including the ordinary least squares (OLS), fixed and random effects, and the generalized method of moments (GMM). The panel regression model is represented formally as follows:

$$C_{it} = \alpha_i + \beta_t + \gamma X_{it} + \varepsilon_{it} \quad (1)$$

Where,  $C_{it}$  represents the capital structure of the company  $i$  at time  $t$ ;  $\alpha_i$ , represents firm fixed effect while  $\beta_t$  is year fixed effects;  $X_{it}$  depicts the vector of independent variables incorporated in the model, which are observed for each firm  $i$  at time  $t$ . The independent variables are the inflation rate, real GDP growth rate, firm size, tangibility, profitability, liquidity, and growth opportunities.  $\gamma$  signifies the parameter estimates, and  $\varepsilon_{it}$  denotes the random error term. More specifically, Equation (1) is expressed functionally as:

$$TL_{it} = \alpha_i + \beta_t + B_1 INF_{it} + B_2 RGDP_{it} + B_3 FS_{it} + B_4 TAN_{it} + B_5 PROF_{it} + B_6 LIQ_{it} + B_7 GROWTH_{it} + \varepsilon_{it} \quad (2)$$

$$STL_{it} = \alpha_i + \beta_t + B_1 INF_{it} + B_2 RGDP_{it} + B_3 FS_{it} + B_4 TAN_{it} + B_5 PROF_{it} + B_6 LIQ_{it} + B_7 GROWTH_{it} + \varepsilon_{it} \quad (3)$$

$$LTL_{it} = \alpha_i + \beta_t + B_1 INF_{it} + B_2 RGDP_{it} + B_3 FS_{it} + B_4 TAN_{it} + B_5 PROF_{it} + B_6 LIQ_{it} + B_7 GROWTH_{it} + \varepsilon_{it} \quad (4)$$

Where,  $TL_{it}$ ,  $STL_{it}$ , and  $LTL_{it}$  are the total leverage, short-term leverage, and long-term leverage respectively for the firm  $i$  at time  $t$ .  $\alpha$  is the constant;  $INF$  is inflation rate;  $RGDP$  is the real GDP growth rate;  $FS$  is firm size;  $TAN$  is tangibility;  $PROF$  is profitability;  $LIQ$  represents liquidity;  $GROWTH$  is growth opportunities of sample firms.  $\beta_t$  is year fixed effects; the  $B_1 \dots B_6$  are the parameters to be estimated and  $\varepsilon_{it}$  is the error term.

### Dealing with a Potential Endogeneity Problem

Based on the observation from the existing empirical works on determining factors of firm capital structure, a potential endogeneity problem in the underlying relationship could be present. Such endogeneity concerns may arise from three main sources, namely, simultaneity (or reverse causality), measurement error and misspecification. The problem of endogeneity including dynamic endogeneity could make estimates from the OLS, fixed-effects model, and random effects model biased and inaccurate. To deal with potential endogeneity in our model, Equation (1) would be estimated using the system generalized method of moments (GMM) estimation technique. As such, a dynamic version of Equation (1) can be expressed as:

$$C_{it} = \alpha_i + \beta_t + \delta C_{i,t-1} + \gamma X_{it} + \varepsilon_{it} \quad (5)$$

Where,  $C_{i,t-1}$  is the lagged value of  $C_{it}$  which is the dependent variable and the capital structure for firm  $i$  at time  $t$ .  $\alpha_i$ , denotes firm fixed effect,  $\beta_t$  are year fixed effects,  $X_{it}$  is the vector of independent variables in the model,  $\gamma$  is the parameter estimates of the independent variables and  $\varepsilon_{it}$  is the random error term. Equation (5) is estimated using the GMM technique which deals with the endogeneity problem (Arellano and Bond, 1991; Arellano and Bover, 1995; Blundell and Bond, 1998). Following the works of Alhassan, Kyereboah-Coleman, and Andoh (2014) who suggest that the system GMM of Arellano and Bover (1995) and Blundell and Bond (1998) has high predictive ability in small samples with short time periods such as our data, compared to the difference GMM of Arellano and Bond (1991). We therefore, adopt the system GMM in our study. The GMM procedure is found to be manageable by relying on internal instruments given the seeming difficulty in recognizing valid external instruments. We express Equation 5 functionally as follow:

$$TL_{it} = \alpha_i + \beta_t + \delta TL_{i,t-1} + B_1 INF_{it} + B_2 RGDP_{it} + B_3 FS_{it} + B_4 TAN_{it} + B_5 PROF_{it} + B_6 LIQ_{it} + B_7 GROWTH_{it} + \varepsilon_{it} \quad (6)$$

$$STL_{it} = \alpha_i + \beta_t + \delta STL_{i,t-1} + B_1 INF_{it} + B_2 RGDP_{it} + B_3 FS_{it} + B_4 TAN_{it} + B_5 PROF_{it} + B_6 LIQ_{it} + B_7 GROWTH_{it} + \varepsilon_{it} \quad (7)$$

$$LTL_{it} = \alpha_i + \beta_t + \delta LTL_{i,t-1} + B_1 INF_{it} + B_2 RGDP_{it} + B_3 FS_{it} + B_4 TAN_{it} + B_5 PROF_{it} + B_6 LIQ_{it} + B_7 GROWTH_{it} + \varepsilon_{it} \quad (8)$$

Where  $TL_{it}$ ,  $STL_{it}$  and  $LTL_{it}$  represent the total leverage, short-term leverage and long-term leverage for firm  $i$  at time  $t$  correspondingly.  $\delta TL_{i,t-1}$ ,  $\delta STL_{i,t-1}$  and  $\delta LTL_{i,t-1}$  are the lagged value of the total

leverage, short-term leverage, and long-term leverage respectively for firm  $i$  at time  $t-1$ .  $\alpha_i$  is the firm fixed effects,  $\beta_t$  is year fixed effects,  $B_1 \dots B_6$  are the parameter estimates. INF is the inflation rate, RGDP is the real GDP growth rate, FS is the firm size, TAN is the tangibility of the firm, PROF is the profitability, LIQ is the liquidity, and GROWTH is the growth opportunities of sample firms.  $\varepsilon_{it}$  is the error term.

