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The effect of capital structure on profitability: an empirical analysis of listed firms in Ghana

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Abstract

Purpose – This paper seeks to investigate the relationship between capital structure and profitability of listed firms on the Ghana Stock Exchange (GSE) during a five-year period.

Design/methodology/approach – Regression analysis is used in the estimation of functions relating the return on equity (ROE) with measures of capital structure.

Findings – The results reveal a significantly positive relation between the ratio of short-term debt to total assets and ROE. However, a negative relationship between the ratio of long-term debt to total assets and ROE was found. With regard to the relationship between total debt and return rates, the results show a significantly positive association between the ratio of total debt to total assets and return on equity.

Originality/value – The research suggests that profitable firms depend more on debt as their main financing option. In the Ghanaian case, a high proportion (85 percent) of the debt is represented in short-term debt.

Keywords Capital structure, Profit, Gearing, Ghana

Paper type Research paper

Introduction

The capital structure decision is crucial for any business organization. The decision is important because of the need to maximize returns to various organizational constituencies, and also because of the impact such a decision has on a firm's ability to deal with its competitive environment. The capital structure of a firm is actually a mix of different securities. In general, a firm can choose among many alternative capital structures. It can issue a large amount of debt or very little debt. It can arrange lease financing, use warrants, issue convertible bonds, sign forward contracts or trade bond swaps. It can issue dozens of distinct securities in countless combinations; however, it attempts to find the particular combination that maximizes its overall market value.

A number of theories have been advanced in explaining the capital structure of firms. Despite the theoretical appeal of capital structure, researchers in financial management have not found the optimal capital structure. The best that academics and practitioners have been able to achieve are prescriptions that satisfy short-term goals. For example, the lack of a consensus about what would qualify as optimal capital structure has necessitated the need for this research. A better understanding of the issues at hand requires a look at the concept of capital structure and its effect on firm profitability. This paper examines the relationship between capital structure and



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profitability of companies listed on the Ghana Stock Exchange during the period 1998-2002. The effect of capital structure on the profitability of listed firms in Ghana is a scientific area that has not yet been explored in Ghanaian finance literature.

The paper is organized as follows. The following section gives a review of the extant literature on the subject. The next section describes the data and justifies the choice of the variables used in the analysis. The model used in the analysis is then estimated. The subsequent section presents and discusses the results of the empirical analysis. Finally, the last section summarizes the findings of the research and also concludes the discussion.

Literature on capital structure

The relationship between capital structure and firm value has been the subject of considerable debate. Throughout the literature, debate has centered on whether there is an optimal capital structure for an individual firm or whether the proportion of debt usage is irrelevant to the individual firm's value. The capital structure of a firm concerns the mix of debt and equity the firm uses in its operation. Brealey and Myers (2003) contend that the choice of capital structure is fundamentally a marketing problem. They state that the firm can issue dozens of distinct securities in countless combinations, but it attempts to find the particular combination that maximizes market value. According to Weston and Brigham (1992), the optimal capital structure is the one that maximizes the market value of the firm's outstanding shares.

The seminal work by Modigliani and Miller (1958) in capital structure provided a substantial boost in the development of the theoretical framework within which various theories were about to emerge in the future. Modigliani and Miller (1958) concluded to the broadly known theory of "capital structure irrelevance" where financial leverage does not affect the firm's market value. However their theory was based on very restrictive assumptions that do not hold in the real world. These assumptions include perfect capital markets, homogenous expectations, no taxes, and no transaction costs. The presence of bankruptcy costs and favorable tax treatment of interest payments lead to the notion of an "optimal" capital structure which maximizes the value of the firm, or respectively minimizes its total cost of capital.

