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# THE IMPACT OF FIRM SIZE ON FIRMS PERFORMANCE IN NIGERIA: A COMPARATIVE STUDY OF SELECTED FIRMS IN THE BUILDING INDUSTRY IN NIGERIA



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## ABSTRACT

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### Keywords

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The study examined the impact of firm size on firm's performance in Nigeria: A comparative study of selected firms in the building industry in Nigeria using annual data from 2004 to 2017. The technique used in the research work was panel analysis. Based on the financial measurement of performance using both return on assets (ROA) and return on equity (ROE), two out of the four variables used as an indicators of size were statistically significant in determine return on assets which are total sales and age of firm since incorporated and total sale has positive effect on return on assets while age of firm since incorporated has a negative effect on return on assets. Furthermore, it was observed that only leverage that was significant in determine return on equity. Based on productivity measurement of performance of the selected firms in the building industry in Nigeria using both output per labour and output per capital, also two out of the four variables used as an indicators of size were statistically significant in determine output per labour which are total sales and age of firm since incorporated and both have positive effect output per labour and total number of employee and leverage has a negative significant impact on output per labour. Also, only age of firm since incorporated as a measure of size that was significant in determine output per capital out of the four measurement of size and liquidity ratio has a positive significant effect on output per capital.

**Contribution/ Originality:** This study is one of very few studies which have investigated the impact of firm size on firm's performance in Nigeria from economics measurement of firm's performance. Performance indicators like return on asset (ROA) and return on equity (ROE) used by the past studies are accounting measurement but this study included economics measurement which are output per labour and output per capital to make this research work different from the existing literature. Also, total sales and total assets was used as proxies for measuring size but this study included two other variables which are number of employee and age of firm since incorporated.

## 1. INTRODUCTION

Size is observed as a major determinant of performance in any firm. It has always been the objectives of the firms to multiply in size in order to have an edge over their competitors. The positive relation between size and performance is theoretically explained by economies of scale. However, many firms while increasing in size are

having poor performance on yearly basis. The literatures reviewed identified the reason behind the negative connection between size and performance; Kouser *et al.* (2012) attributed the problem to the attainment of personal interest of firm managers. Maja and Josipa (2012) also highlighted the problem of substituting the motive of profit maximization of firms' with managerial utility maximization. Baumol (1959) concurred that larger firms can lead to increase co-ordination requirement which make managerial task difficult resulting to inefficiencies and lower profits. Moreover, Nigerian firms have a substantial size increase on yearly basis. This increase in size does not commensurate with their level of performance. For instance, Nigeria Wire and Cable made a negative profit between 2004 and 2013 having total assets and sales on the rise. The rationale behind this is decreasing returns to scale. Also, another factor that hinders the firm from having better performance is diseconomies of scale. It is pertinent in economic theory that as output grow, the average cost declines due to economies of scale of production. At a certain point when the economies of scale are exhausted, diseconomies of scale set in to influence the unit cost of production. The scenario here is that, as size increases the cost of production also rise causing performance to decline. Though, the way these affect performance varies across different firm sizes.

Therefore, this study is set to investigate the impact of firm size on firm's performance in Nigeria: A comparative study of selected firms in the building industry in Nigeria from 2004 to 2017. Moreover, the study will also look at the impact of firm size on financial performance of building firms in Nigeria and the impact of firm size on productivity performance of building firms in Nigeria.

## 2. STYLISED FACTS ABOUT THE SELECTED FIRMS IN THE BUILDING INDUSTRY IN NIGERIA

The selected firms in the building industry in Nigeria are Nigerian Wire and Cable Plc, Lafarge Africa Plc, Cement Company of Northern Nigeria Plc (CCNN), Nigerian Ropes Plc and Ashaka Cement Works. Their profile and products is depicted in Table 1 below but three of the selected firms (Lafarge WAPCO, Cement Company and Ashaka Cement Plc) engage in the production of cements while Nigeria Wire and Cable Plc and Nigerian Ropes Plc are dealing with wires.

