

Investment in Fixed Assets and Firm Profitability: Evidence from the Nigerian Brewery Industry

Okwo, Ifeoma Mary Ph.D^{1*}, Ugwunta David Okelue², Nweze, Austin Uche Ph.D.¹

1. Department of Accountancy, Faculty of Management Sciences, Enugu State University of Sciences and Technology, Enugu State, Nigeria.
2. Department of Banking and Finance, Renaissance University Ugbawka, Enugu State. Nigeria.

* E-mail of the corresponding author: ifeomaokwo@yahoo.com.

Abstract

This study assesses the impact of a company's investment in fixed assets on its operating profit margin. The study is based on a sample four companies in the Nigerian brewery sector over an eleven year period from 1999 to 2009. We used regression statistical method to ascertain the relationship between level of investment in fixed assets and its impact on the operating profit reported by Nigerian brewery firms. Though the relationship is positive, but the result is not statistically significant. Therefore, the result did not suggest any strong positive impact of investment in fixed assets on the operating profit of brewery firms in Nigeria. This finding is in which is in line with past academic researches show that investment in fixed asset does not have any strong and statistical impact on the profitability of brewery firms in Nigeria.

Keywords: Operating profit, investment; fixed assets; brewery firms.

1. Introduction

Apart from the telecommunications industry and oil and gas sector, the brewing industry has been the largest source of Foreign Direct Investment (FDI) in the country. Such investment includes Heineken's investment in Nigeria Breweries Plc which is its largest investment outside Europe. It also became a major stakeholder in consolidated breweries Plc with 50.2% (Omolara, 2006). The Nigerian brewery market is currently a 15mhl market and typifies a classic illustration of a duopoly (Ahmed, 2010). Though there are handful marginal players, the market is dominantly driven by Nigerian Breweries Plc and Guinness Nigeria Plc with a combined market share of 80%. From a holistic view, this concentration level is much more pronounced when we consider the underlying ownership of the 2 brewers: NB Plc is majority-owned by Heineken, and Guinness Nigeria Plc is majority owned by the Diageo Group.

However, while installed capacity grew up to the early 1990's, many of the brewery firms in Nigeria had ceased to be operational. Thus in 1994, only about eleven brewery firms remained in operation in Nigeria. Capacity utilization had also fallen substantially in many cases and several of the plants had been taken over by the industry leaders example is the take-over of the brewery firm that produces Monarch beer brand at 9th mile Enugu by the Nigerian Breweries Plc. According to the Nigerian Stock Exchange FactBook (2010) the brewery firms is beset by the vagaries of the Nigerian Economy and this has culminated in a situation where the number of operational brewery firms has reduced from over thirty in the early 1980's to about ten as of 2006 and as at 2010, only seven are quoted on the Nigerian Stock Exchange out of which four are operational with Nigerian Breweries Plc and Guinness Nigeria Plc taking the lead.

The objective of this paper is to ascertain the relationship between level of investment in fixed assets and the amount of profit reported. The hypothesis that the level of investment in Fixed Assets does not significantly impact on the level of reported profit of breweries in Nigeria was tested. The rest of the study is divided into four sections. Section 2 highlights the theoretical and empirical review of related literature. Methodological issues are the concern of section 3. Section 4 is devoted to presentation of the data and results. We present conclusion in section 5.

2. Review of Related Literature.

Emekewue (2005) defined investment as the art of planning expenditures whose return are expected to exceed one

year. It involves a sacrifice of present consumption in exchange of future benefits. Since investment involves a sacrifice of present condition, there is an element of risk that future outcome may not be realized. The efficiency in the use of fixed assets can be measured with fixed assets turnover ratio. Pandey (1981) opined that the fixed assets turnover ratio measures the efficiency with which a firm is utilizing its investment in fixed assets, such as land, building, plant and machinery, furniture etc. It also indicates the adequacy of sale in relation to the investment in fixed assets.