Modigliani and Miller (1963) reviewed their earlier position by incorporating tax benefits as determinants of the capital structure of firms. The key feature of taxation is that interest is a tax-deductible expense. A firm that pays taxes receives a partially offsetting interest "tax-shield" in the form of lower taxes paid. Therefore, as Modigliani and Miller (1963) propose, firms should use as much debt capital as possible in order to maximize their value. Along with corporate taxation, researchers were also interested in analyzing the case of personal taxes imposed on individuals. Miller (1977), based on the tax legislation of the USA, discerns three tax rates that determine the total value of the firm. These are:

- (1) the corporate tax rate;
- (2) the tax rate imposed on the income of the dividends; and
- (3) the tax rate imposed on the income of interest inflows.

According to Miller (1977), the value of the firm depends on the relative level of each tax rate, compared with the other two.

Other theories that have been advanced to explain the capital structure of firms include bankruptcy cost, agency theory, and the pecking order theory. These theories are discussed in turn.

Bankruptcy costs are the cost directly incurred when the perceived probability that the firm will default on financing is greater than zero. The bankruptcy probability increases with debt level since it increases the fear that the company might not be able to generate profits to pay back the interest and the loans. The potential costs of bankruptcy may be both direct and indirect. Examples of direct bankruptcy costs are the legal and administrative costs in the bankruptcy process. Examples of indirect bankruptcy costs are the loss in profits incurred by the firm as a result of the unwillingness of stakeholders to do business with them (Titman, 1984). The use of debt in capital structure of the firm also leads to agency costs. Agency costs arise as a result of the relationships between shareholders and managers and those between debt-holders and shareholders (Jensen and Meckling, 1976). The need to balance gains and costs of debt financing emerged as a theory known as the static trade-off theory by Myers (1984). It values the company as the value of the firm if unlevered plus the present value of the tax shield minus the present value of bankruptcy and agency costs.

The concept of optimal capital structure is also expressed by Myers (1984) and Myers and Majluf (1984), based on the notion of asymmetric information. The existence of information asymmetries between the firm and likely finance providers causes the relative costs of finance to vary between the different sources of finance. For instance, an internal source of finance where the funds provider is the firm will have more information about the firm than new equity holders; thus, these new equity holders will expect a higher rate of return on their investments. This means that it will cost the firm more to issue fresh equity shares than using internal funds. Similarly, this argument could be provided between internal finance and new debt holders. The conclusion drawn from the asymmetric information theories is that there is a hierarchy of firm preferences with respect to the financing of their investments (Myers and Majluf, 1984). This "pecking order" theory suggests that firms will initially rely on internally generated funds, i.e. undistributed earnings, where there is no existence of information asymmetry, then they will turn to debt if additional funds are needed and finally they will issue equity to cover any remaining capital requirements. The order of preferences reflects the relative costs of various financing options.

The pecking order hypothesis suggests that firms are willing to sell equity when the market overvalues it (Myers, 1984; Chittenden *et al.*, 1996). This is based on the assumption that managers act in favor of the interest of existing shareholders. As a consequence, they refuse to issue undervalued shares unless the value transfer from "old" to new shareholders is more than offset by the net present value of the growth opportunity. This leads to the conclusion that new shares will only be issued at a higher price than that imposed by the real market value of the firm. Therefore, investors interpret the issuance of equity by a firm as signal of overpricing. If external financing is unavoidable, the firm will opt for secured debt as opposed to risky debt and firms will only issue common stocks as a last resort. Myers and Majluf (1984), maintain that firms would prefer internal sources to costly external finance. Thus, according to the pecking order hypothesis, firms that are profitable and therefore generate high earnings are expected to use less debt capital than those that do not

generate high earnings. Several researchers have tested the effects of profitability on firm leverage. Friend and Lang (1988) and Kester (1986) find a significantly negative relation between profitability and debt/asset ratios. Rajan and Zingales (1995) and Wald (1999) also confirm a significantly negative correlation between profitability and leverage.

