An Assessment of the Static Trade-off Theory of Capital Structure Using Ghana Stock Market Data

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The study, employing a multiple regression method, sought to examine whether the Static Trade theory had any impact on Ghanaian companies in their decisions about capital structure during the period 2001-07. Among the study findings were, that there was negative relationship between leverage and size, and between leverage and profitability, contrary to theoretical prediction; that the firms with tangible fixed assets would employ high levels of leverage since tangible fixed assets have a high collateral value, and firms with growth opportunities would take on debt to finance growth, but large and profitable firms would use less debt or no debt at all in their capital structure, which is inconsistent with theory; and that, most of the companies did not employ long-term debt. These have important implications for policy-makers in their quest to develop the debt market for access to long-term finance by Ghanaian companies.

INTRODUCTION

The subject of capital structure decisions by firms constitutes an important area in Finance. Among notable authors on the importance of capital structure in investment decisions was Modigliani and Miller (1958) that influenced the emergence of varied capital structure choice decision models under different assumptions. For example, theories on trade-off tend to rely on traditional factors of tax advantage and potential bankruptcy cost of debt, while others dwell on the asymmetric information with debt used as a signalling mechanism. But there appears no consensus on how firms choose their capital structure, implying that the link between theory and practice of capital structure must be appreciated.

In Ghana, for example, it appears no accurate knowledge exists as to whether companies use the static trade-off theory in arriving at their capital structure decisions. Most of the research in the area has considered the trade-off theory against the pecking order theory. This study thus seeks to fill the gap by investigating the extent to which the static trade-off theory provides an empirical explanation for capital structure decisions of firms listed on the GSE in the period 2001-7.

The aim of this study is to investigate empirically the determinants of capital structure decisions by Ghanaian firms based on well known optimal capital structure theories, namely, the tax based theory and the agency theory. Specifically, the study seeks to:

- investigate the extent to which the static trade-off theory of capital structure provides a satisfactory account of the financing behaviour of publicly traded Ghanaian firms over the period 2001- 2007;

- examine the relationship between leverage ratios and firms' capital structure ; and

- put forward relevant policy recommendations

The study will attempt to provide answers to the following research questions in relation to the analysis of the capital structure of Ghanaian firms in the sample. The research questions in relation to the firms leverage ratio are with respect to the firms':
    (a) Asset Tangibility?
    (b) Growth Opportunities?
    (c) Size?
    (d) Profitability?
Hopefully, answers to these questions, could provide some link between available theory and practice, and thereby contribute to existing research in the area. Furthermore, the study will highlight the financing behaviour of publicly traded Ghanaian firms and help to fashion out appropriate policies that will help in making finance available to Ghanaian firms. Policy makers could likewise benefit from the study in the design of regulatory and taxation regimes that could maximise aggregate output at the minimum possible risk to the nation's economic stability.

The small sample size due to the smaller number of firms listed on the GSE, coupled with the apparent under developed nature of the Exchange appears a limitation to the study. The small sample size making it impossible to work with larger observations could produce a problem of multi-collinearity. This fact is also compounded by the difference in sizes of the companies listed on the exchange. Furthermore, the use of accounting data could pose a problem of reliability and validity of the data being used, especially in most developing countries where accounting standards are not rigorously enforced.

The rest of the paper is covered under: section 2 dealing with the review of existing literature; section 3, the research methodology; section 4 on the analysis and related findings; and section 5, that deals with the conclusions and related policy recommendations.

LITERATURE REVIEW

Among the many well-known authors on the importance of the capital structure in investment decisions are Modigliani and Miller (1958), Titman and Wessels (1988), Rajan and Zingales (1995), Graham (1996) writing on the determinants of corporate debt ratios; and Marsh (1982), Jalilvand and Harris (1984), Bayles and Chaplinsky (1991), Mackie-Mason (1990), and Jung *et al.* (1996) looking at issuing firms' debt versus equity financing choice. These studies have successfully identified firm characteristics such as size, research and development (R & D) intensity, market-to-book ratio of assets, stock returns, asset tangibility, profitability, and the marginal tax rate as important determinants of corporate financing choices. The effects associated with profitability and market-to-book ratio have been found to be very significant.