Table-1. Firms Profile and Products

Firms	Year of Incorporation	Year of Listing	Products
Nigeria Wire and Cable Plc	1974	1995	Electrical and Telecommunication wires, nails and cables
Lafarge WAPCO	1959	1979	Cements
Cement Company	1962	1975	Cements
Nigeria Ropes Plc	1960	1978	Wire ropes, fibre and steel ropes, slings, chain sling assemblies and cargo net.
Ashaka Cement Plc	1974	1990	Cements

Source: Authors' Compilation and computation from Companies Annual Reports and Financial Statements

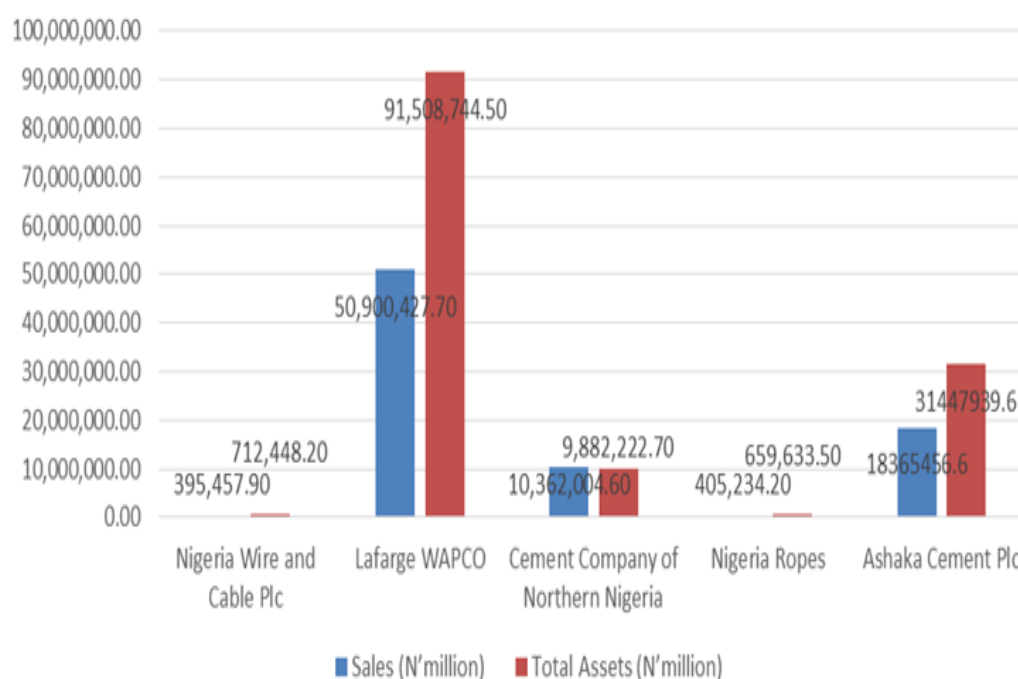
Also, average sale and assets of these selected firms over the period of 2004 – 2017 are depicted in Table 2 and Figure 1 below. On the average, Nigeria Wire and Cable Plc sales was ₦395,457.9 million and total asset was ₦712,448.2 million and also, Lafarge WAPCO sales was ₦50,900,427.7 million and total asset was ₦91,508,744.5 million on the average for the period of 2004 – 2017. In the same vein, Cement Company of Northern Nigeria recorded ₦10,362,004.6 million for its sale while it total asset was ₦9,882,222.7 million on the average. Furthermore, Nigeria Ropes Pls sales was ₦405,234.2 million and total asset was ₦659,633.5 million and that of Ashaka Cement Plc sales was ₦18,365,456.6 million and total asset was ₦31,447,939.6 million.

**Table-2.** Sales and Total Assets of the Selected Firms

Firm	Sales (₦million)	Total Assets (₦million)
Nigeria Wire and Cable Plc	395,457.9	712,448.2
Lafarge WAPCO	50,900,427.7	91,508,744.5
Cement Company of Northern Nigeria	10,362,004.6	9,882,222.7
Nigeria Ropes Pls	405,234.2	659,633.5
Ashaka Cement Plc	18,365,456.6	31,447,939.6

Source: Authors' Compilation and computation from Companies Annual Reports and Financial Statements

Going by figure 1, it could be observed that Lafarge WAPCO has the highest sales and total assets for the period selected and this was followed by Ashaka cement Plc and cement company of the Nigeria. The least company in terms of sales and total assets was Nigeria wire and cable Plc and it is followed by Nigeria Ropes Plc.

