# Determinants of Capital Structure: Evidence from Ghanaian Firms

Paul Kofi Oppong-Boakye[1] pkoppongboakye@ymail.com
Kingsley Opoku Appiah[1] nanaking40@yahoo.com
James Konadu Afolabi[3] jkafolabi@yahoo.com
1.  Department of Accounting & Finance, KNUST School of Business , Private Mail Bag, KNUST, Kumasi, Ghana.
2.  Ghana Education Service, P. O. Box 50, Atebubu, B/A, Ghana.

## Abstract

This paper investigates the determinants of capital structure using dataset from 33 listed and non-listed companies during the period 2003 – 2007 in Ghana.  A multiple regression analysis of pooled-cross sectional and time-series observations have been employed in the analysis.  The results identify long-term debt to be irrelevant component of capital structure of large unquoted and quoted firms in Ghana as there is a greater reliance on equity.  Furthermore, profitability, size, business risk and tangible assets have positive correlation with level of gearing of companies in Ghana.  On the other hand, growth, and tax indicate a negative correlation with the level of gearing.
**Keywords:** Capital structure, financing decisions, listed, non-listed, Ghana.

## 1.0  Introduction

Empirical studies into how firms are financed have been predominant in the United States and other developed countries. Among such studies are; Modigliani and Miller (1958), Myers (1977), Titman and Wessels (1988), Rajan and Zingales (1995), Wald (1999), Bevan and Danbolt (2000 and 2002), Antoniou *et al.*, (2002), and Hall et al (2004). Booth et al, (2001), in their comparative study of capital structure of firms in ten developing countries, confirm that determinants of capital structure of firms in developing countries are similar to those in developed countries. In addition, other studies in respect of developing countries have been carried out by (Pandey, 2001; Chen, 2004; Omet and Nobanee, 2001 and Deesomsak *et al*, 2004). All these studies have concluded that there are similarities in the determinants of capital structure in developed and developing countries.

There are  studies in Ghana that have examined the determinants of capital structure of Ghanaian firms by comparing the capital structures of quoted firms, large unquoted firms, and small and medium enterprises (SMEs) (Abor and Biekpe, 2005a, 2005b; Abor 2007, 2008). However this study takes a slight paradigm shift, in that it strategically focuses on both large quoted and unquoted firms in Ghana. It seeks to answer the question: what are the determinants of capital structure of Ghanaian firms?

## 2.0 Literature Review

The theoretical and empirical studies have revealed that capital structures chosen by companies are based on the agency cost of debt to equity (Jensen and Macklin 1976, Harris and Raviv 1991).  The main determinants of capital structure according to Harris and Raviv (1990) are: tangibility, non-debt shields, growth opportunities, volatility, profitability, tax and size.  These variables influence the ratio of capital structure.  Furthermore, Harris and Raviv, (1990), in their studies on US firms suggest that "leverage increases with fixed assets, non-debt tax shields, investment opportunities and firm size and decreases with volatility, advertising expenditure, bankruptcy, profitability".

Abor and Biekpe (2005) indicate that total debt constitutes more than half of the capital of listed firms in Ghana. The results also show positive relationship between debt ratios (capital structure) and firm size and growth, while asset tangibility, risk, corporate tax and profitability are negatively related to debt ratios. The results generally support the pecking order theory proposed by the theoretical model.

Previous studies have confirmed that a firm with lower tangible assets will pay high cost of debt as compared to a firm with high fixed assets (Ryen and Vasconcellos 1997, Williamson, 1988 and Titman 1984). Tangible assets represent sound collateral for loans. Consequently, lenders are willing to grant loans to firms whose level of tangible assets is high. However, most of these studies are based on the developed countries (Harris and Raviv (1990), Rajan and Zingales (1995), Wald (1999) and Friend and Lang (1988). However, Wiwattanakantang (1999), Um (2001), Booth et al, (2001), and Huang and Song (2002) find that tangible assets are negatively

related to leverage based on studies on developing countries. Moreover, Bevan and Danbolt (2000) suggest positive correlation between assets and long-term debt. Alternatively the relationship between tangible asset and short-term debt is negative.

