OPERATING LEVERAGE AND PRICE EARNINGS RATIO OF SELECTED LISTED MANUFACTURING FIRMS IN NIGERIA

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Abstract

The purpose of this paper was to determine impact of operating leverage on price earnings ratio of selected quoted Nigeria manufacturing firm in Nigeria from 2008-2014. Secondary data were obtained from Factbook published by Nigerian Stock Exchange (NSE), financial statement and annual accounts of the selected firms to investigate relationship between degree of operating leverage and price-earnings ratio. Regression analysis was used to analyze the data obtained for the study. The results showed a significant and positive relationship between degree of operating leverage (DOL) and price-earnings ratio of Nigeria quoted manufacturing firms. The study recommends that finance managers must be careful in using debts but must follow Pecking order theory.

Keywords: Capital structure; Cost of capital operating leverage, market price per share and price-earnings ratio

INTRODUCTION

Almost any human endeavour carries some risk, but some are much more risky than others. Return on equity, free cash flow (FCF) and price earnings ratios are a few of the common methods used to gauging a company's well-being and risk level. One measure of that does not get enough attention is operating leverage which captures the relationship between a company's fixed and variable costs in good times. Operating leverage can supercharge profit growth in bad times, it can crush profits. Even a rough idea of a firm's operating leverage can tell you a lot about a company's prospects (Alaghi, 2012). Leverage refers to the extent to which firms made use of their money borrowings (debt financing) to increase profitability and is measured by total liability to equity. Firms that borrow large sum of money during a business recession are more likely to default to pay off their debts as they mature, they will end up with high leverage and are more likely end up with a potential risk of bankruptcy. On the contrary, the lower the firm's borrowings, the lower the leverage, and the risk of bankruptcy will eventually be lower which signifies that business will continue operating (Alkhatib, 2012). Operating leverage occurs when a company has fixed cost that must be met regardless of sales volume. When the firm has fixed costs, the percentage change in profits due to change in sales volume is greater than the percentage change in sales. With positive (that is greater than zero) fixed operating costs, a change of 1% in sales produces a change of greater than 1% in operating profit. A measure of this leverage effect is referred to as the degree of operating leverage (DOL).

The price earnings ratio (P/E ratio) is of considerable interest, yet little is known about how it behaves over time or about the relative importance of the factor believed to influence its behaviour.

According to Pandey (2010), price earnings ratio is widely used by Security Analysts to value the firm's performance as expected by investors. This tool indicates investors' judgement or expectations about the firm's performance. Management is also interested in this market appraisal of the firm's performance and will like to find the causes if the price-earnings ratio declines. Price-earnings ratio also reflects investor' expectation about the growth in the firm's earning. Industries differ in their growth prospects, accordingly, the price-earnings ratios for industries vary widely. It is for all the reasons above that this study investigates operating leverage as it affects price-earnings ratio of selected listed manufacturing firms in Nigeria.

LITERATURE REVIEW

Conceptual Review

Operating Leverage

Pandey (2010) stated that operating leverage affects a firm's operating profit (EBIT). Operating leverage occurs when a company has fixed costs that must be met regardless of sales volume. Degree of operating leverage (DOL) is defined as the percentage change in the earnings before interest and taxes relative to a given percentage change in sales i.e

DOL = % change in EBIT   equation (1)
           % change in sales

DOL = Δ EBIT/EBIT   equation (2)
           Δ sales/sales

The following equation is also used for calculating DOL

DOL =   Q(s-v)   equation (3)
           Q (s-v)-F

Where Q is the units of output, S is the unit selling price, V is the unit variable cost and F is the total fixed costs. Equation (3) can also be written as follows:

DOL = contribution   equation (4)
              EBIT

Since contribution = EBIT-fixed cost, equation (4) can be expressed as follows:

$$\text{DOL} = \frac{\text{EBIT-fixed cost}}{\text{EBIT}} = 1 + \frac{F}{EBIT} \qquad \text{equation (5)}$$