Fama and French (1998), analyzing the relationship among taxes, financing decisions, and the firm's value, concluded that the debt does not concede tax benefits. Besides, the high leverage degree generates agency problems among shareholders and creditors that predict negative relationships between leverage and profitability. Therefore, negative information relating debt and profitability obscures the tax benefit of the debt. Booth *et al.* (2001) developed a study attempting to relate the capital structure of several companies in countries with extremely different financial markets. They concluded that the variables that affect the choice of the capital structure of the companies are similar, in spite of the great differences presented by the financial markets. Besides, they concluded that profitability has an inverse relationship with debt level and size of the firm. Graham (2000) concluded in his work that big and profitable companies present a low debt rate. Mesquita and Lara (2003) found in their study that the relationship between rates of return and debt indicates a negative relationship for long-term financing. However, they found a positive relationship for short-term financing and equity.

Hadlock and James (2002) concluded that companies prefer loan (debt) financing because they anticipate a higher return. Taub (1975) also found significant positive coefficients for four measures of profitability in a regression of these measures against debt ratio. Petersen and Rajan (1994) identified the same association, but for industries. Baker (1973), who worked with a simultaneous equations model, and Nerlove (1968) also found the same type of association for industries. Roden and Lewellen (1995) found a significant positive association between profitability and total debt as a percentage of the total buyout-financing package in their study on leveraged buyouts. Champion (1999) suggested that the use of leverage was one way to improve the performance of an organization.

In summary, there is no universal theory of the debt-equity choice. Different views have been put forward regarding the financing choice. The present study investigates the effect of capital structure on profitability of listed firms on the GSE.

Methodology

This study sampled all firms that have been listed on the GSE over a five-year period (1998-2002). Twenty-two firms qualified to be included in the study sample. Variables used for the analysis include profitability and leverage ratios. Profitability is operationalized using a commonly used accounting-based measure: the ratio of earnings before interest and taxes (EBIT) to equity. The leverage ratios used include:

- short-term debt to the total capital;
- long-term debt to total capital; and
- total debt to total capital.

Firm size and sales growth are also included as control variables.

The panel character of the data allows for the use of panel data methodology. Panel data involves the pooling of observations on a cross-section of units over several time

periods and provides results that are simply not detectable in pure cross-sections or pure time-series studies. A general model for panel data that allows the researcher to estimate panel data with great flexibility and formulate the differences in the behavior of the cross-section elements is adopted. The relationship between debt and profitability is thus estimated in the following regression models:

$$ROE_{i,t} = \beta_0 + \beta_1 SDA_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 SG_{i,t} + \ddot{e}_{i,t}, \quad (1)$$

$$ROE_{i,t} = \beta_0 + \beta_1 LDA_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 SG_{i,t} + \ddot{e}_{i,t}, \quad (2)$$

$$ROE_{i,t} = \beta_0 + \beta_1 DA_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 SG_{i,t} + \ddot{e}_{i,t}, \quad (3)$$

where:

- $ROE_{i,t}$ is EBIT divided by equity for firm i in time t ;
- $SDA_{i,t}$ is short-term debt divided by the total capital for firm i in time t ;
- $LDA_{i,t}$ is long-term debt divided by the total capital for firm i in time t ;
- $DA_{i,t}$ is total debt divided by the total capital for firm i in time t ;
- $SIZE_{i,t}$ is the log of sales for firm i in time t ;
- $SG_{i,t}$ is sales growth for firm i in time t ; and
- $\ddot{e}_{i,t}$ is the error term.

Empirical results

Table I provides a summary of the descriptive statistics of the dependent and independent variables for the sample of firms. This shows the average indicators of variables computed from the financial statements. The return rate measured by return on equity (ROE) reveals an average of 36.94 percent with median 28.4 percent. This picture suggests a good performance during the period under study. The ROE measures the contribution of net income per cedi (local currency) invested by the firms' stockholders; a measure of the efficiency of the owners' invested capital. The variable SDA measures the ratio of short-term debt to total capital. The average value of this variable is 0.4876 with median 0.4547. The value 0.4547 indicates that approximately 45 percent of total assets are represented by short-term debts, attesting to the fact that Ghanaian firms largely depend on short-term debt for financing their operations due to the difficulty in accessing long-term credit from financial institutions. Another reason