Data Description and Sample

We employ firm-specific and macroeconomic annual data for an 11-year period (2006 to 2016) and a 2-year period (2008 to 2009) representing the normal period and the global financial crisis period respectively. Some 187 observations for the normal period and 34 observations for the period of the financial crisis are realized upon considering our sample of 17 non-financial listed firms in Ghana. We focus our sample selection on listed firms who are likely to fulfil the disclosure requirement ( Enos and Gyapong, 2017). Listed financial firms are not considered in this study, due to the unique nature of their capital structure which is governed by special regulations (Simon, 2009). Firms with missing financial statements are also excluded in this study to obtain a balanced panel data. This is because balanced panels allow observations of the same unit in every time period (Gyapong, Monem, and Hu, 2016). In addition, firms with financial statements presented in foreign currency are eliminated to avoid distortions in currency translation and ensure accuracy and reliability in the computed financial ratios. Our firm-specific and capital structure variables are financial ratios computed from the audited financial statements of sample firms, which were obtained from the Annual Report Ghana database and Ghana Stock Exchange database. Firm-specific variables used as independent variables in our study are firm size, profitability, tangibility, liquidity, and growth opportunities. Macroeconomic data consisting of the annual inflation rate and annual real GDP growth rate are also captured as independent variables in our study and the data obtained from the World Development Indicator Database and IMF Database correspondingly. In the spirit of Welch (2011), our book measure of leverage (total leverage, short term leverage and long term leverage) as a proxy for the capital structure includes the interest and non-interest bearing debt which, follows previous empirical studies (Elkhaldi and Daadaa, 2015; Mokhova and Zinecker, 2014; Perera, 2015). The definition of the variables is summarized in Table 1.

Table 1: Variable Definitions and Data Source

Code	Dependent Variable Name	Definition
TL	Total Leverage	The ratio of total liabilities to total asset
STL	Short-term Leverage	The ratio of current liabilities to total assets
LTL	Long-term Leverage	The ratio of long-term liabilities to total asset
Code	Independent Variable Name	Definition
INF	Inflation	The annual percentage change in the consumer price index
RGDP	Real GDP growth	The annual percentage change in GDP growth
FS	Firm size	The natural log of total sales
PROF	Profitability	The ratio of earnings before interest and tax to total assets
TAN	Tangibility	The ratio of net property, plants, and equipment to total assets
LIQ	Liquidity	The ratio of current assets to current liabilities
GROWTH	Growth Opportunities	The ratio of net sales to total assets

*This table illustrates the codes used to depict the variables and the meaning of the variables. The total leverage, short-term leverage, and long-term leverage are used as a proxy for capital structure hence the dependent variables. Inflation and Real GDP growth constitute the macroeconomic variables used as independent variables. The firm size, profitability, tangibility, liquidity, and growth opportunities are computed as financial ratios for the analysis, which also represents the firm-level determinants to be empirically established in this study. The definition column of Table 1 describes the variables used in our study.*

Table 2 illustrates the descriptive statistics of the variables used in this study. STL, LTL, and TL depict the short-term leverage, long-term leverage, and the total leverage respectively and considered as

measurements of capital structure in the study. RGDP is the annual real GDP growth rate; INF is the annual inflation rate; PROF is the profitability of the firm; LIQ is the liquidity; TAN is the tangibility, and GROWTH is the growth opportunities of the firm. The definitions of these variables are the same as those defined in Table 1 above. The total number of observations for the normal period (2006-2016) is 187. Mean is the average value of the variables; Std. Dev. signifies the standard deviation of the variables; Min. and Max. are the minimum and maximum values of the variables used in our study respectively. Table 3 illustrates the descriptive statistics of the variables during the global financial crisis in the year 2008/2009. Table 4 shows the pairwise correlation between the regression variables used in our study. The p-values are in parenthesis and are used to test the significance of the correlation coefficient for the variables in our model.

Table 2: Summary Statistics of the Variables Used in the Econometric Analysis for the Normal Period (2006-2016)

Variable	Observations	Mean	Std. Dev.	Min.	Max.
STL	187	0.656	1.598	0.018	21.126
LTL	187	0.108	0.244	0.000	1.994
TL	187	0.764	1.611	0.045	21.126
RGDP	187	6.764	3.052	3.700	14.000
INF	187	13.431	3.609	8.727	19.251
PROF	187	0.078	0.297	-2.530	1.569
LIQ	187	1.537	1.837	0.033	13.337
TAN	187	0.446	0.339	0.001	3.353
GROWT	187	1.381	2.266	-0.906	22.452
H					
FS	187	16.695	2.300	11.474	21.361

