INTERFACE OF LEVERAGE AND EARNINGS: AN INVESTIGATION INTO THE NIGERIA MANUFACTURING SECTOR, CASE OF NIGRIA BREWERIES PLC

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ABSTRACT

There is no doubt that financial and operating leverage are important because of the way these factors exert significant effect on the level and variability of returns, and consequently on the overall risk of a firm. An efficient mix of the two factors will minimize the incidence of business risk and financial risk. This work is concerned with assessing the variability in the stream of the firms’ residual earnings induced by the use of operating and financial leverages. The study has empirically employed the use of multiple regression analysis to investigate the impact of the two leverages on earnings and the emphasis is on the manufacturing sector. The result shows that sales, operating leverage, financial leverage and combined leverage have significant influence on earnings of NB Plc from 1979 – 2004.
INTRODUCTION

Firms operate financial and operating leverages in various degrees. The joint use of financial and operating leverages can be measured by calculating the degree of the combined leverage. Samuels and Wilkes (1981:158 - 159), defines Operating leverage as the proportion of change in earnings due to change in the level of sales volume. Further, it relates to the way in which a change in the level of sales of a company affects operating profits. Financial leverage is a company’s practice of the acquisition of part assets of the company with fixed interest capital with the hope of increasing the end result of the common stock holders (Oloyede, 2000:134). The combined leverage is the product of both operating leverage and financial leverage. Against this backdrop, the finance manager is able to ascertain the effect on total leverage caused by adding financial leverage to operating leverage.

The degree of combined leverage brings either positive or negative impact on an organization. Like financial leverage, operating leverage is one of the components of the firm’s risk. Corporate risk can be classified into business risk and financial risk. Business risk refers to the relative dispersion (variability) in the firm’s Earnings Before Interest and Taxes (EBIT) and it has a direct impact on the firm’s investment decision. Financial risk is a direct impact on the firm’s investment decision. Therefore, in selecting a proper financial mix, an organization is expected to consider the effect in variability in earnings that will be available to the shareholders, and the additional chance of insolvency borne by the common shareholder as a result of the use of financial leverage. Because the consequences of business risk are variability or uncertainty of sales and of production costs, operating leverage seems to magnify the impact of these factors on the variability of profits. Considering the central position of operating leverage in the firm’s cost structure, a financial manager is expected to always consider the effect of an increase in fixed costs associated with a new machinery and a reduction in variable costs attributable to a lower labour bill. Where there is prospect for future sales increase, increasing the degree of operating leverage might be wise decision. Operating leverage is only one factor for the course of variability; therefore, knowledge of the operating and financial leverage concept will assist the financial manager in making alteration in the firm’s cost
structure. The relevance of financial leverage is that high leverage can discourage investors and also put a firm in a disadvantage position. Oloyede (2000:133) refers to the practice of financing a proportion of the firm’s assets with fixed interest bearing securities with the hope of increasing the ultimate return to the common shareholder. Financial leverage varies with the fluctuations in earning per share and it has the following advantages:

i. A proportionate increase in earning per share will lead to a greater than proportionate increase in the cost of equity.

ii. A positive financial leverage occurs when the profits of the firm increases because while a negative financial leverage leads to decrease profits arising from the injection of debt.

In this study, we begin with introduction above, objective of study, statement of problem and research questions. Subsequently, we dwell on review of earlier literatures and considered a theoretical framework. We proceed by focusing on research methodology, data collection, presentation and the discussions of findings.

1.2 STUDY OBJECTIVE

The broad objectives of this study are:

i. To investigate if the use of operating and financial leverage has significant impact on the earnings of the organization.

ii. To investigate the variability of operating leverage in turnover.

iii. To consider impact of combined leverage on earnings per share.

1.3 STATEMENT OF PROBLEM

The cost of capital is affected by the composition of its financial structure. Financial and operating leverage is very critical in the process of arriving at an appropriate financial structure. The introduction of the Structural Adjusted Programme in Nigeria in 1986 led to the Interbank Foreign Exchange Market (IFEM) consequent upon which the forces of demand and supply now determine the exchange rate. The exchange rate of the Nigerian naira against the major currencies, the dollar and pound sterling had nose-dived leading to high cost of importation of raw materials and equipment. This has also led to under
capacity utilization. It is against this background that the study of leverage with respect to performance of the manufacturing sector becomes pertinent.