A firm acquires plant and machinery and other productive fixed assets for the purpose of generating sales. Therefore, the efficiency of fixed assets should be judged in relation to sales. Generally, a high fixed assets turnover ratio indicates efficient utilization of fixed assets in generating sales, while a low ratio indicates inefficient management and utilization of fixed assets. Thus a firm, whose plant and machinery has considerably depreciated, may show a higher fixed assets turnover ratio than the firm which has purchased plant and machinery recently. By comparing the fixed asset turnover of the two firms, it cannot be concluded that the former is more efficient in managing fixed assets because of the effects of depreciation. Ibam (2008) opined that a company's investment in fixed asset is dependent, to a large degree, on its line of business. Some businesses are more capital intensive than others. Firms in the natural resource just as firms in the brewery industry and other and industry producers require a large amount of fixed-asset investment and large capital equipment while, service companies and computer software producers need a relatively small amount of fixed assets. Ibam (2008) is more interested in the average fixed assets. This fixed asset turnover ratio indicator, looked at asset over time and compares the ratio to that of competitors. This gives the investor an idea of how effectively a company's management is in using fixed asset. It is a rough measure of the productivity of a company's fixed assets with respect to generating sales. The higher the number of times turns over, the better. However investors should look for consistency or increasing fixed assets turnover rates as positive balance sheet investment qualities (Ibam, 2008).

Various authors have x-rayed the relationship between investment in fixed assets and profitability of firms. Eriotis, Frangouli and Neokosmides (2000) investigated the relationship between debt to equity ratio and firm's profitability taking into consideration the level of a firm's investment and the degree of market power. The study used panel data for various industries, covering a period 1995-96. The main conclusions of the study were: - (a) firms which prefer to finance their investment activities through self-finance are more profitable than firms which finance investment through borrowed capital. (b) Firms prefer competing with each other than cooperating. (c) Firms use their investment in fixed assets as a strategic variable to affect profitability.

Mishra and Cobeli (2003) investigated the impact of research and development (R&D) on a firm's performance. This was compared with the impact on investment. They used an improved time series, cross sectional regression model, to compare the ratio of return from a dollar investment in R&D to a dollar investment on fixed assets in pharmaceutical and chemical industries. They found that (1) there is a positive association of R&D intensity and all variables of a firm's performance (net margin, operating margin, sales growth, and market value). (2) An investment in R&D earns an operating margin return much higher than the industry cost of capital (3). The effect of an investment in R&D on the firm's market value is about twice as much the effect of an investment in fixed assets. They concluded that these funding have implications for corporate investment strategies, indicating that additional R&D investment is more likely to provide a firm with a unique and sustained competitive advantage.

Paradogonas (2007) wrote on the financial performance of large and small firms: evidence from Greece. The paper attempts to specify possible differences in the main factors that determine a firm's profitability, using data from Greek manufacturing sector for 1995- 1999 period. The analysis used regression models and is performed on a longitudinal sample of 3035 firms, classified by size of employment. The econometric results indicate that size, managerial efficiency, debt structure, investment in fixed assets and sales affect significantly a firm's profitability.

According to Adelegan (2008) investment is of paramount importance for business cycle fluctuations and economic growth. It is not surprising that in Nigeria, depreciation, capital allowance and corporate income tax have changed repeatedly and investment tax credit (ITC) has been introduced in an effort to stimulate investment. Adelegan (2008) carried out a study to examine the link between tax and real investment and address the effect of the incentive and disincentive structures of different taxes on investment at the firm and industry level in Nigeria. The study adopts the neoclassical model that incorporated adjustment costs and tax parameters using a firm's level of industry level data

from 1984-2000. The study showed that adjusted tax cash flow, debt shield, and cost of capital have significant positive effects on investment, while marginal tax rates and interest expenses have significant negative effects on a firm's fixed investment.