**Figure-1.** Sales and Total Assets of the Selected Firms

Source: Authors' Compilation and computation from Companies Annual Reports and Financial Statements

The trends analysis of selected firm's performance indicators were analyzed in Table 3 below. The firm's performance indicators include return on assets (ROA), return on equity (ROE) and total profits which are commonly used in the past literature but this research work includes the economic measurement of performance which are output per labour and output per capital. It was revealed that Nigeria wire and cable and Nigeria Ropes Plc recorded a negative profit within the period considered and this also affected their return on asset (ROA) and return on equity (ROE) which are negative as well but in terms of growth rate of output, both Nigeria wire and cable and Nigeria Ropes Plc recorded the highest growth rate with 1,416.26% and 164.68% respectively. Lafarge WAPCO Plc and Ashaka cement Plc has the highest output per labour and Ashaka cement Plc and Nigeria Ropes Plc has the highest output per capital.

Table-3. Selected Firm's Performance Indicators

Firms	Total Profits (₦million)	Return on Asset (ROA)	Return on Equity (ROE)	Growth Rate of Output	Output/Labour	Output/ Capital
Nigeria Wire and Cable	-198,337	-27.64	-117.48	1,416.26	435.45	0.03
Lafarge WAPCO Plc	9,389,546.1	9.31	8.36	37.16	181,716.68	0.31
Cement Company of Northern Nigeria	1,069,114.2	10.85	24.68	19.49	9,038.73	0.66
Nigeria Ropes Plc	-44,017.9	-6.46	-18.14	164.68	823.13	0.87
Ashaka Cement Plc	2,833,171.3	12.97	21.77	5.197	10,894.4	1.24

Source: Authors' Compilation and computation from Companies Annual Reports and Financial Statements

This is an indication that though Nigeria wire and cable and Nigeria Ropes Plc growth rate was on the increase but their total profit with return on asset (ROA) and return on equity (ROE) was not encouraging indicating that the firms are making losses within the period considered. Increase in output does not indicate that firm will make more profit if appropriate measure was not put in place.

### 3. LITERATURE REVIEW

Researches on the effect of organizational size on organizational profitability have generated mixed results ranging from those supporting a positive relationship among these variables to those opposing it. Additionally, under the same sample of the firms, this relationship may be positive over some firm size ranges and negative for others. Beside previously presented theoretical explanations, contradictory empirical results could be a result of different used samples, industry groups, time horizons, indicators and business environment. Due to all stated above, some of the studies will be subsequently presented together with their main empirical results. All the study in Nigeria showed that there is a positive relationship between size and firm's performance. [Akinyomi and Adebayo \(2013\)](#) examined the effect of firm size on the profitability of Nigerian manufacturing sector using Pearson product moment correlation coefficient and regression method. Panel data set over the period of 2005 - 2012 was obtained from the audited annual reports of the selected manufacturing firms listed in the Stock Exchange. Return on assets (ROA) was used as a proxy for profitability while log of total assets and log of turnover were used as proxies for firm size. Furthermore, liquidity, leverage and the ratio of inventories to total assets were used as the control variables. The results of the study revealed that firm size, both in terms of total assets and in terms of total sales, has a positive effect on the profitability of Nigerian manufacturing companies. Meanwhile, on the control variables, a negative relationship with inventory was obtained while others have positive relationship.

[Akinlo \(2010\)](#) investigated the long-run relationship and causality issues between firm size and profitability in 66 firms in Nigeria by using the panel co-integration method between 1999 and 2007. The empirical result showed that there was a long-run steady state relationship between firm size and profitability. The short-run causal relationship showed that there was a bidirectional relationship between size and profitability. This implied that firm size Granger causes profitability and profitability Granger determines firm size.

