The Effects of Optimal Capital Structure on Firms' Performances in Nigeria

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Abstract

This paper examines an optimal capital structure to maximize the performance of the selected firms under the same systematic risk. We investigate the relation between return on equity (ROE) and the capital structure for a sample of 10 firms from 2000 to 2009. We explore the empirical implications that there exists an optimal capital structure under trade-off theory and the optimal capital structure of manufacturing firms. At the same time, find the optimal capital structure and their concerning maximum value of ROE. The target ratio may change over time as the firm's performance and environments change. When firms adjust their capital structure, they tend to move toward an optimal debt ratio consistent with the historical financial behaviors of firms. We also find the firm's performance is a quadratic function of debt ratio. In this paper, there is further evidence on the relation between the distribution of debt ratio and corporate performance. This text summarized the main conclusion that the manufacturing industry's capital structure in Nigeria is consistent with trade-off theory, and the results are consistent with the hypothesis that the corporate performance is a nonlinear function of the capital structure.

Keywords: tradeoff theory, Nigerian stock exchange, capital structure, roe, firm's Performance.

INTRODUCTION

The capital structure referred to enterprise includes mixture of debt and equity financing. Whether or not an optimal capital structure exists is one of the most important and complex issues in cooperate finance. The modern theory of the capital structure originated from the path breaking contribution of Modigliani and Miller in 1958, under the perfect capital market assumption that if there is no bankrupt cost and capital markets are frictionless, if without taxes, the firm's value is independent with the structure of the capital. In 1963, under considering the corporate taxes, Modigliani and Miller modified the conclusion to recognize tax shield. Because debt can reduce the tax to pay, so the best capital structure of enterprises should be 100% of the debt.

Jensen and Meckling (1976) introduce the concept of agency costs and investigate the nature of the agency costs generated by the existence of debt and outside equity. When considering corporation tax, bankrupt costs and agency costs at the same time, trade-off theory can be introduced to derive the existence of the optimum capital structure. Leland (1994) extends the results of Black and Cox (1976) to include taxes, bankruptcy costs to derive the optimal capital structure. Deangelo and Masulis(1980) argue that the existence of non-debt corporate tax shields such as depreciation deductions is sufficient to overturn the leverage irrelevancy theorem.

Hovakimian, Opler, and Titman (2001) tested the hypothesis that firms tend to a target ratio when they either raise new capital or retire or repurchase existing capital. They found firms should use relatively more debt to finance assets in place and relatively more equity to finance growth opportunities.

This study is quite similar to those described in studies by McConnel and Servaes (1990) that investigate the relation between ROE and the capital structure. In this paper, we provide further evidence on the curvilinear relation between ROE and debt-to-asset ratio. And we also find the relation between capital structure and annual loan interest rate to be negative from 2000 to 2009. Unlike previous studies which argue that we can just only derive the range of the optimal capital structure.

LITERATURE REVIEW

A firm's value depends on its operating profitability rather than its capital structure under perfect capital market conditions Modigliani and Miller (1958). In 1963, Modigliani and Miller (1963) fix the previous paper; argue that, when there are corporate taxes then interest payments are tax deductible, 100% debt financing is optimal. This means that the firm's value increases as debts increases.

Titman (1984) argues that stakeholders not represented at the bankruptcy bargaining table, such as customers, can suffer material costs resulting from the bankruptcy. Leland (1994) demonstrates a standard trade-off model. At the optimal capital structure, marginal bankruptcy costs associated with

firm's debt are equated with marginal tax benefits. The static tradeoff theory was the original retort to the theory of capital structure relevance; Modigliani and Miller (1963) argue that, when there are corporate taxes then interest payments are tax deductible [100% debt financing is optimal]. In this framework, firms target an optimal capital structure based on tax advantages and financial distress disadvantages. Firms are thought to strive toward their target and can signal their future prospects by changing their structure. Adding more debt increases firm value through the market's perception of higher tax shields or lower bankruptcy costs. But optimal capital structure at a 100% debt financing are clearly incompatible with observed capital structures, so their findings initiated a considerable research effort to identify costs of debt financing that would offset the corporate tax advantage.

Robichek and Myers (1965) argue that the negative effect of bankruptcy costs on debt to prevent firms from having the desire to obtain more debt. Jensen and Meckling (1976) identify agency cost in governing the corporation. The general result of these extensions is that the combination of leverage related costs (such as bankruptcy and agency costs) and a tax advantage of debt produces an optimal capital structure at less than a 100% debt financing, as the tax advantage is traded off against the likelihood of incurring the costs.

METHODOLOGY
Variables Description
The source for all of our data is from the published financial statement of firms listed on the Nigeria Stock Exchange (NSE) as at January 2000 and in order to guide against data omission and ensure uniformity in presentation, ten firms with complete data for the period of 2000 – 2009 were selected for the study. The requirement for each firm year observation to enter the sample is the availability of a fiscal year end debt ratio and stock price series for at least the twelve months preceding the given year. In this section, the primary hypothesis investigated here is that the performance of the firm is a function of debt ratio.