1.4 RESEARCH QUESTIONS
The study seeks to proffer solutions to some important questions and form a basis in formulation of the hypotheses. The questions stated below are important:

1. Is operating leverage affected relative to differential sales bases?
2. Does operating and financial leverage affect company Earnings Per Share?
3. How do the twin factors affect earnings?
4. What impact does sales have on earnings?

These we will attempt to discus in this study.

2.1 LITERATURE AND THEORETICAL FRAMEWORK
The degree of operating leverage (DOF) is the percentage in net operating income associated with given percentage change in sales volume (Brigham 1985: 529-533). The degree of operating leverage shows the sensitivity of net income to changes in EBIT. Where operating leverage causes a change in sales volume, it will have effect on EBIT.

The financial leverage is superimposed on operating leverage, changes in EBIT will have positive effect on both net income available to common stockholders and earnings per share. Therefore, if a firm uses a considerable amount of both operating leverage and financial leverage, a small change in the level of sales will result in wide fluctuations in net income and EPS. The primary motive of company in using financial leverage is to increase shareholders’ return under favourable conditions (Pandy, 2002: 637-638). Financial leverage will enhance shareholders return on the condition that fixed charges fund (such as the loan from financial institutions and other sources or debentures) can be obtained at cost lower than the firm’s rate of return on net assets (RONA or ROI). Where the difference between the earnings generated by assets financed by the charges funds and costs of these funds is distributed to shareholders, the earnings per share (EPS) or return on equity (ROE) increases. EPS or ROE will decrease if the company obtains fixed
charges fund at a cost higher than the rate of return on the company’s assets. Therefore, EPS, ROE are important factors for analyzing impact of financial leverage.

In deriving the degree of operating leverage, we assume that P, F and V are constant, that they do not change in output. High degree of operating leverage, other factors held constant, implies that a small change in sales will result in large change in operating income (Brigham, 1985:226-230). The higher a company’s operating leverage, the higher the business risk factor. The more operating leverage the company has, the greater the potential for large swings in the company’s operating profits. Operating leverage, the commitment to fixed production charges will add to beta of a capital project (Myers, 2003:239-240). Fixed costs are cash outflow that occur regardless of whether the asset is active or idle. Favourable leverage is a situation in which EPS rises as a result of introduction of debt into capital. Unfavourable leverage is a situation in which EPS decreases as a result of debt introduced into the capital structure.

Financial leverage is a change in EPS caused by the use of fixed payment securities to finance a company’s operations. Business risk and financial leverage have impact on the leverage of an organization. However, business risk depends on the industry to which a firm or company belongs and on general economic conditions. Financial risk is the additional variability of earnings induced by leverage. The impact of financial leverage given the relative assumption that uncertainty prevails, can be reduced to three alternatives:

i. Situation in which leverage increases risk, but at the same time decreases expected EPS

ii. Neutral situation in which the increase in risk following the introduction of leverage leaves EPS unchanged

iii. Situation in which the introduction of leverage increases expected EPS and risk simultaneously.

Keown (2003:366-367) opined that financial structure is the mix of all items that appear on the right hand side of the company’s balance sheet. Capital structure is the mix of the
long-term sources of funds used by the company. Capital structure is the mix of the long-term sources of funds used by the company.

The assets owned by the firm affect the maturity profile of financial plans. A company heavily committed to real capital investment, represented primarily by fixed assets on its balance sheet, should finance those assets with permanent (long-term) types of financial capital. Permanent portion of the firm's investment in current assets should likewise be financed with permanent capital. The firm's cost of equity rises when the firm increases its use of financial leverage because the financial risk of the equity increases while the business risk remains the same (Westerfield, Ross, 2000:496). The total systematic risk of the firm's equity has two parts: business risk and financial risk. The first part (the business risk) depends on the firm's asset and operations and is not affected by capital structure. Given the firm's business risk (and its cost of debt), the second part (the financial risk) is completely determined by financial policy.