[Obehioye and Osahon \(2013\)](#) investigated the determinants of corporate profitability in developing economies using Nigeria as a case study. A panel data of 40 randomly selected companies covering a period of 5 years (2006 - 2010) was used for the study. In their work, return on assets was used to measure profitability while sales turnover was used to measure size. The ordinary least square regression method was utilized to determine the relationship between size and corporate profitability. The study deduces a positive relationship between the two variables.

Also, the study outside Nigeria showed a mixed results. The studies like [Denčić-Mihajlov \(2014\)](#) who examined the impact of firm structure determinants like firm size, liquidity, leverage, asset turnover and

institutional ownership on firm profitability during recession from 2008 – 2011 by using fixed effect regression analysis. Operating profit margin and return on total assets were used to measure profitability while sales growth is used to measure size. The result revealed that positive and significant relationship exists between size and profitability in Serbian listed companies. In the same vein, Doğan (2013) investigated the effect of firm size on profitability. In the study, data was collected from 200 companies in the Istanbul Stock Exchange between 2008 and 2011 using multiple regression and correlation method. At the end of the work, Dogan concluded that there exists a positive relation between size and profitability. That is, as firms in the Istanbul Stock Exchange (ISE) increase in size (total assets, total sales and number of employees), they have higher profits in terms of return on assets.

Also, Anila *et al.* (2011) examined the determinants of profitability of Pakistani firms, in which size is a major determinant by collecting data from 50 companies between 2006 and 2012 using ordinary least square regression method. Sales turnover was used as a measure of size in the study while return on equity and investments were proxies for measuring firm profits. The study observed a positive but insignificant impact of size on firm profitability. Vlachvei *et al.* (2008) examined the impact of firm level variables on the growth of firms operating in Greece from 1995 – 2000 by using a model of optimal firm size as a theoretical framework and ordinary least square dummy variable as the methodology for analyzing the data. The study was based on financial data of 178 manufacturing and trading firms, which are present in Greek Stock Market. Growth rate was defined in terms of the number of employees and sales. In the estimation of growth rate the study control for various factors characterizing the sample firms, their capital structure and performance. The results showed that the relationship between growth, size and the age of firms is very sensitive with respect to the methods of estimation and growth and size definitions.

Furthermore, Lafrance (2012) examined the relationship between ROA and the dispersion of earnings on an intra-group basis (within a size class) using the coefficient of variation in profit rates, and on an inter-temporal basis using the standard deviation in individual firms' rates of return over the period. The data used was obtained from Statistics Canada's T2- Leap Longitudinal firm-level database and the span of the research was between 2000 and 2009. Ordinary least square regression method was used to analyse the data. Both measures showed that the smallest firms had the highest variation in ROA. Firms in the medium size class, which have the highest ROA, tended to have relatively low variability in their rates of return. Intra-group variability in ROA was lowest for the largest firms. Halil and Hasan (2012) examined the effect of firm size on profitability, with evidence from Turkish manufacturing companies. The data for the study were retrieved from web sites of Istanbul Stock Exchange (ISE) and Public Disclosure Platform covering the period of 2005 - 2011 for the manufacturing firms listed in the ISE. All the firms that were present for the entire period of the study were considered in order to obtain a uniform panel. The firms that were on the Watch List Companies Market and have missing data were excluded from the data set. After this elimination a balanced data set of 143 companies was used, resulting and total sales were used as the proxies of firm size. Furthermore, liquidity, leverage and the ratio of inventories to total assets were considered as the control variables. According to the results, both in terms of total assets and in terms of total sales, firm size has a positive impact on the profitability of Turkish manufacturing companies.

Also, Niresh and Velnampy (2014) explored the effects of firm size on profitability for 15 manufacturing active companies in Colombo Stock Exchange (CSE) for the period from 2008 to 2012 using multiple regression and correlation method. Return on assets and net profit are the indicators of firm profitability in the study while total assets and total sales are size indicators. They found a weak positive relationship between firm size and profitability. Dashmash (2015) tested for size effectiveness on company profitability covering the period of 2005 – 2011. The data was collected from annual published financial data of Jordanian public companies listed on Amman Security Exchange. In the work, return on assets serves as an indicator for performance while natural logarithm of assets and revenue serve as an indicator for size. Unbalanced panel regression analysis was used to analyzed the

data and the findings revealed that a positive but insignificant relationship exist between size and company profitability.