Price-Earnings Ratio

The price-earnings ratio plays a pivotal role in both academic research and investment practices and it has been found to reflect the market's expectation of future growth and is associated with firm risk. It measures the relationship between the market price and earnings per share (Olowe, 2017). Price-earnings ratio is the most important yardstick for assessing the relative worth of a share. The price-earnings ratio is equal to the number of years earnings (at the rate given in the last published accounts) needed to cover the current market price per share (Akinsulire, 2011). The value of the price-earnings ratio reflects the market appraisal of the shares future prospects. It is the most important yardstick for assessing the relative worth of a share. It is calculated as:

Price-earnings ratio   =   Market price per share
                                         Earnings per share

The price earnings ratio is equal to the number of years' earnings (at the rate given in the last published accounts) needed to cover the current market price per share. The value of the price earnings ratio reflects the market's price appraisal of shares future prospects (Olowe, 2017).

One of the advantages of price-earnings ratio is that investors need to assess if the price-earnings ratio of a company is high or low in order to compare a firm's price earnings ratio with its competitors' price earnings ratio and the price-earnings ratio of similar firms. It also indicates the payback period within which the prospective investor can recover his investment in a single share by way of earnings per share (EPS).

Theories

Net Income Approach

According to Net Income Approach, a firm may increase its total value by lowering its cost of capital. When cost of capital is lowest and the value of the firm is greatest, we call it the optimum capital structure for the firm and, at this point, the market price is maximized. The same is possible continuously by lowering its cost of capital by the use of debt capital. In other words, using more debt capital with a corresponding reduction in cost of capital, the value of the firm will increase. The approach makes the following assumptions aside from the general assumptions under capital structure:

i. Cost of debt (Kd) is less than the cost of equity (Ke)

ii. The use of debt does not change the risk perception of the investors since the degree of leverage is increased to that extent

iii. The cost of debt (Kd) and the cost of equity (Ke) remain constant with an increase in leverage and
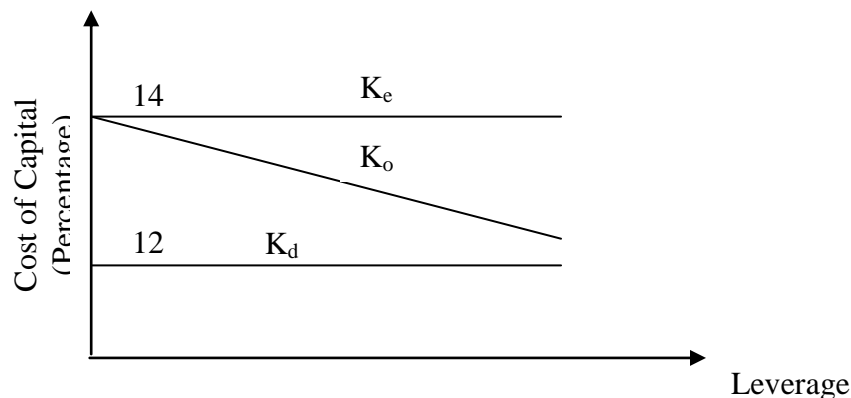
iv. There are no taxes

Figure 1: Net Income Approach

Source: Olowe, (2017) Financial Management

Net Operating Income Approach

Net Operating Income Approach was advocated by David Durand. The Net Operating Income Approach states that the way a company finances its operations is irrelevant in the determination of the company's value. The theory states further that the issue of cost of debt rising after a given point does not hold. The assumptions of the net operating income approach are as follows:

1. Cost of debt will remain constant regardless of the level of gearing.
2. The WACC will remain unchanged as the gearing increases.
3. The cost of equity will rise in such a way as to keep the WACC constant.