Sayed and Hogue (2009) studied the impact of assets and liability management on profitability; a study on public versus private commercial banks in Bangladesh. According to them, banks' profitability is almost concern in modern economy. Banks are in a business to receive deposits or liabilities and to issue debt securities on the one hand and create or invest in assets on the other hand. Thus commercial banks incur cost for their liabilities and earn income from their assets. Thus profitability of banks is directly affected by management of their assets and liability. Their study examined how assets and liability management together with external variable such as degree of market concentration and inflation rate impact the profitability of selected commercial banks in Bangladesh. The study also dealt with the impact of Assets and Liability Management (ALM) on the profitability of the sixteen Bangladesh commercial banks classified into private and public. A modified Statistical Cost Accounting (SCA) model was applied to test whether the ALM of the private sector banks are better than public sector banks. The regression results show that the use of total income the dependent variable for private and public banks show evidence that all of the assets have significant contribution to total income of the private banks. The coefficients of all liabilities are insignificant. Six out of eleven independent variables have significant impact on total income to assets ratio of public sector banks. The co-efficient of assets are positive and significant whereas the coefficient of three out of the four liabilities is not significant implying that, like private banks, public banks are earning very nominal or zero return from these liabilities. The effect of the investment in fixed assets cannot be completely studied without mentioning the effect of depreciation on fixed assets.

Gautam (2008) reports that Indian stock market result for the first quarter of 2009 financial year did not reflect the combined impact that high interest rates and input cost had on companies sales and profitability. He however commented on the effect of high fixed cost on profitability. According to him, if a company's fixed portion of input costs remains high even when its sales are falling the profit margin will get depleted. In India, problems due to operating leverage (the balance between fixed and variable costs) will be higher because, in the last few years, companies have had a high fixed cost that was contributing towards higher margins.

Belgian Magazine (2009) analysis of SAB Miller 2009 performance shows that Revenue in the six months to September 2009 fell to USD8.85 billion from USD 11.17 billion while the net profit dropped to USD 973 million from USD 1.42 billion. Profit was hit by higher input costs and unfavourable foreign-exchange rates.

Svetlana and Aaro (2012) studied the impact of company's investment intensity on its return on assets. Svetlana and Aaro (2012) used regression analysis as the methodology on a sample of 8,074 companies in six European Union (EU) member states over a nine year period from 2001 to 2009. Contrary to some previous studies, they could not identify any strong negative (or positive) impact of investment intensity on future rate of return on assets.

3. Methodology Framework.

A cross sectional data was gathered for the analysis from the annual reports of the sampled brewery firms for a period of 1995 to 2009. The four brewery firms that constitute the sample were those quoted on the Nigerian Stock Exchange and their inclusion in the analysis is based on the availability of data for the sample period. The brewery firms that constitute the sample are: Nigerian Breweries Plc, Guinness Nigeria Plc and International Breweries Plc, Champion Breweries Plc.

The hypothesis that the level of investment in Fixed Assets does not significantly impact on the level of reported profit of brewery firms in Nigeria was tested for predictive association using multiple linear regression. In order to predict the dependent variable as accurately as possible, it is usually necessary to include multiple independent variables in the model. Multiple linear regressions allow researchers to test how well one can predict a dependent variable on the basis of multiple independent variables (Steve, 2011; Lani, 2009). The model is shown as:

$$OP = \alpha + \beta_1 TFA + \beta_2 IR + \beta_3 FER + \beta_4 COS + \varepsilon \dots\dots\dots(1).$$

Where:

Operating margin = Profitability Measure proxied as Operating Profit / Sales

α = a constant i.e the value of profit after tax when all the independent variables are zero.

$\beta_1, \beta_2, \beta_3, \beta_4$ = Regression slopes for the independent variables

TFA = Sales/ Net Fixed Assets

IR = Interest Rates

FER = Foreign Exchange Rate

Inv/COS = Inventory/Cost of Sale

ϵ = an error term normally distributed about a mean of 0. For purposes of computation, the ϵ is assumed to be 0.