The Trade-Off theory rather than the Pecking Order theory (Fama, et al, 2002) is our main focus in this paper, but a brief look at the latter is not out of place here. The pecking order theory suggests that firms will initially rely on internally generated funds, i.e. undistributed earnings, and where there is no existence of information asymmetry, they will turn to debt if additional funds are needed before they finally will issue equity to cover any remaining capital requirements. The order of preferences reflects the relative costs of various financing options. Myers and Majluf (1984) maintain that firms would prefer internal sources to costly external finance; firms that are profitable or do generate high earnings are consequently expected to use less debt capital than those that do not. The pecking order theory would indicate that the profitability of a firm affects its financing decisions. If the firm issues debt, it is because it has an investment opportunity that exceeds its internally generated funds. Thus, changes in the capital structure often serve as a signal to outsiders with regard to the current situation of the firm, as well as the managerial expectations about future earnings. This is referred to as the Signalling Theory. The offering of debt is believed to reveal information the management of a firm is expecting about future cash flows if

it will cover the costs of debt. However, the bankruptcy fears still impact on the signal, and intensify the cost of this signal (Asquith and Mullins, 1986; and Eckbo, 1986).

The trade-off theory of capital structure refers to the idea that a company chooses how much debt finance and how much equity finance to use by balancing the costs and benefits. The classical version of the hypothesis goes back to Kraus and Litzenberger (1973) who considered a balance between the dead-weight costs of bankruptcy and the tax saving benefits of debt. Frequently agency costs are also included in the balance. This theory is usually set up as a competitor theory to the pecking order theory.

The trade-off theory helps to explain that corporations are normally financed partly with debt and partly with equity. It indicates that there is an advantage in financing with debt, (the Tax Benefit of Debt), and there is a cost of financing with debt (the costs of financial distress including bankruptcy costs of debt and non-bankruptcy costs, such as staff leaving, suppliers demanding disadvantageous payment terms, bondholder/stockholder infighting, etc). The marginal benefit of further increases in debt tends to decline as debt increases, while the marginal cost tends to increase, such that a firm that is optimizing its overall value will tend to focus on this trade-off in choosing how much debt and equity to use for financing. The theory may successfully explain many industry differences in capital structure, but apparently, it fails to deal with why the most profitable firms within an industry generally have the most conservative capital structures. With the theory, high profitability should imply high debt capacity and a strong corporate tax incentive to use that capacity. Iddrrisu (2009) identifies a few factors generally considered by firms in making capital structure decisions. According to Pandey (1984), a number of companies in practice would always prefer to borrow for the following reasons:

- Tax deductibility of interest
- Higher return to shareholders
- Complicated procedure for raising equity capital
- No dilution of ownership and control.

There are, however, managers whose choice of financing depends on internal and external factors. The internal factors include the purpose of financing, the company's earning capacity, the extant capital structure, the firm's ability to generate cash flows, and investment plans. The external factors include such factors as the capital and money market conditions, the debt-equity stipulations being followed by financiers, and the restrictions imposed by lenders.