*This table illustrates the descriptive statistics of the variables used in this study. STL, LTL, and TL depict the short-term leverage, long-term leverage, and the total leverage respectively and considered as measurements of capital structure in the study. RGDP is the annual real GDP growth rate; INF is the annual inflation rate; PROF is the profitability of the firm; LIQ is the liquidity; TAN is the tangibility, and GROWTH is the growth opportunities of the firm. The definitions of these variables are the same as those defined in Table 1 above. The total number of observations for the normal period (2006-2016) is 187. Mean is the average value of the variables; Std. Dev. signifies the standard deviation of the variables; Min. and Max. are the minimum and maximum values of the variables used in our study respectively.*

Table 3: Summary Statistics of the Regression Variables During the Global Financial Crisis Period (2008-2009)

Variable	Observations	Mean	Std. Dev.	Min.	Max.
STL	34	0.434	0.18	0.077	0.861
LTL	34	0.106	0.157	0	0.611
TL	34	0.54	0.241	0.773	1.078
RGDP	34	6.95	2.155	4.8	9.1
INF	34	17.886	1.384	16.522	19.251
PROF	34	0.081	0.134	-0.151	0.39
LIQ	34	1.615	1.883	0.359	9.806
TAN	34	0.451	0.245	0.041	0.834
GROWTH	34	1.193	1.144	-0.012	4.53
FS	33	16.537	2.262	13.984	19.111

*This table illustrates the descriptive statistics of the variables during the global financial crisis in the year 2008/2009. STL, LTL, and TL depict the short-term leverage, long-term leverage, and the total leverage respectively and considered as a proxy of capital structure in the study. RGDP is the annual real GDP growth rate; INF is the annual inflation rate; PROF is the profitability of the firm; LIQ is the liquidity; TAN is the tangibility, and GROWTH is the growth opportunities of the firm. The definitions of these variables are the same as those defined in Table 1 above. Mean is the average value of the variables; Std. Dev. signifies the standard deviation of the variables; Min. and Max. are the minimum and maximum values of the data set for the variables respectively. The global financial crisis period represents the year 2008 to 2009.*



Table 4: Correlation Matrix of Regression Variables

	STL	LTL	TL	RGDP	INF	PROF	LIQ	TAN	GROWTH	FS
STL	1									
LTL	-0.024 (0.745)	1								
TL	0.9884 (0.000)	0.1278 (0.081)	1							
RGDP	-0.0652 (0.375)	0.1054 (0.151)	-0.0487 (0.508)	1						
INF	0.0309 (0.675)	-0.0791 (0.282)	0.0186 (0.800)	-0.6155 (0.000)	1					
PROF	-0.5979 (0.000)	-0.0771 (0.295)	-0.6048 (0.000)	0.0497 (0.499)	-0.0155 (0.833)	1				
LIQ	-0.1668 (0.023)	-0.1668 (0.023)	-0.1908 (0.009)	0.0723 (0.326)	-0.0753 (0.306)	0.1797 (0.014)	1			
TAN	-0.0165 (0.823)	0.2492 (0.001)	0.0214 (0.771)	0.0264 (0.720)	-0.0127 (0.864)	0.1567 (0.032)	-0.0704 (0.338)	1		
GROWTH	0.2412 (0.001)	-0.0685 (0.351)	0.2289 (0.002)	0.0252 (0.732)	-0.0891 (0.225)	0.0239 (0.746)	-0.0828 (0.260)	-0.0374 (0.611)	1	
FS	-0.1133 (0.124)	-0.1972 (0.007)	-0.1424 (0.053)	-0.0385 (0.602)	0.0573 (0.437)	0.2434 (0.001)	0.0817 (0.268)	-0.1492 (0.042)	0.259 (0.000)	1

This table shows the pairwise correlation between the regressions variables used in our study. The p-values are in parenthesis and are used to test the significance of the correlation coefficient for the variables in our model. STL is the short-term leverage; LTL is the long-term leverage; TL is the total leverage, RGDP is the real GDP growth; INF is the inflation rate; PROF is the profitability of the sample firm; LIQ is the liquidity of the firm; TAN is the tangibility of the firm; GROWTH is the growth opportunity variable, and FS is the firm size. It is worthy of note however that weak correlation exists amongst most of the independent variables, indicating perhaps the absence of a potential multicollinearity problem.

## EMPIRICAL RESULTS AND DISCUSSION

This section presents and discusses the empirical results. The regression results presented in this section are structured into two main subsections. The first sub-section presents and discusses the estimated results of the macroeconomic and firm-specific contributing factors of firm capital structure in the normal period (2006 to 2016) without emphasis on the global financial crisis period. The second sub-section presents estimated results of the macroeconomic and firm-specific contributing factors of firm capital structure focusing on the global financial crisis period (2008-2009).

### Capital Structure Determinants of Non-Financial Listed Firms in Ghana: Full Sample Period (2006-2016)

Empirical outcomes on the determinants of capital structure for the full sample period are presented in Table 5, 6, and 7. Specifically, Table 5, 6, and 7 present the results of the macroeconomic and firm-specific contributing factors of total leverage, short-term leverage, and long-term leverage respectively. Columns I, II and III of each of the regression tables under this section present the results of the OLS, the random effects, and the system GMM respectively indicating the robustness of our findings. To make a choice between the fixed effects and the random effects model, the study employs the Hausman test to determine the preferred model (random effects model) at the 5% level of significance. The Adjusted R-Squared of the OLS model in Column I, of Table 5, 6, and 7 indicates that 44.5%, 43.1% and 10.1% of the variations in total leverage, short-term leverage and long-term leverage respectively are explained by the independent variables. Previous studies on capital structure determinants have highlighted the potential endogeneity problem including serial correlation process (Gonzalez and Gonzalez, 2012; Nyeadi, Banyen, and Mbawuni, 2017), as evident in our data. This makes the estimates of the OLS and random effects models

less efficient relative to the GMM model, which could mitigate possible endogeneity. We, therefore, focus our discussion of the results on the system GMM in Column III of Table 5, 6, and 7. The significance of each of the estimated parameters, holding all other variables constant is tested at the conventional 1%, 5%, and 10% levels of significance for establishing the determinants of capital structure.