In the same vein, [Maja and Josipa \(2012\)](#) examined the relationship between firm size and business success using fixed effect regression analysis by obtaining data from the website of Croatian Financial Agency and from Amadeus database. Since data were available only for medium size and large enterprises, only these enterprises were analyzed during the period of 2002 to 2010 financial year. The sample comprised of 2,050 firms per year, yielding a total of 18,492 observations for the period under consideration. In order to test the relationship between firm size and profitability in Croatian manufacturing industry, several different measures of firm's financial performance and firm size were employed. Financial performance measures used included return on assets, return on equity, profit margin, and earnings before interest and tax, earnings before interest, tax, depreciation and amortization. Meanwhile, firm size was measured by natural logarithms of firm assets and natural logarithms of number of employees. The results of the regression analysis conducted showed that firm size has a weak positive impact on firm profitability. [Becker-Blease et al. \(2010\)](#) examined the relation between firm size and profitability within 109 SIC four-digit manufacturing industries using partial regression analysis from 1987 - 2002. Depending on the measure of profitability, the study find out that profitability increases at a decreasing rate and eventually declines in up to 47 of our industries. No relation between profitability and size was found in up to 52 of our industries. The two categories account for 97 of our 109 industries. Profitability continues to increase as firms become larger in up to 11 industries.

Another study by [Vijayakumar \(2011\)](#) examined the impact of firm structure on firm profitability by examining some factors like firm size, growth, liquidity, leverage and the likes in Indian automobile companies. The data in the study was analysed using correlation and multiple regression method. Return on assets and logarithm of firm sales were used to measure performance and size respectively. The findings showed a positive relation between the two variables. Also, [Sritharan \(2015\)](#) examined the influence of firm's size on firm's profitability. The panel econometric technique was adopted on 30 listed Sri - Lankan companies of hotels and travels sector from 2008 - 2012. In the study, return on assets was used as a proxy for measuring profitability while log of sales was used to measure size. The result of the study showed that firm's size has positive impact on the return on assets which was the measure of profitability. Also the study showed a negative relationship between total debt ratio and profitability.

However some studies found a negative or weak negative relationship between size and firm performance. [Močnik and Širec \(2015\)](#) shed light on the factors like firm size, leverage ratio and labour costs that determine the profitability of a developing firm using a sample of 782 Slovenian fast growing firms. The study covered a span of 2 years (2008 - 2009) and the data was analysed using a combination of ordinary least square regression method and multiple least square dummy variable regression. Ratio of net income to assets and logarithm of total assets were used to measure performance and size respectively. The result from the findings showed a negative relationship between firm size and profitability. Likewise, [Kouser et al. \(2012\)](#) examined the relationship between firm size, growth and profitability of 70 non-financial companies in the Karachi stock exchange over a period of 2010 - 2010. A panel data regression technique was used to analyse the relationship between return on assets and natural logarithm of total assets. The result of the study revealed a less significant negative impact of size on profitability in Pakistani companies. Also, [Vintilă and Duca \(2013\)](#) examined the impact of firm size on the return on equity, a measure of firm performance. The research also examined whether larger firms are more profitable than other firm sizes using data for 100 firms listed in 2010 at the Bucharest Stock Exchange by using regression analysis method. Findings from the study showed a negative relation between total assets, total sales and return on equity.

Furthermore, [Tailab \(2014\)](#) analyzed the factors like leverage, liquidity inventory, growth, size and firm age that affect firm's performance using a sample of 100 top non-financial American firms listed on Fortune 500 for a

period between 2009 – 2013. The data was analyzed using multiple regression. The result of the study showed a negative significant impact of leverage, inventory, growth and age on performance while liquidity and size in terms of total sales have a positive significant effect on the profitability of U.S firms.