The wide and varied literature on capital structure can be summarised under:

i) Those authors with the view that the firm's leverage ratio is positively related to asset tangibility, defined here as the ratio of net property, plant and equipment and inventories to total assets. Among them are Myers (1977), Scott (1977), Marsh (1982), Bradley, et al (1984), Titman and Wessels (1988), Rajan and Zingales (1995), Antoniou et al (2007), and Seifert and Gonene (2007).

ii) Those who maintain that the leverage of firms is negatively related to growth opportunities, championed by such authors like Kim and Sorensen (1986), Titman and Wessels (1988), Rajan and Zingales (1995), Booth et al (2001) and Padron et al (2005). Here, the-market-to-book value is used as proxy for growth opportunities.

iii) Those authors of the view that the leverage ratio of firms is positively related to size. Among these authors are Marsh (1982), Narayanan (1988), Rajan and Zingales (1995), Wald (1999), Booth et al (2001), and Seifert and Gonene (2007). Here, the natural log of sales and the natural log of total assets are used as proxy for size, which is meant to control for possible non-linearity in the data and the likely resulting problem of heteroskedasticity. The natural log of total sales is easier to calculate and is also more accurate.

iv) Those who maintain that the leverage ratio of firms is positively related to profitability. Among them are Long and Miller (1985), Wald (1999), and Abor (2005).

The importance of this grouping is that it makes it easier to make a decision on the choice of variables for our model specification in the next section on research methodology.

RESEARCH METHODOLOGY

Model Specification

The dependent variable is the leverage ratio. In our calculation of the leverage ratio, short-term debt was included because it constitutes a significant portion of total debts employed by Ghanaian firms. Data limitations dictate the use of book values of debt rather than market values. The general empirical model has the form:

$$y_{i,t} = \alpha + \beta X_{i,t} + \varepsilon_{i,t\,;}$$

with the subscript i denoting the cross-sectional dimension and t representing the time series dimension. The left-hand variable $y_{i,t}$ represents the dependent variable in the model, leverage for the ith firm at time t, α represent the firm-specific intercepts, β is a 4 x 1 vector of parameters, $X_{i,t}$ contains the set of explanatory variables for the ith company in the tth period. The fixed-effects model, by allowing different company intercepts, serves as a solution for the known problem of the capital structure model, which is not fully specified, and ε_{it} is a disturbance term defined as $\varepsilon_{it} = \mu_i + v_{it}$, where μ_i denotes the unobservable individual effect, and $v_{i,t}$ indicates the remainder of the disturbance. An obvious way to deal with the fixed-effects of those omitted variables that are specific to each firm, but remain constant over time is to introduce dummy variables into the regression model. Hence the fixed-effects model is also referred to as the least squares dummy variable (LSDV) model. It provides a common set of partial regression coefficients while allowing a different intercept for each of the cross-sectional units. The set of explanatory variables $X_{i,t}$ is represented by: asset tangibility, growth opportunities, size, and profitability.

Our current model is adapted from the above general model (Rajan andZingales, 1995) and is specified as:

$$\text{LEV}_{it} = \alpha + \beta_T T_{it} + \beta_{MVB} MBV_{it} + \beta_{LS} LTA_{it} + \beta_{PRF} PRF_{it} + \varepsilon_{it;}, \quad \text{where}_:$$

LEV_{it} = the leverage (debt level) defined as (total liabilities/total assets) for firm i in time t;

T_{it} = Asset Tangibility (non-current assets/total assets) for firm i in time t;

MBV_{it} = the market-to-book value ratio (market value of equity/book value of equity) for firm i in time t;

LTA_{it} = the natural log of total assets (size) for firm i in time t; and

PRF_{it} = profitability measured by earnings before interest and tax (EBIT/total assets) for firm i in time t.

Table 1 below provides information on the definition and description of the above variables.

Data Types, Sources and Data Processing

Our data was extracted from the annual published financial statements of non-financial companies listed on the Ghana Stock Exchange (GSE) for which consecutive data is available for the period 2001-2007. All firms that were listed on the GSE for the period 2001-2007 were sampled. Because variables were calculated over this period, the study only maintained firms that provided data over the seven-year period. This excluded newly listed firms and firms that did not exist between 2001 and 2007. Firms with missing values were also excluded from the sample, as well as financial firms with capital structures likely to be significantly different from others in the sample, and which might constitute serious outliers.