The estimated outcomes of the system GMM as presented in Column III of Table 5, 6, and 7, indicates that real GDP growth is the only macroeconomic variable that has a negative and statistically significant effect on short-term leverage for the full sample period. Thus, unit growth in real GDP results in a 0.039 decrease in the use of short-term debt of the firms, holding all other variables constant. We infer that during the period of increased economic growth, listed non-financial firms in Ghana are likely to increase revenue and consequently profit. This may offer firms the opportunity to access internal funds prior to considering short-term debt as maintained by the pecking order theory. This finding contradicts the study by Mensah (2014), but is consistent with the findings by Köksal and Orman (2014) and Bokpin (2009). Inflation has no significant effect on the leverage ratios of sample firms. There is a significant positive relationship between firm size and long-term leverage (see Table 7, Column III). This could imply that large firms as demonstrated by high sales values may show less inconsistency in their profits, hence a minor possibility of non-repayment of long-term debt to lenders or creditors. The positive relationship between firm size and long-term leverage follows previous findings (see Köksal and Orman, 2014; Fan, Titman and Twite, 2012).

As indicated in Column III, of Table 5, 6, and 7, profitability has statistically significant negative effects on total leverage and short-term leverage contrary to the significant positive effect on long-term leverage. The significant negative effect of profitability on short-term leverage and total leverage could point to the importance of utilizing internal funds relative to seeking short-term debt when the profitability of sampled firms increases. This finding does not depart from the conclusion made by Abor (2008), Köksal & Orman (2014), and Lemma & Negash (2013) with further support from the pecking order theory. In agreement with the trade-off theory, we infer that creditors are likely to provide long-term debt financing to sampled firms with high profitability since they exhibit low risk of default on debt repayment. Previous findings reveal such a positive relationship between profitability and long-term debt (see Oppong-Boakye et al., 2013; Wald, 1999).

Tangibility, as shown in our findings in Column III of Table 5, 6 and 7, has a negative relationship with total leverage, short-term leverage, and long-term leverage, although only long-term leverage is statistically significant as presented in Column III of Table 7. The negative relationship between long-term leverage and tangibility could be attributed to the fact that the capital market, especially the debt market where firms could borrow to finance their long-term assets, remains under-developed in Ghana. Further, our evidence shows that liquidity which is measured by current ratio has a statistically insignificant negative relationship with all the measures of leverage in our study as illustrated in Column III of Table 5,6, and 7. This implies that liquidity is not an important factor in determining leverage of sample firms for the full sample period. From the estimates of the system GMM in Column III of Table 5, 6, and 7, total leverage, short-term leverage and long-term leverage of sample firms are positively influenced by growth opportunities at a statistically significant level of 1 %. This finding suggests that as opportunities for business growth increase, sample firms utilize debt to augment inadequate internal financing with likely credit support from lenders. This corroborates the results of Michaelas et al. (1999) and Muijs (2015) and intuitively confirms the pecking order theory. Testing for over-identifying restrictions (i.e. the Sargan test), it is observed from Table 5,6, and 7 that, the null hypothesis that the over-identifying assumptions are valid is overruled at the 1% level of statistical significance given the P-value of 0.000. This implies that the internal instruments identify the same vector of parameters so the model does not suffer from over-identifying bias.

Table 5: Determinants of the Total Leverage of Non-financial Listed Firms in Ghana for the Full Sample Period (2006-2016)

Variables	I OLS	II Random Effects	III System GMM
<i>Dependent Variable: Total leverage (TL)</i>			
INF	0.012 (0.032)	0.012 (0.032)	0.003 (0.020)
RGDP	-0.004 (0.038)	-0.004 (0.037)	-0.035 (0.023)
FS	-0.029 (0.043)	-0.019 (0.048)	-0.030 (0.025)
PROF	-3.311*** (0.325)	-3.406*** (0.332)	-3.264*** (0.380)
TAN	0.561** (0.275)	0.677** (0.289)	-0.428 (0.475)
LIQ	-0.045 (0.053)	-0.041 (0.057)	-0.017 (0.616)
GROWTH	0.183*** (0.042)	0.179*** (0.042)	0.912*** (0.108)
L.TL	-	-	-0.103** (0.045)
Constant	0.929 (0.943)	0.72 (1.000)	-
Observations	186	186	170
R-squared/Overall R-squared	0.446	0.445	-
Adjusted R-squared	0.424	-	-
Number of years	11	11	10
Wald chi2/F statistic	20.47	141.22	80.7
Hausman test (p-value)	-	0.359	-
AR(1)	-	-	0.005
AR(2)	-	-	0.518
Sargan test (p-value)			0.000