Lastly, Velnampy and Nimalathasan (2010) examined the relationship between firm size and profitability of Bank of Ceylon and Commercial Bank of Ceylon Ltd in Sri Lanka within 1997 - 2006 using Pearson correlation analysis. In the work different criteria like sales, the number of branches, number of depositors and number of advances were used to measure size. The proxies for profitability were net profit, operating profit, return on investment, return on equity, return on average assets and return on average shareholder. The study find a positive impact of firm size on profitability in the commercial bank of Ceylon while there was no effect of size on profitability in the bank of Ceylon.

In conclusion, total sales and total assets was used as proxies for measuring size but this study will include two other variables which are number of employee and age of firm since incorporated to make it different from the past work. Also, performance indicators like return on asset (ROA) and return on equity (ROE) used by the past studies are accounting measurement but this study will include economics measurement which are output per labour and output per capital.

#### 4. THEORETICAL FRAMEWORK AND METHODOLOGY

##### 4.1. Theoretical Framework

The theoretical framework for this research work is based on the technological theory of returns to scale. Returns to scale emerged from the firm’s production function. It explains how output increase relative to increase in inputs in the long-run. In microeconomic theory, the returns to scale faced by firm are technologically imposed and not determined by the market conditions. Technological theories lay emphasis on physical capital and economies of scale to determine size which by implication determines profitability. It focuses on the production process and the investment in physical capital (inputs) needed to produce output. Increasing economies of scale gives room for accumulated fixed costs to be spread over large volumes of output. This will later leads to a decrease in average production cost and increasing return on invested capital, thereby increasing the size of firm. The relationship between the two is due to economies of scale.

$$\text{Profitability} = f(\text{PhysicalCapital \& TotalAsset}) \dots \dots \dots (1)$$

However, at a certain point, economies of scale will cease to exist. At this point, increase in physical capital to produce more output is no longer beneficial. The major reason why profitability falls as firm expand under technological theories is due to diseconomies of scale.

##### 4.2. Methodology

###### 4.2.1. Model Specification and Estimation Techniques and Data Requirement and Source

In order to measure firm’s performance both accounting and economics measures will be used. The accounting measure of firm’s performances are return on asset (ROA) and return on equity (ROE) while economic measure of firm’s performances are output per labour and output per capital. Therefore, four models will be specified.

$$\text{ROA} = f(\text{TA, TS, K, L, LEV, LIQ \& AGE}) \dots \dots \dots (2)$$

$$\text{ROE} = f(\text{TA, TS, K, L, LEV, LIQ \& AGE}) \dots \dots \dots (3)$$

$$\text{Q/L} = f(\text{TA, TS, K, L, LEV, LIQ \& AGE}) \dots \dots \dots (4)$$

$$Q/K = f(TA, TS, K, L, LEV, LIQ \& AGE) \dots \dots \dots (6)$$

Where ROA = Return on Asset (Net Income/Total Assets), ROE = Return on Equity (Net Income/Total Owners' Equity), Q/L = Output per Labour (Output/Labour), Q/K = Output per Capital (Output/Capital), TA = Total Asset (₦million), TS = Total Sales (₦million), K = Capital, L = Number of Employee as a measure of labour, LEV = Leverage (percentage), LIQ = Liquidity (percentage) and AGE = Age of firm since incorporated (years).

Hence, the linear regression model was specified as follows:

$$ROA = \beta_0 + \sum_{K=1}^n \beta_1 TA_{K-1} + \sum_{K=1}^n \beta_2 TS_{K-1} + \sum_{K=1}^n \beta_3 K_{K-1} + \sum_{K=1}^n \beta_4 L_{K-1} + \sum_{K=1}^n \beta_5 LEV_{K-1} + \sum_{K=1}^n \beta_6 LIQ_{K-1} + \sum_{K=1}^n \beta_7 AGE_{K-1} + e \dots \dots \dots (6)$$