The relationship between profitability and leverage of firms has received attention. Empirical and theoretical studies on this area have given mixed results. Kester (1986), Rajan and Zingales (1995) Titman and Wessels (1988) and Toy et al. (1974) suggest profit to be negatively correlated with leverage. Peterson and Rajan (1994) and Long and Maltiz (1985), on the other hand, find a positive relationship between profitable and debt ratios. Profitable firms could rely on debt because they generate enough profits strengthening their ability to pay back loans. But Myers and Majluf (1984) state that the pecking order theory of capital structure assumes that information asymmetry causes companies to prefer internally generated finance to other sources of finance. They predict an inverse relationship between profitability and debt on the premise that profitable companies are less likely to rely on debt finance because they are able at raise funds internally from accumulated profits. The work of Bradley et al. (1984), Titman and Wessels (1988), Rajan and Zingales (1995), Antoniou et al. (2002) and Bevan and Danbolt (2002) in developed countries and Booth et al. (2001), Pandey (2001), Um (2001), Wiwattanakantang (1999), Chen (2004) and Al-sakran (2001) in developing countries suggest that profit negatively correlates with leverage.

Another important determinant of capital structure is size of the firm. Large companies tend to choose long-term debt and small companies tend to rely on short-term debt (Marsh, 1982). The size of a firm plays a vital role in the negotiation for debt. Large firms can negotiate for long-term debt because they can have influence on the creditors. Also large firms are more diversified than small firms and have a more stable cash flow. However, previous studies into size in relation to capital structure have given mixed results. Rajan and Zingales (1995) argue that the effect of size on equilibrium leverage is more ambiguous. Large firms tend to be more diversified and fail less often, so size may be an inverse proxy for the probability of bankruptcy." Barclay and Smith (1995) suggest that a firm with high intangible asset will borrow debt at high cost and a firm with high tangible assets can use the assets as collateral hence borrow debt at cheaper cost.

The level of information disclosure is very high in larger firms compared to smaller firms. For example large firms are obliged by law to publish and disclose information based on the standards and regulations. On other hand, small companies are not under any obligations and regulations. Fama and Jesnsen (1983) and Friend and Lang (1988) argue that a large firm tends to provide more information to lenders than a small firm. Managers prefer to finance investment by equity capital because of asymmetric information cost and this in effect causes a negative relationship between size and leverage. Marsh (1982), Rajan and Zingales, Booth et al. (2001) and Wald (1999) confirm that gearing is positively correlated with the size of a company. Titman and Wessels (1988) report a positive correlation between the size of the firm and the total debt ratio and the long-term debt ratio. However Bevan and Danbolt (2002) confirmed that size is found to be negatively related to short-term and positively related in the long-term.

Growth of the firm is critical to the capital structure of firms. Empirical studies confirm that growth opportunities are negatively correlated with gearing (Titman and Wesseles 1988). In their research Thies et al. (1992) and Basking (1989) report that growth opportunities normally divert capital from equity to debt. Furthermore, growth opportunities bring demand for more capital but when the demand is more than the supply the company would have to look for alternative sources of financing. Once the retained profit would be insufficient to finance the growth opportunities and additional issue of new shares would bring additional cost because of the asymmetric information, the only alternative is debt financing. In this context, financing the investment will transfer the wealth from shareholders to debt holders. The empirical and theoretical studies from Booth et al. (2001), Rajan and Zingales (1995), and Wald (1999) confirm that growth opportunities positively correlate with gearing.

Modigliani and Miller (1963) have argued that companies will prefer debt capital because of the tax shield on interest. On the other hand, tax shield from depreciation and other provisions will discourage some management to arrange for debt capital according to DeAngelo and Marsalis (1980).