The operating margin relates a company's operating income after depreciation to its sales. Operating income is a measure of the reward that a manufacturer earns for its functions (Leah, 2012). Operating margin is calculated as operating profit

$$\frac{\text{Sales}}{\text{Net Fixed Assets}} \dots\dots\dots(2).$$

The fixed assets turnover ratio is sales divided by net fixed assets (i.e depreciation value of fixed assets) (Pandey, 1981). A firm acquires plant and machinery and other productive fixed assets for the purpose of generating sales. Therefore, the efficiency of fixed assets should be judged in relation to sales. Generally, a high fixed assets turnover ratio indicates efficient utilization of fixed assets in generating sales, while a low ratio indicates inefficient management and utilization of fixed assets.

$$\text{Fixed assets turnover} = \frac{\text{sales}}{\text{Net fixed Assets}} \dots\dots\dots(3).$$

Firm profitability is affected by unfavourable foreign-exchange rates especially where factor inputs of production are largely imported.

Interest rate is a cost that must be paid for funds when firms employ debt financing as part of their capital structure. It can also be referred to as the price of credit. A cursory look at the sampled firms' balance sheet revealed that all the firms carry varying degree of debt. Debt financing is expected to enhance profitability while interest rate is expected to deplete earnings as it is applied to the profit and loss account. Therefore, the prime rate of interest as the lowest rate of interest charged by the Nigerian's leading banks on business loan is included as an independent variable.

The INV/COGS ratio measures the impact of inventory levels with respect to cost of goods sold on profitability. The sign of the coefficient of this variable cannot be predicted in advance. On the one hand, higher inventory levels are a drain on profitability. On the other hand, a manufacturer with higher inventory levels is also providing a valuable function and undertaking a risk that should enhance profitability (Leahy, 2012). INV/COGS variable is calculated as Inventory

$$\frac{\text{Inventory}}{\text{Cost of Goods Sold}} \dots\dots\dots(4)$$

4. Findings.

<Insert Table 1>

Table 1 gives details of the correlation between each pair of variables. The table reveals that all the predictor variables except interest rate have a positive relationship with the profitability or the predicted variable while interest rate has a negative relationship with the predictor variable. Fixed asset have a negative relationship with interest rate and having a positive relationship with foreign exchange rate and cost of sales. Interest rate has a negative relationship with foreign exchange rate and cost of sales while foreign exchange rate have a positive relationship with cost of sales.

<Insert Table 2>

Table 2 provides the R and R² value and shows that R = .964, which represents the simple correlation and shows the simple correlation at 96.4% and therefore, indicates a good degree of correlation. The R² value indicates how much of the dependent variable, profit, can be explained by the independent variables. In this case, 92.9% of the variation in the dependent variable can be explained by the predictor variables, and this is large. The Adjusted R² value tells us

that our model accounts for 92.6% of variance in the profitability of brewery firms in Nigeria.

<Insert Table 3>

T Table 3 reports the ANOVA, which assesses the overall significance of our model. As can be observed from the table, at a sum of squares of 2.303, degree of freedom of 79 ($n - 80$) and an F statistics of 247.171, our model is significant at $p = .000 < 0.05$.

<Insert Table 4>

The Beta value (standardized regression coefficients) is a measure of how strongly each predictor variable influences the criterion or predicted variable. The beta is measured in units of standard deviation. The Standardized Beta Coefficients gives a measure of the contribution of each variable to the model. A large value indicates that a unit change in this predictor variable has a large effect on the criterion variable. The table therefore suggests that fixed assets and interest rate have a positive relationship with profitability but is not statistically significant as the t values = .752 for FA and 1.503 for IT and < 2 . These results are not as their significance values are all > 0.05 . Foreign exchange rate has a negative relationship with profitability and is not significant. The cost of sale COS $t = 10.657$ and is > 2 . This result is positive and is statistically significant. The result is confirmed by the p value $.000 < 0.05$ and indicates that cost of sales impacts positively on profitability. The Coefficients in table 3 provides us with information on each predictor variable. This provides us with the information necessary to predict profit from independent variables. The regression relationship is thus stated: $PAT = -1523922.942 + .020_{FA} + 78848.020_{IT} - 20.602_{FER} + .287_{COS}$.