*This table presents the results of regression equations 2 and 6 for the full sample period. The standard errors are reported in parenthesis. \*\*\*, \*\*, \* indicates statistical significance at 1%, 5%, and 10% respectively. TL is the total leverage. INF is the annual inflation rate. RGDP is the annual real GDP growth rate. FS is the firm size. PROF is profitability. LIQ is the liquidity ratio measured as the current ratio. TAN is tangibility. GROWTH is the growth opportunities of the firm. L.TL is the lag of total leverage. AR(1) and AR(2) is the first-order and second-order serial correlation respectively.*

### Capital Structure Determinants of Listed Non-Financial Firms in Ghana: Global Financial Crisis Period

This section discusses the empirical results of both macroeconomic and firm-specific determinants of listed non-financial firms' capital structure in Ghana, during the global financial crisis of 2008 and 2009. Given that three variables, namely, total leverage, short-term leverage, and long-term leverage, proxies capital structure, three types of results are presented in Table 8, 9 and 10 correspondingly. For robustness check of our empirical findings, we provide results of the OLS, the preferred random effects and system GMM in Column I, II, and III of Table 8, 9, and 10 respectively. The Adjusted R-Squared of the OLS model in Column I of Table 5, 6, and 7 shows that 47.1%, 61%, and 15.9% of the variations in total leverage, short-term leverage and long-term leverage respectively of sample firms during the crisis period are explained by the regressors. Nonetheless, possible endogeneity issues that affect the underlying relationship in previous studies of capital structure determinants make estimates from OLS, fixed effects model and random effects model biased and inefficient compared to the GMM model which deals with this endogeneity problem (Nyeadi, Banyen, and Mbawuni, 2017). Hence, our discussion mainly focuses on the results of the system GMM in Column III of Table 8, 9 and 10. From the observation of our results in Column III of Table 8, 9, and 10, macroeconomic factors such as inflation rate and real GDP growth do not have any statistically significant relationship with the sample firms' leverage during the 2008/2009 global financial crisis period.

Table 6: Determinants of Short-term Leverage of Non-financial Listed Firms in Ghana for the Full Sample Period (2006-2016)

Variables	I OLS	II Random Effects	III System GMM
<i>Dependent Variable: Short-term leverage (STL)</i>			
INF	0.014 (0.032)	0.013 (0.031)	0.006 (0.197)
RGDP	-0.012 (0.037)	-0.012 (0.036)	-0.039* (0.023)
FS	-0.015 (0.043)	0.001 (0.051)	0.013 (0.025)
PROF	-3.261*** (0.326)	-3.424*** (0.335)	-3.536*** (0.380)
TAN	0.398 (0.276)	0.639** (0.298)	-0.233 (0.478)
LIQ	-0.242 (0.053)	-0.021 (0.059)	-0.01 (0.062)
GROWTH	0.188*** (0.042)	0.188*** (0.042)	0.885*** (0.107)
L.STL	-	-	-0.074* (0.043)
Constant	0.667 (0.945)	0.311 (1.048)	-
Observations	186	186	170
R-squared/Overall R-squared	0.434	0.431	-
Adjusted R-squared	0.412	-	-
Number of years	11	11	10
Wald Chi2/F statistic	19.49	137.61	77.35
Hausman test (p-value)	-	0.289	-
AR(1)	-	-	0.004
AR(2)	-	-	0.767
Sargan test (p-value)	-	-	0.000

This table presents the results of regression equations 3 and 7 for the full sample period. The standard errors are reported in parenthesis. \*\*\*, \*\*, \* indicates statistical significance at 1%, 5%, and 10% respectively. STL represents short-term leverage. INF is the inflation rate. RGDP is the real GDP growth rate. FS is the firm size. PROF is profitability. LIQ is the liquidity ratio measured as the current ratio. TAN is tangibility. GROWTH is the growth opportunities of the firm. L.STL is the lag of short-term leverage. AR (1) and AR (2) is the first-order and second-order serial correlation respectively.

Interestingly, firm size has a statistically significant negative and positive relationship with short-term leverage and long-term leverage respectively (see Column III of Table 9 and Table 10), contrary to the statistically insignificant positive relationship between total leverage and firm size as illustrated in Column III of Table 8. The negative relationship between firm size and short-term leverage is crucial during the crisis period since lenders could be uncertain in extending debt claims to firms. Therefore, firms which are small in size could be compelled to opt for the short-term debt even in the crisis period since lenders may associate smaller firms with high risk making access to long-term funds difficult relative to large firms, following the argument of Muijs (2015). This finding is consistent with the study of Muijs (2015), Zabolotna (2013) and Proença et al. (2014). The positive effect of firm size on long-term leverage indicates the importance of large firms mitigating the possible adverse selection and information asymmetry they may face with lenders during the crisis period. Evidence from the system GMM results in Column III of Table 8, 9, and 10 suggest that, during the crisis period, profitable firms are likely to reduce their long-term funding and take advantage of the lower cost of financing their operational activities with an internal source of funding as predicted by the pecking order theory. This confirms previous studies by Proença (2014) but contradicts the findings of Muijs (2015).

An increase in tangibility is found to be unimportant in securing high leverage during the global financial crisis period as evidenced in Table 8, 9 and 10 of Column III. Besides, a statistically significant negative relationship exists between tangibility and firm leverage (i.e. total leverage and short-term leverage). Consequently, lenders perhaps are not likely to extend their liability claims for a long period during the crisis period. They may not consider the tangible non-current assets of sample firms for security due to the illiquid nature of the asset. Firms could additionally bear the relatively higher cost in perfecting the non-current assets as collateral in a period of crisis. Moreover, high short-term liabilities composition in the total debt structure of sample firms suggests a decline in total leverage when an increase in current assets is substituted for tangible non-current assets. Trinh and Phuong (2016), as well as Zabolotna (2013), found a similar negative relationship between tangibility and total debt ratio in their study of the global financial crisis and business financing choices. Iqbal and Kume (2014) also realized a negative relationship between tangibility and the total debt ratio of firms in France. Although the findings of these authors were not restricted to the global financial crisis period compared to our study, our results do not depart from intuition behind the pecking order theory.