3.1 METHODOLOGY

This section seeks to highlight or spell out in detail the research design adopted in the entire study and to test the hypotheses formulated. The data collected for this study consists of primary and secondary sources data. Twenty-Six years historical data collected from the financial statement is used in the analysis of this paper. Multiple regression using the ordinary least square (OLS) is employed to test the relationship. The remainder of this section is divided into various sub-sections:

Scope
Hypotheses
Model Specification
Measurement of Variable and Data Sources
Data Analysis, Presentation and Results

Scope
The period covered in this study is 1979-2004 and the data were obtained from Nigerian Brewery Annual Reports. The analysis covers only a specific section of the manufacturing sector that is NB Plc. This is done in order to have a more penetrating result.
Test of Hypotheses

(i) Operating leverage has no significant influence on earnings of NB Plc.
(ii) Financial leverage has no significant influence on earnings of NB Plc.
(iii) The expected value of financial and operating leverage has no significant influence on earnings of NB Plc.
(iv) Sales have no significant influence on earnings.

Table 1

NIGERIAN BREWERIES PLC

Measures of leverage According to Different Sales Bases and Earnings Before Interest and Taxes

<table>
<thead>
<tr>
<th>Year</th>
<th>Sales =N='000</th>
<th>EBIT =N='000</th>
<th>Financial Leverage=N='000</th>
<th>EPS</th>
<th>Operating Leverage=N='000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X₄</td>
<td>Y</td>
<td>X₂</td>
<td></td>
<td>X₁</td>
</tr>
<tr>
<td>1979</td>
<td>155,800</td>
<td>32,318</td>
<td>69,316</td>
<td>19.5k</td>
<td>81,746</td>
</tr>
<tr>
<td>1980</td>
<td>174,207</td>
<td>40,304</td>
<td>73,036</td>
<td>24.4k</td>
<td>103,613</td>
</tr>
<tr>
<td>1981</td>
<td>187,636</td>
<td>38,532</td>
<td>65,682</td>
<td>28.1k</td>
<td>139,731</td>
</tr>
<tr>
<td>1982</td>
<td>241,097</td>
<td>53,887</td>
<td>89,296</td>
<td>33.2k</td>
<td>161,115</td>
</tr>
<tr>
<td>1983</td>
<td>317,387</td>
<td>95,652</td>
<td>132,996</td>
<td>28.80k</td>
<td>157,528</td>
</tr>
<tr>
<td>1984</td>
<td>322,125</td>
<td>104,158</td>
<td>136,389</td>
<td>32.27k</td>
<td>147,668</td>
</tr>
<tr>
<td>1985</td>
<td>179,109</td>
<td>41,566</td>
<td>68,805</td>
<td>15.47k</td>
<td>141,004</td>
</tr>
<tr>
<td>1986</td>
<td>205,476</td>
<td>45,387</td>
<td>74,744</td>
<td>16.07k</td>
<td>141,752</td>
</tr>
<tr>
<td>1987</td>
<td>341,047</td>
<td>75,774</td>
<td>96,095</td>
<td>28.36k</td>
<td>153,821</td>
</tr>
<tr>
<td>1988</td>
<td>514,992</td>
<td>138,431</td>
<td>162,987</td>
<td>45.49k</td>
<td>168,334</td>
</tr>
<tr>
<td>Year</td>
<td>Income (₦)</td>
<td>Profit After Tax (₦)</td>
<td>EBITDA (₦)</td>
<td>EBITDA Margin (%)</td>
<td>Net Worth (₦)</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td>----------------------</td>
<td>-------------</td>
<td>-------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>1989</td>
<td>514,992</td>
<td>227,040</td>
<td>204,651</td>
<td>54.64k</td>
<td>520,788</td>
</tr>
<tr>
<td>1990</td>
<td>811,052</td>
<td>274,562</td>
<td>330,824</td>
<td>63.55k</td>
<td>819,714</td>
</tr>
<tr>
<td>1991</td>
<td>1,1179,539</td>
<td>442,501</td>
<td>466,571</td>
<td>108.22k</td>
<td>932,214</td>
</tr>
<tr>
<td>1992</td>
<td>1,708,559</td>
<td>684,625</td>
<td>734,271</td>
<td>167.65k</td>
<td>1,398,099</td>
</tr>
<tr>
<td>1993</td>
<td>1,969,150</td>
<td>458,056</td>
<td>135,457</td>
<td>100.31k</td>
<td>680,931</td>
</tr>
<tr>
<td>1994</td>
<td>7,142,601</td>
<td>2,204,008</td>
<td>2,400,458</td>
<td>149.65k</td>
<td>2,526,440</td>
</tr>
<tr>
<td>1995</td>
<td>10,768,180</td>
<td>2,506,821</td>
<td>3,456,756</td>
<td>194.38k</td>
<td>11,378,748</td>
</tr>
<tr>
<td>1996</td>
<td>12,256,731</td>
<td>2,581,465</td>
<td>14,037,600</td>
<td>95k</td>
<td>10,965,050</td>
</tr>
<tr>
<td>1997</td>
<td>10,886,950</td>
<td>2,406,396</td>
<td>3,602,491</td>
<td>84k</td>
<td>10,714,122</td>
</tr>
<tr>
<td>1998</td>
<td>9,186,869</td>
<td>3,231,043</td>
<td>1,096,005</td>
<td>113k</td>
<td>10,538,663</td>
</tr>
<tr>
<td>1999</td>
<td>12,033,111</td>
<td>5,268,116</td>
<td>1,701,140</td>
<td>184k</td>
<td>11,521,472</td>
</tr>
<tr>
<td>2000</td>
<td>25,575,545</td>
<td>6,481,065</td>
<td>401,924</td>
<td>225k</td>
<td>12,074,011</td>
</tr>
<tr>
<td>2001</td>
<td>39,091,435</td>
<td>10,035,471</td>
<td>2,546,120</td>
<td>240k</td>
<td>15,287,003</td>
</tr>
<tr>
<td>2002</td>
<td>48,584,892</td>
<td>12,553,245</td>
<td>2,170,816</td>
<td>193k</td>
<td>37,022,763</td>
</tr>
<tr>
<td>2003</td>
<td>62,974,995</td>
<td>13,060,877</td>
<td>2,068,830</td>
<td>194k</td>
<td>50,041,941</td>
</tr>
<tr>
<td>2004</td>
<td>73,594,134</td>
<td>14,425,769</td>
<td>5,277,630</td>
<td>67k</td>
<td>54,448,027</td>
</tr>
</tbody>
</table>