Under this approach, the most significant assumption is that the WACC is constant irrespective of the degree of leverage. The segregation of debt and equity is not important here and the market capitalises the value of the firm as a whole. Thus, an increase in the use of apparently cheaper debt funds is offset exactly by the corresponding increase in the equity capitalization rate. So the WACC and cost of debt remain unchanged for degree of leverage.
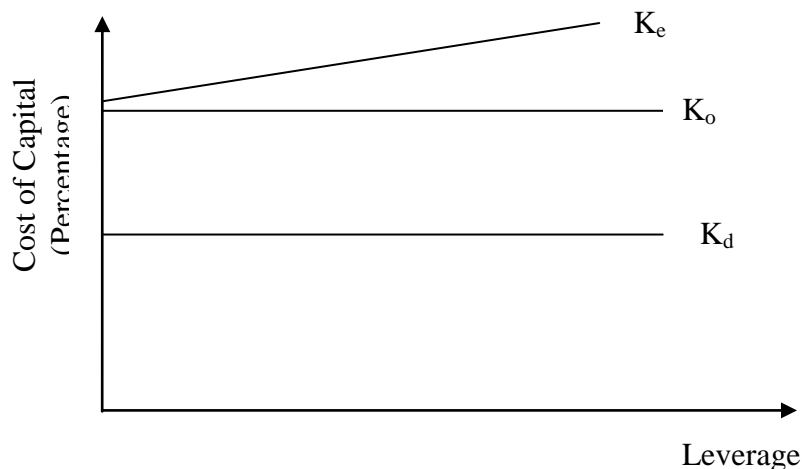

Figure 2: Net Operating Income Approach

Source: Olowe (2017) Financial Management

Traditional Theory Approach

It is accepted by all that judgment use of debt will increase value of the firm and reduce the cost of capital. So, the optimum capital structure is the point at which the value of the firm is highest and the cost of capital is at its lowest point. Practically, this approach encompasses all the ground between the Net Approach and the Net Operating Income Approach, i.e, it may be called Intermediate Approach. The traditional Approach explains that, up to a certain point, debt-equity mix will cause the market value of the firm to rise and cost of capital to decline. But after

attaining the optimum level, any additional debt will cause to decrease the market value and to increase the cost of capital. In other words, after attaining the optimum level, any additional debt taken will offset the use of cheaper debt capital since the average cost of capital will increase along with a corresponding increase in the average cost of debt capital. Thus, the basic propositions of this approach are:

(a) The cost of debt capital, K_d remains constant, more or less, up to a certain level and thereafter, rises.

(b) The cost of equity capital, K_e remains constant, more or less, or rise gradually up to a certain level and, thereafter, increases rapidly.

(c) The average cost of capital, K_o decreases up to a certain level, remains unchanged more or less and, thereafter, rises after attaining a certain level.

The traditional approach can graphically be represented from the figure below:
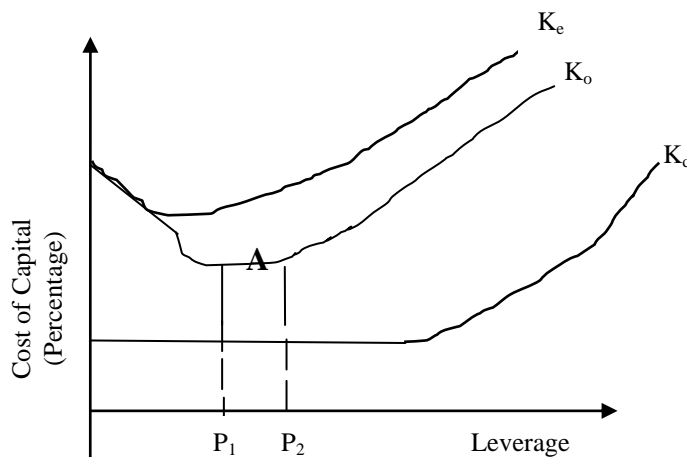

Figure 3: Traditional Approach

Source: Olowe (2017), Financial Management

It is found from the above that the average cost curve is U-shaped. That is, at this stage, the cost of capital would be minimum which is expressed by the 'A' in the graph. If we draw a perpendicular to the X-axis from A, the same will indicate the optimum capital structure for the firm. Thus, the traditional position implies that the cost of capital is not independent of the capital structure of the firm and that there is an optimal capital structure. At that optimal structure, the marginal real cost of debt (explicit and implicit) is the same as the marginal real cost of equity in

equilibrium. For degree of leverage before that point, the marginal real cost of debt is less than that of equity; beyond that point the marginal real cost of debt exceeds that of equity.