Table 7: Determinants of Long-term Leverage of Non-financial Listed Firms in Ghana for the Full Sample Period (2006-2016)

Variables	I OLS	II Random Effects	III System GMM
<i>Dependent Variable: Long-term leverage (LTL)</i>			
INF	-0.002 (0.007)	-0.002 (0.006)	-0.003 (0.004)
RGDP	0.008 (0.007)	0.008 (0.006)	0.003 (0.004)
FS	-0.013 (0.008)	-0.002 (0.012)	0.010** (-0.004)
PROF	0.163 (0.052)	-0.033 (0.056)	0.200* (0.068)
TAN	0.163** (0.052)	0.058 (0.053)	-0.273*** (0.084)
LIQ	-0.021** (0.010)	-0.007 (0.010)	-0.001 (0.011)
GROWTH	-0.004 (0.008)	-0.003 (0.008)	0.073*** (0.020)
L.LTL	-	-	-0.072 (0.080)
Constant	0.262 (0.180)	0.118 (0.227)	-
Observations	186	186	170
R-squared/Overall R-squared	0.125	0.101	-
Adjusted R-squared	0.091	-	-
Number of years	11	11	10
Wald Chi2/F statistic	3.64	5.79	19.16
Hausman test (p-value)	-	0.703	-
AR(1)	-	-	0.013
AR(2)	-	-	0.117
Sargan test (p-value)	-	-	0.000

This table presents the results of regression equations 4 and 8 for the full sample period. The standard errors are reported in parenthesis. \*\*\*, \*\*, \* indicates statistical significance at 1%, 5%, and 10% respectively. TL is the long-term leverage. INF is the annual inflation rate. RGDP is the annual real GDP growth rate. FS is the firm size. PROF is profitability. LIQ is the liquidity ratio measured as the current ratio. TAN is tangibility. GROWTH is the growth opportunities of the firm. L.LTL is the lag of long-term leverage. AR(1) and AR(2) is the first-order and second-order serial correlation respectively.

An illustration of our findings in Column III of Table 8, 9, and 10 suggest that liquidity exhibits a negative relationship with all measures of leverage ratio used in our study. However, total leverage and short-term leverage is observed with a negative relationship statistically significant at 10% (see Column III of Table 8 and Table 9). Thus, sample firms could rely on the availability of current assets to meet their pressing obligations by generating an internal source of funding as opposed to relying on external debt.

This may not be surprising as the financial crisis period could possibly be associated with a relatively high cost of lending due to weak economic indicators such as high inflation during the crisis period. The pecking order theory offers an insight into this finding as firms may consider the lower cost of financing their assets during the financial crisis period. Zabolotna (2013) and Proença (2014) examine capital structure determinants alongside the impact of the global financial crisis. They confirm the negative relationship between liquidity and leverage ratio (total leverage and short-term leverage). During the global financial crisis period, sample firms’ total leverage and long-term leverage show a negative sensitivity to an increase in the growth opportunities at a 1% level of statistical significance (Column III of Table 8 and Table 10). Short-term leverage, however, has a statistically significant level of 10% albeit a negative relationship with growth opportunities as illustrated in Column III of Table 9.

Table 8: Determinants of Total Leverage of Non-Financial Listed Firms in Ghana During the Global Financial Crisis Period (2008-2009)

Variables	I OLS	II Random Effects	III Systems GMM
<i>Dependent Variable: Total leverage (TL)</i>			
INF	-	0.059*** (0.020)	0.001 (0.006)
RGDP	-0.010 (0.010)	0.028** (0.013)	-0.003 (0.002)
FS	-0.032 (0.020)	-0.032 (0.027)	0.041 (0.009)
PROF	-0.154 (0.311)	-0.093 (0.261)	-0.721** (0.259)
TAN	-0.267 (0.168)	-0.152 (0.208)	-0.360** (0.130)
LIQ	-0.089 (0.019)	-0.067*** (0.019)	-0.031* (0.017)
GROWTH	-0.002 (0.426)	-0.021 (0.043)	-0.146*** (0.034)
L.TL	-	-	0.631*** (0.153)
Constant	1.416 (0.320)	- 1	- 34
Observations	34	34	34
R-squared/Overall R-squared	0.568	0.548	-
Adjusted R-squared	0.471	-	-
Number of years	2	2	2
Wald chi2/F statistic	5.9	167.14	118.46
Hausman test (p-value)	-	-3.13	-
AR(1)	-	-	0.246
AR(2)	-	-	-
Sargan test (p-value)	-	-	0.005

*This table presents the results of regression equations 2 and 6 for the global financial crisis period. The standard errors are reported in parenthesis. \*\*\*, \*\*, \* indicates statistical significance at 1%, 5%, and 10% respectively. TL is the total leverage. INF is the inflation rate. RGDP is the real GDP growth rate. FS is the firm size. PROF is profitability. LIQ is liquidity. TAN is tangibility. GROWTH is the growth opportunities of the firm. L.TL is the lag of total leverage. AR(1) and AR(2) is the first order and second-order serial correlation respectively. Inflation (INF) was omitted from the OLS estimates for the crisis period due to collinearity.*

A possible reason for the inverse relationship between leverage ratios and growth opportunities may be that firms could forgo investments openings that may yield positive returns during periods of global financial crisis since debt-holders may benefit from high-risk premiums from lending. Further, due to the possibility

of moral hazard within the financial crisis period lenders may be reluctant to offer debt. Previous studies confirm such a negative relationship (see Demirguc-Kunt et al., 2015, Iqbal and Kume, 2014) contrary to the findings of Zabolotna (2013). The Sargan test with a P-value of 0.005 suggests statistical significance level at 1%, indicating a rejection of the null hypothesis that the overidentifying restrictions are valid. Consequently, internal instruments identify the same vector of parameters making the model not to suffer from over-identifying bias.