Source: Compiled By the Researchers From NB Plc Financial Statements
Model Specification

In an attempt to investigate the relationship between leverage and earnings of NB Plc, earning is postulated as a function of operating leverage, financial leverage and combined leverage. This study adopts a disequilibrium model, which takes the state of affairs of the period (financial statements) under review. (See table 1). The ordinary least square (OLS) is used to test the relationship.

Measurement of Variable and Data Sources

For the purpose of estimating equation 1, the least square method is used to ascertain the impact of leverage on earnings as shown in table 1 of NB Plc. It is assumed in this study that leverage has inhibited earnings of NB Plc. This implies that there is a direct relationship between earnings and leverage. This would assist us to show the relationship between earnings and leverage for the period covered. The sources of various secondary data used in this study are the financial statements of NB Plc (various issues). These data covers the period 1979-2004.

4.1 DATA ANALYSIS, PRESENTATION AND DISCUSSION

Two types of leverage can be identified in financial management, namely: (i) that which is due to fixed costs associated with the production of goods or services, called operating leverage and (ii) that which is due to the existence of fixed financing cost like interest on a loan called financial leverage. For the data on table 1 above, financial leverage is inclusive of excise duty charges because of the magnitude. A third type is the combination of both operating leverage and financial leverage captured in the regression result on table 2. (See below). The theoretical formular for calculating the leverages are represented below
Table 2: Main Findings