The sources of data were the annual financial statements of the companies included in the sample. The income statements and balance sheets data were available at the Securities and Exchange Commission (SEC) and the Ghana Stock Exchange (GSE). The GSE Fact Books published in 2006 and 2008 contained financial data of the listed companies. The extent to which the data reported on the dependent and independent variables is accurate was certainly an issue. However, accounting reports are normally subject to independent audit and since all firms in the sample are publicly traded, accounting reports are subject to the supervision of the SEC. Accounting standards impact on the accuracy, and interpretability of accounting policies, assets and liabilities and the income and expenses, even though Ghana's accounting standards are said not to be enforced with sufficient rigor (World Bank, 2005).

The data extracted from the income statements and balance sheet was organised into a panel data set. The panel nature of the data allowed the study to use a panel regression model for testing the trade-off model. A panel data consists of a time-series for each cross-sectional member in the data set. Hsiao (2003) and Baltagi (1995) look at the advantages of a panel data approach. The data was organised in excel spreadsheet and processed, using the Quantitative Micro Software (Eviews 6) computer software package to generate the relevant inferential statistics for analysis and interpretation in the next section.

TABLE 1
DEFINITION AND DESCRIPTION OF VARIABLES IN THE MODEL

	Definition	Variable	Description
1.	Leverage ratio	(LEVit)	Total liabilities /(Total assets + book value of equity)
2.	Asset Tangibility	(Tit)	(Tangible assets + inventories) / Total assets
3.	Market-to-book value	(MBVit)	Market value of equity / Book value of equity
4.	Size	(LTAit)	Natural logarithm of total assets
5.	Profitability (ROA)	(PRFit)	EBIT /Total assets

ANALYSIS AND DISCUSSION OF REGRESSION RESULTS

Results of our regression model of the determinants of leverage are presented in Table 3. Coefficient β_T behaves in line with expectation, but coefficients β_{MVB}, β_{LS} and β_{PRF} do not. As expected, the results indicate positive coefficients for asset tangibility. But, in contrast, the coefficients for size and profitability are negative, while that for market-to-book value is positive. The asset tangibility coefficient of 0.72 means that, holding other variables constant, if asset tangibility increases by one percentage point, on average, leverage ratio will increase by 72 percentage points, which could be interpreted to mean that tangible assets are used as collateral to encourage firms with tangible assets to take on more loans. Lending institutions tend to lend to firms with tangible assets that could be used as security for loans. Similarly, if growth opportunities for a company increase by one percentage point, on the average, leverage ratio will increase by about 1 percentage point, implying that companies with growth opportunities (particularly young companies) would need more funds to invest in these opportunities and would tend to rely on debt to raise the funds needed. On the other hand, holding other variables constant, a one percentage point drop in total assets (a proxy for size), on average, would result in a drop of leverage ratio by about 3.4 percentage points, an indication that mature and large firms would normally accumulate large reserves that obviate the need for debt finance. Holding other variables constant, percentage drop in profitability would lead to a marginal drop in leverage ratio.

In Contrast to the prediction of the trade-off theory, firms with low profitability tend to employ low levels of debt since the use of debt increases financial and bankruptcy risks. The negative coefficient of the intercept has no practical significance in finance theory.

Test of the Coefficients
Test of significance of the various coefficients in the regression at 5% level of significance with 93 degrees of freedom (d.f) is provided below. The t-statistic for this d.f at the 5% level of significance is 1.980.

Test of TA ($\beta_T T_{it}$) - value of test statistic: $t = 14.028$; p-value = 0.0000.
Test MBV ($\beta_{MVB} MBV_{it}$) - value of test statistic: $t = 2.634$; p-value = 0.0098.
Test of Size ($\beta_{LS} LTA_{it}$) - value of test statistic: $t = -2.088$; p-value = 0.0395.
Test of PRF ($\beta_{PRF} PRF_{it}$) -value of test statistic: $t = -2.246$; p-value = 0.0270.

The values of all the above tests imply that there is linear relationship between the leverage ratio and the independent variables.