5. CONCLUSION.

The result of the tested hypothesis showed that the level of investment in fixed assets does not strongly and significantly impact on the level of reported profit of breweries in Nigeria. This result is in consonance with the findings of Svetlana and Aaro (2012) that used regression analysis as the methodology on a sample of 8,074 companies in six European Union (EU) member states over a nine year period from 2001 to 2009 and could not identify any strong negative (or positive) impact of investment intensity on future rate of return on assets. Svetlana and Aaro (2012) interestingly noted that several previous studies such as Abarbanell and Bushee (1997, 1998), Hennessy and Levy (2002), Beneish, Lee and Tarpley (2001), and Fairfield, Whisenant and Yohn (2003), among others have identified a rather strong negative relationship between investment intensity and profitability. Gautam (2008) found out that high fixed cost can deplete a company's profit especially if sales fall. The revelation that other variables do not have significant impact on profit after tax may be explained by the fact that companies probably adjust selling prices of their products to take care of changes in variable cost other than fixed cost. Secondly, there is a general trend to increased volume of production of goods in the companies. What this means is that all things being equal there is supposed to be a drop in the unit cost of production because of economy of scale. Given this phenomenon, any increase in interest rate, foreign exchange or investment in fixed may not have significant impact on profit. The study also shows that there is a direct relationship between cost of sale and profit. As the cost of sale increases the profit also increases. This may be due to the fact that the Brewery firms are in the habit of increasing the prices of their products frequently.

Conclusively, this study shows that investment in fixed asset does not have any strong and statistical impact on the profitability of brewery firms in Nigeria.

References

Adelegan, O. J (2008) Tax, Investment and Q: Evidence from firm and Industry level data in Nigeria. *International Research Journal of Finance and Economics Issue 16*. Euro Journals Publishing Inc. <http://www.eurojournals.com/finance.htm>. Retrieved on 5th June, 2011.

Ahmed, R. (2010). Nigerian Brewery Sector Brewing growth; malting value. Vetiva Capital Management Limited

Research Publication. www.vetiva.com. Accessed 05/06/2012.

Begian Magazine (2009) Beer Monopoly (On-line: [http://www.beermonopoly.net/news-dec 09.htm](http://www.beermonopoly.net/news-dec-09.htm)) Retrieved on 20th March, 2012.

Emekewue, P (2005). *Corporate Financial Management, 5th Revised Edition*, Kinshasa: African Bureau of Educational Sciences. 680 P.

Eriotis, N. P, Frangouli, A. Z and Neokosmides, Z. V (2000) Profit Margin and Capital Structure: An Empirical Relationship. *The Journal of Applied Business Research*, Volume 18 (285) 1 – 3.

Gautam, K. (2008) Important Tips for Stock Market Investors *Outlook Money*, November 24 Rediff Indian Abroad. (On-line: www.rediff.com) Retrieved on 20th February, 2011

Ibam How to Evaluate a Company before Investing. *Stock Exchange News Sat*. 22 March 2007 (On-line: freemanskrikesblogspot.com/.../how-toevaluate-company-be) Retrieved on 20th March, 2011.

Lani, J. (2009) Linear Regression Analysis and Logistic Regression Analysis, *Dissertation Statistic help* Thursday, January 8. (On-line: statisticsolutions.blogspot.com/2009/.../linear-regression-analy...). Retrieved on 4th August, 2011.

Leahy, A. S. (2012). The Determinants of Profitability in The Pharmaceutical Industry. *American Journal of Health Sciences* – First Quarter, Vol. 3, No. 1.