Ordinary Least Square Estimate for the Equation

Dependent Variable: Earnings

<table>
<thead>
<tr>
<th>Explanatory variables</th>
<th>Summary Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>Operating</td>
</tr>
<tr>
<td>119699.1 (0.69323)</td>
<td>0.063523 (0.147691)</td>
</tr>
<tr>
<td>Operating Financial</td>
<td>0.18819 (2.5524)</td>
</tr>
<tr>
<td>Financial Leverage</td>
<td>0.2056 E-7 (-3.7811)</td>
</tr>
<tr>
<td>Combined Leverage</td>
<td>0.25321 8.6797</td>
</tr>
<tr>
<td>Sales</td>
<td>0.9814</td>
</tr>
<tr>
<td>RL:</td>
<td>2.1377</td>
</tr>
<tr>
<td>DW</td>
<td>276.65</td>
</tr>
<tr>
<td>F. Stat</td>
<td>0.978</td>
</tr>
<tr>
<td>Adj R²</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Notes: T – Values are in parenthesis

Degree of Operating Leverage (DOL)

It is defined as the percentage change in profit against change in output (Sales).

DOL = \( \frac{\% \text{ Change in Profit}}{\% \text{ Change in Output}} \)

Alternative;

\[ Q \left( P - VC \right) \]

\[ Q \left( P - VC \right) - FC \]

Where: \( VC \) = Variable Cost per unit

\( FC \) = Fixed Costs

\( P \) = Price Per Unit
\[ Q = \text{Volume of Output (Sales)} \]

**Degree of Financial Leverage (DFL)**

This is the change in proportion of the Earnings per share relative to EBIT

\[
\text{DFL} = \frac{\% \text{Change in EBIT}}{\% \text{ Change in EBIT}-1}
\]

i.e \[ \text{DFL} = \frac{Q \,(P-VC) - FC}{Q \,(P-VC) - 1} \]

Where I is the interest element

**Degree of Combined Leverage**

This is the product of both Degree of Operating Leverage and Degree of Financial Leverage i.e. \[ \text{DOF x DFL:} \]

\[
\frac{Q \,(P-VC)}{Q \,(P-VC) - FC} \times \frac{Q \,(P-VC) - FC}{Q \,(P-VC) - FC - I} = \frac{Q \,(P-VC)}{Q \,(P-VC) - FC - I}
\]

**Case of Multiple Regression**

\[ Y = a + bx_1 + cx_2 + dx_3 + ex_4 \ldots \quad \text{Equation 1} \]

Where \[ Y = \text{Earnings} \]

\[ X_1 = \text{Operating Leverage} \]

\[ X_2 = \text{Financial Leverage} \]

\[ X_3 = \text{Expected Value of Operating and Financial Leverage (Combined Leverage)} \]

\[ X_4 = \text{Sales} \]
\[ f_1 > 0; f_2 > 0 \]

From the regression result, the model used captured that \( R^2 \) has a coefficient of determination of 98.14%. This shows that the regression equation has a good fit. This also mean that about 98.14% of the variation in earnings is explained by increase in sales, operating leverage, financial leverage and combined leverage. The regression result also shows that there is a positive relationship between the level of earnings and the level of sales, operating leverage, financial leverage and combined leverage in Nigerian Breweries Plc. The higher the variables \( X_1, X_2, X_3 \) and \( X_4 \) the higher the earnings. In assessing the level of significance of \( X_1, X_2, X_3 \) and \( X_4 \) in the regression, the t-value associated with this variables are greater than 2. Thus we can accept that \( X_1, X_2, X_3 \) and \( X_4 \) are good variables explaining earnings in the regression. The standard error for \( X_1, X_2, X_3 \) and \( X_4 \) are 4.3%, 7.4%, 54.4% and 2.9% respectively for the regression and are also significant variables.

**CONCLUSION**

The importance of the concept of operating leverage is that it assists the manager in making appropriate decision concerning altering the firm's cost structure. For instance, if there are high prospects for future sales, then increasing the degree of operating leverage might be a wise decision. The greater the degree of financial of financial leverage, the more the fluctuations in earning per share. Financial leverage is positive when the profits of the firms increased because of the injection of debt and negative when profits decreased because of employment of debt. The total risk facing an organization can be managed by combining operating leverage and financial leverage in varying degrees. The hypotheses tested in the study using the ordinary least square method produced the results in table 2 above. The results showed that operating leverage, financial leverage, combined leverage and sales have significant influence on earnings of NB Plc by 98.14% (coefficient of determination). Therefore, the financial manager should understand the appropriate mix of the leverages to introduce at any time to maximize profit and consequently the wealth of the shareholder.
REFERENCES