Modigliani-Miller Approach

Modigliani-Miller (M & M) (1958) advocated that the relationship between the cost of capital, capital structure and the valuation of the firm should be explained by NOI (Net Operating Income Approach by making an attack on the Traditional Approach). The Net Operating Income Approach supplies proper justification for the irrelevance of the capital structure. In this context, Modigliani and Miller (M&M) support the net operating income (NOI) approach on the principle that the cost of capital is not dependent on the degree of leverage, irrespective of the debt-equity mix. In other words, according to their thesis, the total market value of the firm and the cost of capital are independent of the capital structure. They advocated that the weighted average cost of capital (WACC) does not make any change with a proportionate change in debt-equity mix in the total capital structure of the firm. The same can be shown with the help of the following diagram:
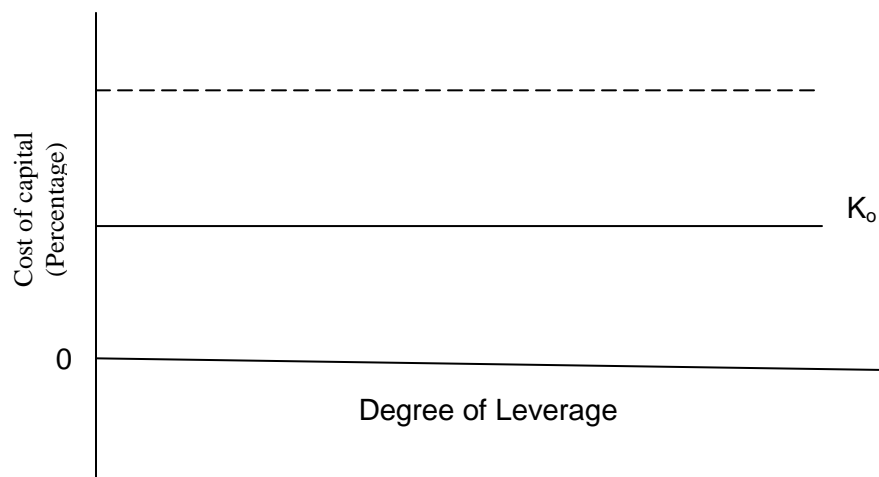

Figure 4: Modigliani & Miller

Source: Modigliani and Miller (1958)

Empirical Review

Ibrahim (2009) examined the impact of capital structure on firm performance in Egypt using a multiple regression analysis in estimating the relationship between leverage level and firm performance, the study covered 1997-2005. Three accounting based measure of financial performance (return on equity, return on assets and gross profit margin) were used. The result revealed that capital structure choice decision in general, has a weak-to-no impact on firm's performance. Brabete and Balesunderan (2010) examined capital structure and its impact on

profitability in listed manufacturing companies in Sri-Lanka. Result showed that debt equity ratio is positively and strongly associated to all profitability ratios.

Ebrait, Emadi, Balasang and Safari, (2013) studied impact of capital structure on firm performance evidence from Tehran Stock Exchange using a sample of 85 firms listed in Tehran Stock Exchange from 2006-2011. Their results indicated that firm performance which is measure by ROE, MBVR and Tobin's Q is significantly and positively associated with capital structure. While report a negative relation between capital structure and ROA and EPS. This can be interpreted to mean that firm performance is positively or even negatively related to capital structure.

Marobhe (2014) conducted a study on the influence of capital structure on the manufacturing companies listed in East African countries using sample size of 12 manufacturing companies and applying multiple regression analysis to statistically test for the relationship between capital structure and profitability. It was found that capital structure has a significant negative relationship with return on assets (ROA) but weak relationship with return on equity (ROE) and earnings per share (EPS) which are the variables that represent profitability.