In Table 3, the coefficient of determination of 0.736, means that about 74% of the variation in the leverage ratio is explained by the four explanatory variables. The F-statistic of 64.905, with a p-value of 0, provides overwhelming evidence that our model is well fit and valid. Table 2 presents a summary of the expected signs of the coefficients according to the Static Trade-off Theory, and the signs actually obtained in our regression model.

TABLE 2
EXPECTED SIGNS OF THE RZ MODEL VRS. ACTUAL SIGNS IN OUR MODEL

Explanatory variables	Expected sign form RZ model	Sign Obtained from our model
TA	+	+
MBV	-	+
Size	+	-
PRF	+	-

Source: Rajan and Zingales (1995) adapted

Correlation Analysis

A test of possible degree of multi-collinearity among the explanatory variables indicates that a positive correlation exists among asset tangibility, market-to-book value and logarithm of total assets, but a negative correlation with profitability. Among the regressors, logarithm of total assets (proxy for size) and market to book value are found to be highly correlated, but unlikely to cause any serious problem of multi-collinearity, considering the fact that the model equation has been earlier proved to a good fit.

TABLE 3
REGRESSION RESULTS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005986	0.030987	0.193161	0.8473
TA	0.725325	0.051706	14.02778	0.0000
MBV	0.010214	0.003872	2.637658	0.0098
Log(total assets)	-0.034271	0.016408	-2.088590	0.0395
PRF	-4.63E-08	2.06E-08	-2.246562	0.0270

R-squared	0.736259	Mean dependent var	0.354484
Adjusted R-squared	0.724915	S.D. dependent var	0.191065
S.E. of regression	0.100211	Akaike info criterion	-1.713410
Sum squared resid	0.933924	Schwarz criterion	-1.581524
Log likelihood	88.95711	Hannan-Quinn criter.	-1.660065
F-statistic	64.90451	Durbin-Watson stat	1.620676
Prob(F-statistic)	0.000000		

Source: Eviews output of the data processed

CONCLUSIONS AND RECOMMENDATIONS

A major conclusion of the results of our analysis is that publicly traded Ghanaian firms did not use the trade-off theory in setting their capital structures over the period 2001- 2007. The study also finds a

negative relationship between leverage and size; and between leverage and profitability, contrary to theoretical prediction, which also predicts a negative relationship between leverage and growth opportunities, contrary to the study findings. Another conclusion is that firms with tangible fixed assets tend to employ high levels of leverage since tangible fixed assets have a high collateral value and that firms with growth opportunities tend to take on debt to finance growth. But, firms that are large and profitable tend to use less debt or no debt at all in their capital structure. This is inconsistent with the trade-off theory. Perhaps, firms with high levels of profitability are able to plough back their profits to finance their operations. These findings are however consistent with past empirical studies. Lastly, the study shows that most of the companies do not employ long-term finance in their capital structures, probably because the debt market is not well developed; they rather depend much more on bank loans and trade credit as sources of funds.

A number of recommendations have resulted from the foregoing analysis. Firstly, policy-makers should strive to develop the debt market to increase access to long-term sources of finance by Ghanaian companies since the use of equity financing leads to loss of tax benefits enjoyed from debt financing. Most firms do not employ debt in their capital structure, and so do not benefit from interest tax shields associated with the use of debt and would thus always call for reductions in the tax in order to improve their cash flows, a fact policy makers need to be aware of. Secondly, the size of the GSE is small and hence illiquid, therefore publicly traded Ghanaian firms must be encouraged to use more equity than long-term debt. Finally, finance managers should plan the capital structures of their companies. Companies should employ long-term funds to finance their long-term assets while using short-term finance to finance short-term assets. A high debt ratio is not necessarily bad, if a company could service its debt without any risk, thus increasing shareholders' wealth. Conversely, a low debt ratio can prove to be burdensome for a company which has liquidity problems.

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