Mishra, C. S. and Gobeli, D. H. (2003). The Return on R & D versus Capital Expenditures in Pharmaceutical and Chemical Industries. *Engineering Management, IEEE Transaction* Vol. 50(2)141-150.

Nigerian Stock Exchange FactBook (2010). A publication of the Nigerian Stock Exchange.

Omolara (2006) Challenges of Brewery Industry in Nigeria on –Line: <http://www.Niarchitect.Org/downloads/category%20example/Malsc.Pdf>) Retrieved on the 13th day of December, 2011.

Pandey, I. M. (1999). *Financial Management Eighth Edition*. New Delhi: Vikas Publishing House PVT LTD. 1226P

Paradogonas, T. A. (2007). The Financial Performance of Large and Small Firms, Evidence From Greece. *International Journal of Financial Services Management Issues*, 2(1).

Sayeed. M. A. and Hogue, M. S. (2009). Impact of Assets and Liability Management on Profitability: A Study of Public vs Private Commercial Bank in Bangladesh. (On-line: www.wbicconpro.com/30%5B/%5D.pdf). Retrieved on

5th December, 2010.

Steve, A. (2011). Multiple Linear Regression Statistical Significant Consulting, LLC
 (Steve@StatisticallySignificantconsulting.com). Retrieved on 14th, October, 2010.

Svetlana and Aaro (2012) Does Investment Intensity Impact Company Profitability? A Cross- Country Empirical Study. *2nd International Conference on Economics, Trade and Development IPEDR* vol.36 IACSIT Press, Singapore

Table 1: Correlations

		PAT	FA	IT	FER	COS
Pearson Correlation	PAT	1.000				
	FA	.907	1.000			
	IT	-.107	-.117	1.000		
	FER	.287	.293	-.016	1.000	
	COS	.963	.932	-.161	.296	1.000

Source: Authors' SPSS computation.

Where: PAT = Profit After Tax; IT = Interest Rate; FER = Foreign Exchange Rate; COS = Cost of Sales.

Table 2. Model Summary^b

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R ² Change	F Change	df1	df2	Sig. F Change	
1	.964 ^a	.929	.926	1.47132E6	.929	247.171	4	75	.000	1.031

a. Predictors: (Constant), COS, IT, FER, FA

b. Dependent Variable: PAT

Table 3. ANOVA^b

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2.140E15	4	5.351E14	247.171	.000 ^a
	Residual	1.624E14	75	2.165E12		
	Total	2.303E15	79			

a. Predictors: (Constant), COS, IT, FER, FA

Table 2. Model Summary^b

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R ² Change	F Change	df1	df2	Sig. F Change	
1	.964 ^a	.929	.926	1.47132E6	.929	247.171	4	75	.000	1.031

a. Predictors: (Constant), COS, IT, FER, FA

b. Dependent Variable: PAT

Table 4. Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1523922.942	1213374.640		-1.256	.213
	FA	.020	.027	.064	.752	.454
	IT	78848.020	52457.234	.047	1.503	.137
	FER	-20.602	3848.632	.000	-.005	.996
	COS	.287	.027	.911	10.657	.000

a. Dependent Variable: PAT

This academic article was published by The International Institute for Science, Technology and Education (IISTE). The IISTE is a pioneer in the Open Access Publishing service based in the U.S. and Europe. The aim of the institute is Accelerating Global Knowledge Sharing.

More information about the publisher can be found in the IISTE's homepage:

<http://www.iiste.org>

CALL FOR PAPERS

The IISTE is currently hosting more than 30 peer-reviewed academic journals and collaborating with academic institutions around the world. There's no deadline for submission. **Prospective authors of IISTE journals can find the submission instruction on the following page:** <http://www.iiste.org/Journals/>

The IISTE editorial team promises to review and publish all the qualified submissions in a **fast** manner. All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Printed version of the journals is also available upon request from readers and authors.

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digital Library, NewJour, Google Scholar