Twairesh (2014) in his study of impact of capital structure on firm's performance: evidence from Saudi Arabia conducted a study of 74 Saudi Arabia firms listed on the Saudi Arabia Stock Exchange (TADAWUL) for the period 2004-2012 using panel econometric technique called fixed effect regression concluded that firm size has significant impact on firm performance when ROA is a dependent variable and no impact on firm performance when ROA is depending variable. Birru (2016) in his paper title "The impact of capital structure on financial performance of commercial banks in Ethiopia" established that financial performance which is measure by return on assets (ROA) is significantly and negatively associated with capital structure proxies such as debt equity ratio (DER), size and tangibility whereas debt ratio (DR) has negative impact.

METHODOLOGY

The research design adopted in this study was *ex-post facto*. Data considered for the study were selected mainly from secondary sources. The data were collected from the Stock Exchange Factbook, annual reports and statement of account of the companies. The data sets on the surrogates of the variables used in this study had time series (2008-2014) and cross-section i.e twenty (20) quoted manufacturing firms. Proportionate sampling technique was used considering sectorial grouping of the firms in the Nigerian Stock Exchange.

Data gathered were analyzed using regression analysis method. Regression analysis is a statistical tool for estimating relationships among variables especially when focus is on

relationship between a dependent variable and one or more independent variable. A panel regression model was used.

y(PER)= f(DOL)

Where:

PER – Price-earnings ratio

DOL- Degree of operating leverage

Regression analysis was carried out with leverage being the independent variable and price earnings ratio as a dependent variable to show if a relationship exists between the two (2) variables.

$PER = \lambda_0 + \lambda_1 DOL + \mu$ ---- (1)

ANALYSIS AND FINDINGS

Equation 1 based on table 1…

$$PER = 2.9857 + 0.1207DOL + \varepsilon_4$$

Table 1 Panel Regression Estimate

Variable	Model			
	Coefficient	Std. Error	t-Statistic	Prob.
Constant	2.9857	0.5868	5.09	0.0000*
DOL	0.1207	0.0037	3.18	0.0010*
Wald Test	10.1000			0.0010*
Hausman Test	0.2000			0.6520
Heteroskedasticity: Breusch-Pagan/Cook-Weisberg	1.9300			0.1640
Wooldridge test for autocorrelation	7.1980			0.0140*

*significance at 5%

From Table 1, the Hausman Test was first used to determine whether fixed or random effect is suitable for the model. The probability of this test showed 0.652 which is higher than the acceptable 5%, thus, the null hypothesis to estimate random effect was accepted. Also, Breusch-pagan Heteroskedasticity Test showed a p-value of 0.164, implying that the null hypothesis of constant variance was accepted an indication of the absence of Heteroskedasticity. However, the probability value of Wooldridge Test for autocorrelation stood at 0.014, indicating that the null hypothesis of no serial correlation was rejected. Thus, there is presence of serial correlation. In order to accommodate the presence of serial correlation in the model, the Feasible Generalized Least Squares (FGLS) Estimator was used. As such, the model was specified correctly.

From Table 1, the size of the coefficient of the independent variables shows that a 1 unit increase in operating leverage would lead to a 12% increase in price earnings ratio (LNPER) of the sampled companies in Nigeria. Also, the overall R-square of the model showed that 70% variations in price earnings ratio can be attributed to operating leverage used in this study, while the remaining 30% variations in price earnings ratio are caused by other factors not included in this model. This showed that the model had a strong explanatory power. Also, the Wald-test showed a probability value of 0.01 which indicates that the explanatory variables are statistically significant because this is less than 5%, the level of significance adopted for this study. Therefore, the model is statistically significant.

From the above analysis the t-statistics was 3.18 while the p-value is 0.0010 which was less than 0.05. Therefore, the null hypothesis was rejected and the alternate was accepted. Which means that degree of operating leverage had significant effect on price earnings ratio of quoted Nigerian manufacturing firms. Thus, the null hypothesis that operating leverage had no significant effect on price earnings ratio of manufacturing firms in Nigeria was rejected. The alternate was accepted which means that operating leverage had significant effect on profitability of manufacturing firms in Nigeria.