In conclusion the limitations and associated cost of debt and equity funding have called for other sources of financing for firms. Most theories have sought to explain capital structure by introducing frictions omitted in the Modigliani and Miller framework (Taggart, 1989). The static trade-off model (Myers, 1977) emphasized that capital structure is determined by the agency cost of financial distress and the tax-deductibility of debt finance. These problems of agency cost have been emphasized by Jensen (1986) in his free cash flow theory and formally

modelled by Stulz (1990). Alternatively, (Myers and Majluf, 1984) emphasizes in their pecking order theory that the friction due to asymmetric information between managers and outside investors influences firms to rely on internal funds than external funds. Thus, there exists a financial hierarchy descending from internal funds, to debt, and to external equity. (Greenwald, Stiglitz and Weiss, 1984).

## 3.0 Research Methodology

### 3.1 Data Sources

Data have been collected from the financial statements of 33 listed companies and unlisted companies and the Ghana Stock Exchange Fact Book 2007. The study period is 2003-2007.

The sample consists of 5 years data from 2003 – 2007 for 33 companies. It is generally recognised under Central Limit Theorem that in a sample of 30, distribution is approximately normal and the results statistical tests performed are meaningful (Grinstead and Snell, 2000). Thus our sample size of 33 companies is reasonable.

The multiple regression model given below was used to calculate the relationship between the dependent variable and independent variables (Rajan and Zingales, 1995; Booth *et al*., 2001).

$$\text{Gea}_i = \mathring{A} + \beta \acute{W}_1 \text{Pro}_{1+} \beta \acute{W}_2 \text{Asset}_{1+} \beta \ \acute{W}_3 \text{Size}_1 + \beta \ \acute{W}_4 \text{Risk} + \beta \ \acute{W}_5 \text{Gro}_1 + \beta \acute{W}_6 \text{T}_1 + \hat{e}$$

Where:

| | | |
|---|---|---|
| $\text{Gea}_{i \ (Gearing)}$ | = | Long-term debt/ capital employed |
| $\mathring{A}$ | = | Intercept coefficient |
| $\beta$ | = | Slope coefficient for independent variable |
| $\acute{W}_1 \text{Pro}_{1 \ (Profitability)}$ | = | Earning before interest and Tax / Total assets |
| $\acute{W}_2 \text{Asset}_{1 \ (Tangible \ assets)}$ | = | Net fixed assets / Total assets |
| $\acute{W}_3 \text{Size}_{1 \ (Size \ of \ company)}$ | = | Log of sale value |
| $\acute{W}_4 \text{Risk}_{1 \ (Business \ risk)}$ | = | percentage change in operating profit |
| $\acute{W}_5 \text{Gro}_{1 \ (Growth)}$ | = | Percentage change in total assets |
| $\acute{W}_6 \text{T}_{1 \ (Tax)}$ | = | Operating income after interest and tax payments to total assets. |
| $\hat{e}$ | = | Regression error terms. |

The regression analysis was carried out between the dependent variable (debt) and the independent variables such as; tangible assets, profitability, size of firm, growth opportunities, and business risk and non-debt tax. Data for this study are pooled cross sectional and time series observations. Specifically, data for the six variables (assets tangibility, profitability, company size, growth opportunity, risk (volatility), and taxation) for thirty three (33) Ghanaian companies were collected for the period of 2003-2007, a total of 198 pooled observations.

## 4.0 Results and Discussion

### 4.1 Descriptive statistics

Table 4.1 below provides descriptive statistics information for the full sample of the companies. The mean debt ratio (measured by total debt to total capital) of the sample companies is 28%, and median is 23%. This implies that in Ghana equity financing represents 72% contrary to Abor and Biekpe (2005). Company size determined as the natural logarithm of turnover had a mean and median of 13.273 and 13.298 respectively. Asset tangibility had a mean of 0.582. This indicates that, on average, fixed assets accounted for 58.20% of total assets. Profitability, given as the ratio of EBIT to total assets, registered a mean value of 0.1215 suggesting a return on assets of 12.15%. Risk is measured as the variability of EBIT and this showed a mean (median) of -0.5900 (-0.1330). The mean for growth (measured as growth in total assets) was 0.1130. This indicates that, on average, growth rate in total assets was 11.30% during the five-year period. Corporate tax rate on average was 7.39