Table 9: Determinants of Short-term leverage of Non-financial Listed firms in Ghana During the Global Financial Crisis Period (2008-2009)

Variables	I OLS	II Random Effects	III System GMM
<i>Dependent Variable: Shortterm leverage (STL)</i>			
INF	-	0.036*** (0.013)	0.003 (0.005)
RGDP	-0.008 (0.009)	0.015* (0.009)	0.001 (0.008)
FS	0.003 (0.013)	0.002 (0.017)	-0.024*** (0.008)
PROF	-0.490** (0.200)	-0.340* (0.201)	-0.465* (0.237)
TAN	-0.424*** (0.109)	-0.448*** (0.141)	-0.249** (0.112)
LIQ	-0.062*** (0.013)	-0.058*** (0.013)	-0.027* (0.014)
GROWTH	-0.012 (0.027)	-0.02 (0.036)	-0.064* (0.032)
L.STL	-	-	0.617*** (0.171)
Constant	0.784*** (0.206)	-	-
Observations	34	34	34
R-squared/Overall R-squared	0.681	0.664	-
Adjusted R-squared	0.61	-	-
Number of years	2	2	2
Wald Chi2/F statistic	9.59	275.84	97.24
Hausman test (p-value)	-	0.997	-
AR(1)	-	-	0.196
AR(2)	-	-	-
Sargan test (p-value)	-	-	0.053

*This table presents the results of regression equations 3 and 7 for the global financial crisis period. The standard errors are reported in parenthesis. \*\*\*, \*\*, \* indicates statistical significance at 1%, 5%, and 10% respectively. STL represents short-term leverage. INF is the annual inflation rate. RGDP is the annual real GDP growth rate. FS is the firm size. PROF is profitability. LIQ is the liquidity of the firms measured as the current ratio. TAN is tangibility. GROWTH is the growth opportunities of the firm. L.STL is the lag of short-term leverage. AR(1) and AR(2) is the first order and second-order serial correlation respectively. Inflation (INF) was omitted from the OLS estimates for the crisis period due to collinearity.*

## SUMMARY AND CONCLUSION

Past literature demonstrates macroeconomic indicators and firm-characteristics as important elements that affect the choice of financing, with further evidence of the direct influence of the global financial crisis on the financing mix of businesses. This study investigates macroeconomic and firm-level characteristics affecting the capital structure of listed non-financial firms in a normal period and the era of the global financial crisis within the context of the developing Sub-Saharan African economy of Ghana. Our findings on the influential elements of capital structure decisions for the sample companies in the normal period

indicate that real GDP growth has a significant negative effect on capital structure specifically the short-term leverage. However, macroeconomic variables (inflation and real GDP) do not significantly influence capital structure decisions during the global financial crisis period. The insignificant relationship between the macroeconomic variables and the various measures of firm leverage could be associated with the fact that firms do not have control over those variables as less attention is given to them in capital structure decisions. Perhaps managers of the firm pay more attention to microeconomic variables in their capital structure decisions to make them more competitive and profitable.

Table 10: Determinants of Long-Term Leverage of Non-Financial Listed Firms in Ghana During the Global Financial Crisis Period (2008-2009)

Variables	I OLS	II Random Effects	III System GMM
<i>Dependent Variable: Long-term leverage (LTL)</i>			
INF	-	0.023 (0.017)	-0.001 (0.003)
RGDP	-0.002 (0.012)	0.013 (0.011)	-0.003 (0.005)
FS	-0.035 (0.016)	-0.035 (0.024)	0.017*** (0.004)
PROF	0.335 (0.255)	0.200 (0.216)	-0.273* (0.147)
TAN	0.157 (0.138)	0.355* (0.179)	-0.084 (0.071)
LIQ	-0.026 (0.016)	0.011 (0.018)	-0.008 (0.009)
GROWTH	0.011 (0.350)	0.213 (0.045)	-0.093*** (0.019)
L.LTL	-	-	0.488*** (0.118)
Constant	0.632 (0.263)	-	-
Observations	34	34	10
R-squared/ Overall R-squared	0.312	0.257	-
Adjusted R-squared	0.159	-	-
Number of years	2	2	2
Wald Chi2/F statistic	2.04	17.2	19.16
Hausman test (p-value)	-	0.344	-
AR(1)	-	-	0.944
AR(2)	-	-	-
Sargan test (p-value)	-	-	0.000

Notes: This table presents the results of regression equations 4 and 8 for the global financial crisis period. The standard errors are reported in parenthesis. \*\*\*, \*\*, \* indicates statistical significance at 1%, 5%, and 10% respectively. LTL represents long-term leverage. INF is the annual inflation rate. RGDP is the annual real GDP growth rate. FS is the firm size. PROF is profitability. LIQ is the liquidity ratio measured as the current ratio. TAN is tangibility. GROWTH is the growth opportunities of the firm. L.LTL is the lag of long-term leverage. AR(1) and AR(2) is the first order and second-order serial correlation respectively. Inflation (INF) was omitted from the OLS estimates for the crisis period due to collinearity.