DISCUSSION OF FINDINGS

The objective of this study was to establish how degree of operating leverage (DOL) affected price earnings ratio (PER) of Nigeria quoted manufacturing companies. The analysis of this study was done in three folds. The first part showed the description of the data, the second part gave the trend analysis test results of the cost of capital on corporate performance of selected quoted Nigerian manufacturing companies for the period under review and the third part gave the empirical analysis where regression analysis estimates were shown and interpreted.

In order to test the research hypothesis, Hausman test was used to determine whether fixed or random effect was suitable for the model. This is followed by Heteroskedasticity test and Wooldridge test for autocorrelation. The size of the coefficient of the independent variables showed that one (1) unit increase in operating leverage would lead to 12% increase in price earnings ratio of the Sampled companies in Nigeria. At 5% level of significance, the t-statistics is 3.18 while the p-value is 0.0010 which is less than 0.05. The null hypothesis that operating leverage had no significant effect on price earnings ratio of manufacturing firms in Nigeria was rejected ($\beta = 0.1207$; $t(140) = 3.18$; $p < 0.05$). The result obtained was consistent with our a priori expectation. That is operating leverage had a positive effect on price earnings ratio. Perman (1996) in agreement with our result, established a high degree of relationship between price earnings ratio and capital structure. The price earnings ratio has a crucial role in the

investment community. This ratio reflects the market expectation of future growth and firm risk. This ratio can be used of estimate cost of equity capital and to earn excess stock returns from the glamour/value anomaly phenomenon. Financial analysis also widely cite the P/E ratio as a justification for their stock recommendations.

CONCLUSION

The purpose of this paper was to establish if a relationship exists between degree of operating leverage and price-earnings ratio. The results showed a significant and positive relationship between degree of operating leverage (DOL) and price-earnings ratio of Nigeria quoted manufacturing firms i.e leverage has positive and significant effect on Nigeria manufacturing firms.

RECOMMENDATIONS

Financial managers should be careful while using debts as sources of finance, since debt is advantageous to a firm to an extent. In addition, financial managers should take other factors into consideration for example, use of internal financing as recommended by Pecking Order Theory (POT) in their decision of capital structure of a firm.

Government should provide conducive financial environment for manufacturing companies to thrive and regular supply of electricity to be provided by government to reduce or eliminate closure of factories due to high cost of production. Lastly, since most of the materials used for production are imported from abroad, government should make it possible that high exchange rate of naira to foreign currencies is reduced to the bearest minimum.

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APPENDIX

List of Nigerian firms used in the study

S/N	NAME OF FIRM	SECTOR
1	Nestle Nigeria Plc	Food/beverages and tobacco
2	Cadbury Nigeria Plc	Food/beverages and tobacco
3	7-up Bottling Company Plc	Food/beverages and tobacco
4	Honeywell Flour Mills Plc	Food/beverages and tobacco
5	Nigeria Bottling Company Plc	Food/beverages and tobacco
6	Portland Paints & Product Plc	Chemical and Paints
7	Vitafoam Nigeria Plc	Industrial and domestic product
8	BOC Gases Plc	Chemicals
9	Studio Press Nigeria Plc	Printing and Publishing
10	GSK Nigeria Plc	Healthcare
11	May & Baker Nigeria Plc	Pharmaceutical
12	Livestock Feeds Plc	Livestock/Animal specialist
13	Nigeria Wire Industry Plc	Construction
14	Lafarge Wapco Plc	Building materials
15	Nigerian Breweries Plc	Breweries
16	Presco Plc	Crop production
17	PZ Nigeria Plc	Conglomerates
18	Unilever Nigeria Plc	Conglomerates
19	Guinness Nigeria Plc	Breweries
20	Berger Paints Plc	Chemical and Paints