**Table 4.1**           **Descriptive Statistics for Full Sample**

|  |  | Debit ratio | Profitability | Tangibility | Size (Logsales) | Business risk % | Growth % | Taxation |
|---|---|---|---|---|---|---|---|---|
| N | Valid | 33 | 33 | 33 | 33 | 33 | 33 | 33 |
|  | Missing | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mean | | .27864 | .12145 | .58200 | 13.27376 | -.59009 | .11309 | .07394 |
| Std. Error of Mean | | .041540 | .029004 | .072146 | .363112 | .158317 | .027308 | .017914 |
| Median | | .23000 | .07500 | .54600 | 13.29800 | -.13300 | .11000 | .04900 |
| Std. Deviation | | .238629 | .166615 | .414445 | 2.085917 | .909463 | .156871 | .102908 |
| Variance | | .057 | .028 | .172 | 4.351 | .827 | .025 | .011 |
| Skewness | | .913 | 3.269 | 4.196 | .201 | -.993 | -.264 | 2.904 |
| Std. Error of Skewness | | .409 | .409 | .409 | .409 | .409 | .409 | .409 |
| Kurtosis | | -.489 | 13.925 | 21.699 | -.731 | -.844 | -.898 | 10.907 |
| Std. Error of Kurtosis | | .798 | .798 | .798 | .798 | .798 | .798 | .798 |
| Range | | .779 | .963 | 2.572 | 7.630 | 2.650 | .551 | .589 |
| Minimum | | .010 | -.075 | .110 | 9.854 | -2.311 | -.185 | -.069 |
| Maximum | | .789 | .888 | 2.682 | 17.484 | .339 | .366 | .520 |

The output generated from multiple regression has been summarized in table 4.2 below. It can be deduced from the table that the $R$ Square values in model 1 shows 55.4% of the variance. The $R$ square change value of 55.4% means that the independent variable explains 55.4% of the variance in the dependent variable. This is a statistically significant contribution as indicated by the Sig. F Change value (0.001). Furthermore the Adjusted $R$ Square of 45.1% explains the power in the variation in the firm's financial level. Therefore, approximately 45.1% of the variation in the firm's level of finance can be explained by the six independent variables in the model. This explanatory power is comparable to that obtained by Rajan and Zingales (1995) and Bevan and Danbolt, (2000, 2002).

**Table 4.2**                **Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | |
|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  | R Square Change | F Change | df1 | df2 | Sig. F Change |
| 1 | .744(a) | .554 | .451 | .176790 | .554 | 5.384 | 6 | 26 | .001 |

a. Predictors: (Constant), Tax, Business risk %, Growth %, Tangibility, Size        (Logsales), Profitability
b. Dependent Variable: Debit ratio

The ANOVA table 4.3 below contains an output analysis that tests whether the model as a whole is significantly better at predicting the outcome than using the mean as a best guess. From the table below it can be said that this analysis is significant because the P-value of 0.001 is less than the alpha level of 0.05.

**Table 4.3**         **ANOVA**

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 1.010 | 6 | .168 | 5.384 | .001(a) |
| | Residual | .813 | 26 | .031 | | |
| | Total | 1.822 | 32 | | | |

a. Predictors: (Constant), Taxation, Business risk %, Growth %, Tangibility, Size (Logsales), Profitability
b. Dependent Variable: Debit ratio

*4.2 Correlation Coefficient*

Regression analysis is used to investigate the relationship between the firm-level variables and leverage. Table 4.4 below indicates the correlation coefficient. These estimates tell about the relationship between the independent variables and dependent variable. It shows the amount of increase in dependent variable that would be predicted by an increase in the predictor if the effects of all other predictors are held constant. In addition, because the calculation is based on one (1) tailed p-value for testing the independent variables that the coefficient is zero, the p-value will not be divided by two (2) before comparing it to alpha. The constant is significantly different from zero at the 0.05 alpha levels. For example, for the independent variables which are not significant, the coefficients are not significantly different from zero, thus giving no cause for concern about multi-collinearity among the regressors.