Large firms have high long-term leverage in the normal period and in the global financial crisis period, contrary to small firms, which exhibit high access to short-term liabilities during the crisis period. This offers a plausible insight into the trade-off theories of capital structure. Sample firms that have high



profitability demonstrate less short-term and long-term leverage during the period of the financial crisis, highlighting the problem of information asymmetry in relation to the pecking order theory. Conversely, the normal period reveals a significant positive effect of profitability on long-term leverage. Tangibility is negatively associated with long-term leverage and short-term leverage of sample firms in the normal period as well as the crisis period. This raises the implication for policymakers to reflect and delve into the provision and implementation of a seamless system. The system taking charge of collateral in the event of default as well as the cost of perfecting tangible assets as collateral especially in a financial crisis period. High liquidity measured as the current ratio of the firm has a negative association with short-term leverage and total leverage. Our evidence further suggests that listed non-financial firms in Ghana respond positively to an increase in leverage when opportunities for firm growth increase. However, the association is negative in the global financial crisis period. This suggests to corporate managers must efficiently and effectively manage their working capital especially during crisis periods. They must adopt strategies that seek to curtail the moral hazard problem, which may restrict lenders from extending debts in the awakening of a crisis period in spite of opportunities for firm growth.

The results of our study signify managers' ability to influence the financing choice of firms in the pursuit of optimal value creation. Our results render insight to firms in designing financing policies that position the firm to take advantage of various sources of finance, especially, in times of financial and economic upheaval. This is critical in an era where countries and firms find it necessary to shield their operations from unanticipated financial shocks and economic recession. Continuous financial innovation leading to sophisticated financial products and advancement in technology are not without their associated risks. Moreover, policymakers and regulatory bodies should take the necessary steps to develop the capital market especially debt markets to enhance firms' access to long-term funds to finance their long-term assets.

Despite the useful findings of this study, limitations in our study exist. Future studies could apply the measurement and constructs of the financial sector and Small and Medium Scale Enterprises (SMEs) to substantiate the findings in this study. Further research might also examine the effect of other macroeconomic indicators on the financing choice of firms. Aside from inflation and real GDP growth other variables could offer holistic evidence on how macroeconomic indicators contribute to the financing mix of business entities. Finally, determining factors of financing choices of listed-non financial firms prior to and after the global financial crisis period could render comprehensive findings on the extent of the impact of the financial crisis on the macroeconomic and firm-specific determinants of capital structure.

## APPENDIX

## APPENDIX A: Regression Results for the Fixed Effects Model

Variables	Full Sample Period (2006-2016)			Global Financial Crisis Period (2008-2009)		
	I Total Leverage	II Short-term Leverage	III Long-term Leverage	IV Total Leverage	V Short-term Leverage	VI Long-term Leverage
INF	0.009 (0.031)	0.011 (0.031)	-0.002 (0.005)	0.013 (0.012)	0.009 (0.009)	0.004 (0.008)
RGDP	0.005 (0.037)	-0.012 (0.036)	0.007 (0.006)	-	-	-
FS	-0.044 (0.103)	0.035 (0.101)	0.008 (0.015)	0.014 (0.170)	0.128 (0.143)	-0.114 (0.128)
PROF	-3.836*** (0.380)	-3.817*** (0.374)	-0.019 (0.058)	-0.082 (0.401)	-0.446 (0.335)	0.365 (0.301)
TAN	1.232*** (0.368)	1.201*** (0.362)	0.030 (0.056)	-0.252 (0.465)	-0.68 (0.389)	0.932** (0.349)
LIQ	-0.021 (0.082)	-0.019 (0.080)	-0.003 (0.012)	-0.021 (0.042)	-0.014 (0.035)	-0.007 (0.032)
GROWTH	0.155*** (0.045)	0.157*** (0.045)	-0.002 (0.007)	-0.096 (0.117)	-0.111 (0.097)	0.015 (0.087)
Constant	0.489 (1.791)	-0.431 (1.763)	-0.058 (0.272)	1.116 (2.772)	-1.344 (2.317)	1.46 (2.078)
Observations	186	186	186	34	34	34
Overall R-squared	0.426	0.410	0.011	0.060	0.046	0.236
Number of years	11	11	11	2	2	2
F statistic	18.53	19.12	0.65	0.780	1.590	2.400
Hausman test (p-values)	0.359	0.288	0.703	-3.13	0.997	0.344

This table shows the fixed effect results for total leverage, short-term leverage, and long-term leverage in Column I, II and III respectively, for the full sample period. Column IV, V and VI reveal the fixed effect estimates for total leverage, short-term leverage, and long-term leverage accordingly during the period of the global financial crisis. Standard errors are reported in parenthesis. \*\*\*, \*\*, \* illustrate statistical significance at 1%, 5% and 10% respectively. INF is the annual inflation rate, RGDP is the annual real GDP growth rate, PROF is the profitability, TAN is the tangibility, LIQ is the liquidity, and GROWTH is the growth opportunities of the firm. The Hausman test is used to test the null hypothesis that, the regressors are uncorrelated with the error term. The real GDP growth rate was omitted for the crisis period due to collinearity.

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