Sample Selection
The tax shield increases the value of the levered firm. Financial distress costs lower the value of the levered firm. The two offsetting factors produce an optimal capital structure. The Miller model with limited deductibility of interest leads to a ∩-shaped graph similar to the one presented in Figure 1. The ∩-shape in Figure 1 arose from the trade-off between corporate taxes and bankruptcy costs. In the model, the debt-assets ratios will adjust to that the net tax advantage of debt is of the same of magnitude as expected marginal financial distress costs.
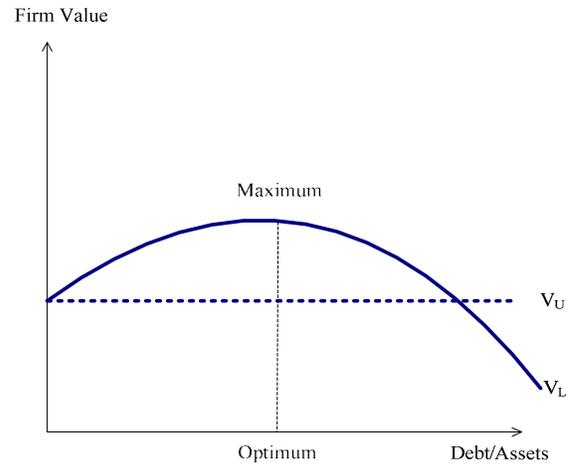

Figure 1. The optimal amount of debt and the value of the firm

We assume that capital markets are perfectly competitive, and if there are corporate taxes, the model is

$$V = \alpha + \beta \cdot Debt + \gamma \cdot Debt^2, \quad \beta > 0, \gamma < 0, \ 0 \le x \le 100 \quad \text{i}$$

Below, $Debt$ is treated as equity ratio, while V is treated as debt ratio. α, β are the parameters. Since the company has more debt, the debt is riskier and the cost of debt is higher.

RESULTS AND DISCUSSION

Table 1. Regression analysis of ROE on debt ratio for ten firms in Nigeria from 2000 – 2009 (p-values in parentheses below coefficients).

Variable[a]	Panel A: 05 of food firms		Panel A: 05 of Beverages firms.	
	(1)	(2)	(3)	(4)
Intercept	37.470	-6.252	13.341	3.224
	(0.006)	(0.532)	(0.000)	(0.159)
Debt	-0.810	1.784	-0.160	0.485
	(0.002)	(0.001)	(0.006)	(0.000)
Debt²		-0.026		-0.007
		(0.000)		(0.000)
Critical point[b]	0	34.31%	0	34.64%
R^2	0.460	0.844	0.391	0.828

[a]$Debt$ = debt-to-assets ratio

[b]The critical point is the percentage debt ratio at which the value of ROE reaches its maximum in the estimated regressions. Column (1) and Column (3) contain the linear model of five firms that ware food manufacturing and five beverages manufacturing firms in which ROE is regressed against ($Debt$). For the ten companies, the coefficients of ($Debt$) are negative and significant.

Column (2) and Column (4) contain the curvilinear relations of five food production companies and five beverages production firms. The curvilinear relations are consistent with trade-off theory. This curve reaches its maximum prior to 50% debt-to-asset ratio. In food production firms, the maximum is reached at 34.31% debt ratio. In beverages production firms, the maximum is reached at 34.64% debt ratio. An implication of this paper is that the optimal capital structures of ten firms seem to be not different. Hence, a firm's performance should be a dependent determinant of its capital structure, an empirical result documented in Modigliani and Miller (1963).

For the overall sample, the mean debt ratio for all firms is 47.84% in 2000. The mean leverage decreases monotonically to 34.31% year by year. Figure 1 presents the mean leverage for each leverage decline yearly over the 10-year holding period. At low levels of debt ratio, the positive effect of tax shield strongly dominates the negative effect of financial distress cost.
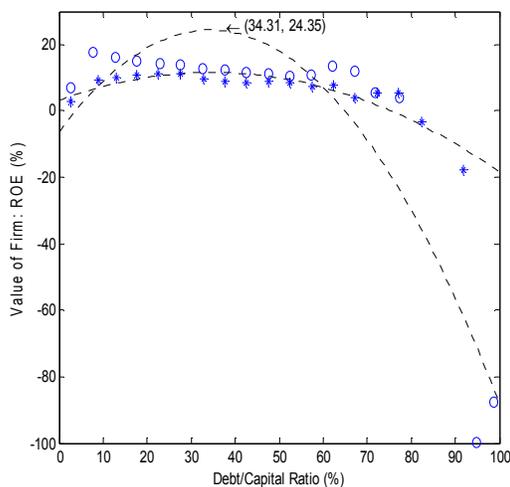

Figure 2. ROE as a function of debt-to-capital ratio

CONCLUSIONS
This paper explores the relation between firms' performances and the capital structure. We find a strong curvilinear relation between ROE and the debt-to-assets ratio. According to the dominant corporate finance paradigm, capital structure choice is a trade-off between the costs and benefits of debt. It can be argued that the large firms are more inclined to retain higher performance than middle firms under the same level debt ratio. Although there is broad agreement among academics and practitioners on the benefits of debt, these results are broadly consistent with trade-off theory. The theory predicts that the value of firms will first increase, then decrease, as debt ratio increases. Most existing papers on capital structure require firm's performance or firm's value to bear the linear relation with debt ratio, but the

empirical evidence does not support this. In contrast, there is evidence that the quadratic relations are significant, yet these have not received much attention in the finance literature. Our analysis demonstrates that, at reasonable parameter values, the financial distress costs borne by debts do, in fact, provide a first-order counterbalance to the tax benefits of debt.

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