**Table 4.4**         **Coefficient Correlations**

| Model | | | Taxation | Business risk % | Growth % | Tangibility | Size (Logsales) | Profitability |
|---|---|---|---|---|---|---|---|---|
| 1 | Correlations | Taxation | 1.000 | .069 | -.030 | -.331 | -.171 | -.161 |
| | | Business risk % | .069 | 1.000 | .152 | -.176 | .061 | -.308 |
| | | Growth % | -.030 | .152 | 1.000 | -.016 | -.376 | -.333 |
| | | Tangibility | -.331 | -.176 | -.016 | 1.000 | -.082 | .203 |
| | | Size (Logsales) | -.171 | .061 | -.376 | -.082 | 1.000 | .223 |
| | | Profitability | -.161 | -.308 | -.333 | .203 | .223 | 1.000 |
| | Covariances | Taxation | .111 | .001 | -.002 | -.009 | -.001 | -.011 |
| | | Business risk % | .001 | .001 | .001 | -.001 | -005 | -.002 |
| | | Growth % | -.002 | .001 | .052 | .000 | -.001 | -.016 |
| | | Tangibility | -.009 | -.001 | .000 | .007 | .000 | .004 |
| | | Size (Logsales) | -.001 | -.005 | -.001 | .000 | .000 | .001 |
| | | Profitability | -.011 | -.002 | -.016 | .004 | .001 | .046 |

a. Dependent Variable: Debit ratio

**Table 4.5**                **Coefficients**

| Model | | Standardized Coefficients | T | Sig. | 95% Confidence Interval for B | | Correlations | | | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Beta | | | Lower Bound | Upper Bound | Zero-order | Partial | Part | Tolerance | VIF |
| 1 | (Constant) | | 1.609 | .120 | -.100 | .822 | | | | | |
| | Profitability | .062 | .417 | .680 | -.350 | .529 | -.110 | .082 | .055 | .769 | 1.300 |
| | Tangibility | .124 | .863 | .396 | -.099 | .242 | .061 | .167 | .113 | .828 | 1.207 |
| | Size (Logsal | .019 | .126 | .901 | -.033 | .037 | -.273 | .025 | .016 | .772 | 1.296 |
| | Business risk % | .112 | .793 | .435 | -.047 | .105 | .219 | .154 | .104 | .867 | 1.154 |
| | Growth % | -.706 | 4.714 | .000 | -1.542 | -.605 | -.715 | -.679 | -.617 | .765 | 1.307 |
| | Taxation | -.144 | 1.003 | .325 | -1.020 | .351 | -.203 | -.193 | -.131 | .829 | 1.206 |

a. Dependent Variable: Debt ratio

*4.3 Profitability*

The result from this study is that profitability is positively correlated with gearing and this is inconsistent with pecking order theory by Myers and Majluf (1984), Rajan and Zingales (1994), Abor and Biekpe (2005). The underlying principle is that as firms pursue high level of profits, they tend to borrow to achieve that level of business activity and the level of profit. The study also confirms the findings in the study by Wald (1999). He puts it; "profitability has the largest single effect on debt to assets ratios'. However, profitability is technically not significant because the p-value of 0.068 is significantly greater than 0.05.

 *4.4 Assets Tangibility*

There is also a positive relationship between assets tangibility and gearing. This empirical finding confirms the previous study by Rajan and Zingales (1995). Firms with high level of assets can use their assets as collateral to secure debt finance with less cost. In addition, increasing assets denotes high operating efficiency and could attract investors. This is not statistically significant because   the p-value of 0.396 is significantly greater than 0.05. The results suggest that, for Ghanaian firms, a higher proportion of fixed assets lead to the use of more debt financing because of availability of collateral.

*4.5 Company Size*

The results suggest that the bigger the firm in terms of sales or turnover, the more debt it will use. One reason is that, larger firms are more diversified and hence have lower variance of earnings, making them able to tolerate high debt ratios. Lenders are more willing to lend to larger companies because they are perceived to have lower risk levels. Besides, with increasing levels of sales which can translate into earnings, repayment of loans and interest should not be a challenge. But smaller firms may find it relatively more costly to resolve issues with information asymmetry with lenders, thus limiting their ability to borrow. . This finding is in line with the findings of Rajan and Zingales (1995), but contradicts the findings of Marsh (1982) and Titman and Wessels (1988) where they identify a contrary negative relationship between gearing and firm size.  However, this variable is statistically not significant with a p-value of 0.901.