	Mean	SD	Minimum	Median	Maximum
ROE	0.3694	0.5186	-1.0433	0.2836	3.8300
SDA	0.4876	0.2296	0.0934	0.4547	1.1018
LDA	0.0985	0.1803	0.0000	0.0186	0.7665
DA	0.5861	0.2032	0.2054	0.5571	1.1018
SIZE	18.2124	1.6495	14.1875	18.2361	22.0995
SG	0.3288	0.3457	-0.7500	0.2561	1.3597

Table I.
Descriptive statistics



is due to the under-developed nature of the Ghanaian long-term debt market. The ratio of total long-term debt to total assets (LDA) also stands on average at 0.0985. Total debt to total capital ratio (DA) presents a mean of 0.5861. This suggests that about 58 percent of total assets are financed by debt capital. The above position reveals that the companies are financially leveraged with a large percentage of total debt being short-term.

Regression analysis is used to investigate the relationship between capital structure and profitability measured by ROE. Ordinary least squares (OLS) regression results are presented in Table II. The results from the regression models (1), (2), and (3) denote that the independent variables explain the debt ratio determinations of the firms at 68.3, 39.7, and 86.4 percent, respectively. The *F*-statistics prove the validity of the estimated models. Also, the coefficients are statistically significant in level of confidence of 99 percent.

The results in regression (1) reveal a significantly positive relationship between SDA and profitability. This suggests that short-term debt tends to be less expensive, and therefore increasing short-term debt with a relatively low interest rate will lead to an increase in profit levels. The results also show that profitability increases with the control variables (size and sales growth). Regression (2) shows a significantly negative association between LDA and profitability. This implies that an increase in the long-term debt position is associated with a decrease in profitability. This is explained by the fact that long-term debts are relatively more expensive, and therefore employing high proportions of them could lead to low profitability. The results support earlier findings by Miller (1977), Fama and French (1998), Graham (2000) and Booth *et al.* (2001). Firm size and sales growth are again positively related to profitability.

The results from regression (3) indicate a significantly positive association between DA and profitability. The significantly positive regression coefficient for total debt implies that an increase in the debt position is associated with an increase in profitability; thus, the higher the debt, the higher the profitability. Again, this suggests that profitable firms depend more on debt as their main financing option. This supports the findings of Hadlock and James (2002), Petersen and Rajan (1994) and Roden and Lewellen (1995) that profitable firms use more debt. In the Ghanaian case, a high proportion (85 percent) of debt is represented by short-term debt. The results also show positive relationships between the control variables (firm size and sale growth) and profitability.

Variable	Profitability (EBIT/equity) Ordinary least squares		
	1	2	3
SIZE	0.0038 (0.0000)	0.0500 (0.0000)	0.0411 (0.0000)
SG	0.1314 (0.0000)	0.1316 (0.0000)	0.1413 (0.0000)
SDA	0.8025 (0.0000)		
LDA		-0.3722 (0.0000)	
DA			-0.7609 (0.0000)
<i>R</i> ²	0.6825	0.3968	0.8639
SE	0.4365	0.4961	0.4735
Prob. (<i>F</i>)	0.0000	0.0000	0.0000

Table II.
Regression model results

Conclusions

The capital structure decision is crucial for any business organization. The decision is important because of the need to maximize returns to various organizational constituencies, and also because of the impact such a decision has on an organization's ability to deal with its competitive environment. This present study evaluated the relationship between capital structure and profitability of listed firms on the GSE during a five-year period (1998-2002). The results revealed significantly positive relation between SDA and ROE, suggesting that profitable firms use more short-term debt to finance their operation. Short-term debt is an important component or source of financing for Ghanaian firms, representing 85 percent of total debt financing. However, the results showed a negative relationship between LDA and ROE. With regard to the relationship between total debt and profitability, the regression results showed a significantly positive association between DA and ROE. This suggests that profitable firms depend more on debt as their main financing option. In the Ghanaian case, a high proportion (85 percent) of the debt is represented in short-term debt.

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