*4.6 Business Risk*

From the regression analysis, there is a positive correlation between risk and gearing. This presupposes that firms with high business risk are more likely to have high level of gearing. Equity investors are usually not keen on businesses with high risk. Management of such companies tend to depend on debt than equity. Our finding is in line with the previous study by Titman and Wessels (1988) who also find a positive relationship between business risk and gearing. It must, however, be noted that this finding is not statistically significant with a  p-value of 0.435 which is greater than alpha level 0.05.


*4.7 Growth*

The results indicate a statistically significant negative relationship between growth and leverage. This is also in line with previous studies by Titman and Wessels (1988) and Barton et al (1989). One reason is that, growth puts more pressure on retained earnings in the short run according to the pecking order theory. In the long run, however, management would seek external sources of funds to finance the increasing growth opportunities.

Empirical evidence regarding the relationship between gearing and growth opportunities is rather mixed. It must be noted further that while Titman and Wessels (1988), Chung (1993) and Barclay et al. (1995) find a negative correlation, Kester (1986) does not find any support for the predicted negative relationship between growth opportunities and gearing. However, our study reveals a negative correlation between growth and gearing and a statistically significant relationship with a p-value of 0.000.

*4.8 Tax*

The results provided show that there is a negative correlation between corporate tax and gearing. The relationship could be attributable to the special tax rebate for listed firms. Firms that go public tend to enjoy tax reduction compared to unlisted firms. Companies have an incentive to get listed given the tax incentive they receive. Thus, a general increase in corporate tax would be associated with increasing equity capital since firms would be encouraged to go public and enjoy the special tax rebate.This variable is statistically not significant predictor variable in the regression model because with coefficient of -0.333 the p-value of 0.325 is greater than the alpha level.

**5.0 Summary, Conclusions and Policy Recommendations**

The study examines the determinants of capital structure of large unquoted and quoted firms in Ghana. The study reveals that long term debt is an unimportant component of capital employed of unquoted and quoted firms in Ghana. The results from the multiple regression model reveal that profitability, asset tangibility, company size, and business risk correlate positively with gearing. These are, however, not statistically significant. It must be noted that the findings are comparable to those obtained by Rajan and Zingales (1995), and Abor and Biekpe (2005). For growth opportunities and taxation, they correlate negatively with the level of gearing even though only business growth is statistically significant based on the regression results.

In comparison to study conducted by Abor and Biekpe (2005) on twenty two listed companies in Ghana, their study reveals that size, tangibility, profitability, risk, and taxation are statistically significant while growth is statistically insignificant. This is inversely related to the result of this study. Our study reveals that size, tangibility, profitability, risk, and taxation are statistically insignificant while growth is statistically significant. These statistical differences between the present study and the aforementioned, might have resulted partially to our sources of data, sample size and time (duration of studies)

The above difference notwithstanding, the Government of Ghana should take into account the need to improve the long-term external sources of funds, especially to improve the bond market in Ghana. Also high rate of government bonds encourage Ghanaians, investors and other financial institutes to invest in government bond rather than corporate investment because of the low risk associated with the government bond investment. Therefore an interesting future research on the impact of asymmetric information on determinants of capital structure in Ghana is inevitable.

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Mr. Paul Kofi Oppong-Boakye is a lecturer in the School of Business, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana. He teaches Corporate Finance, Venture Capital Finance and Microfinance. His research interests are Corporate Finance, Microfinance and Venture Capital

Mr. Kingsley Opoku Appiah is a lecturer in the School of Business, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana. He teaches Cost Accounting, Financial Reporting and Performance Management. Currently he is pursuing his PhD in Finance in Loughborough University.

Mr. James Konadu Afolabi is an Educationist at the Ghana Education Service. He is the Agriculture and Environment Co-ordinator, and the Circuit Supervisor. His research interests are Management and Finance.

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