$$ROE = \beta_0 + \sum_{K=1}^n \beta_1 TA_{K-1} + \sum_{K=1}^n \beta_2 TS_{K-1} + \sum_{K=1}^n \beta_3 K_{K-1} + \sum_{K=1}^n \beta_4 L_{K-1} + \sum_{K=1}^n \beta_5 LEV_{K-1} + \sum_{K=1}^n \beta_6 LIQ_{K-1} + \sum_{K=1}^n \beta_7 AGE_{K-1} + e \dots \dots \dots (7)$$

$$Q/L = \beta_0 + \sum_{K=1}^n \beta_1 TA_{K-1} + \sum_{K=1}^n \beta_2 TS_{K-1} + \sum_{K=1}^n \beta_3 K_{K-1} + \sum_{K=1}^n \beta_4 L_{K-1} + \sum_{K=1}^n \beta_5 LEV_{K-1} + \sum_{K=1}^n \beta_6 LIQ_{K-1} + \sum_{K=1}^n \beta_7 AGE_{K-1} + e \dots \dots \dots (8)$$

$$Q/K = \beta_0 + \sum_{K=1}^n \beta_1 TA_{K-1} + \sum_{K=1}^n \beta_2 TS_{K-1} + \sum_{K=1}^n \beta_3 K_{K-1} + \sum_{K=1}^n \beta_4 L_{K-1} + \sum_{K=1}^n \beta_5 LEV_{K-1} + \sum_{K=1}^n \beta_6 LIQ_{K-1} + \sum_{K=1}^n \beta_7 AGE_{K-1} + e \dots \dots \dots (9)$$

Therefore,  $\beta_0$  is the intercept coefficient and the slope coefficients in the models are  $\beta_1 - \beta_7$ .

Since the study deals with panel data of different firms variables that is data collected at different points in time. The econometric test of panel data analysis on both fixed effect and random effect will be employed. Model can be estimated using a fixed-effect (FE) estimator or random effect (RE) estimator. In order to apply appropriate estimator the research work performed the Hausman specification test (test that examines if the individual effects are uncorrelated with the other regressors in the model) whose results (significant p-value) indicated that fixed-effect (FE) model is more appropriate than the random effect (RE) model. Therefore, the research work applied fixed-effect estimator. Data were obtained from annual reports and financial statements of the selected building company in Nigeria with random sample of 5 firms listed in the Nigeria Stock Exchange.

## 5. EMPIRICAL RESULTS AND DISCUSSIONS

The effect of firm size on firm's performances will be analysed base on financial (accounting measure) and productivity (economic measure) performance of firms and this are depicted in Table 4 and 5 below.

As it can be seen from the Table 4, two out of the four variables used as an indicators of size were statistically significant in determine return on assets which are total sales and age of firm since incorporated and total sale has positive effect on return on assets while age of firm sine incorporated. This implies that the higher the total sales, the more will be the performance of the selected firms in the building industry in Nigeria while age of firm since incorporated will reduce return on assets by 1.29%.



Table-4. Effect of Firm Size on Financial Performance of Firms

Variables	Fixed Effect (FE) Model			
	ROA		ROE	
	Coefficients	p-value	Coefficients	p-value
TA	-4.0800	0.452	2.4700	0.680
TS	5.8200	0.024**	4.4900	0.987
K	2.0200	0.710	-2.0400	0.735
L	-.0043	0.764	0.0105	0.948
LEV	-7.7941	0.275	163.2306	0.043***
LIQ	8.5171	0.023**	51.5664	0.203
AGE	-1.2913	0.016**	-5.6473	0.327
CONS_	52.1015	0.022**	30.9068	0.899
R <sup>2</sup>	0.4148		0.1202	
F-Stat.	3.85 (0.0030)*		0.74 (0.6386)	
Observation	70		70	

Source: Author's Computation from Stata12

Notes: \* Statistical significance at 1% level; \*\* Statistical significance at 5% level; \*\*\* Statistical significance at 10% level.

Liquidity ratio which was used as one of the control variables was also significant in determine the return on assets of the selected firms indicating that one percentage increase in liquidity ratio will bring about 8.52% increase in return on assets of the selected firms. The result shows that total assets have an insignificant negative influence on return on assets and by implication, if firms in the Nigeria building industry increases their number of assets, earnings from their assets decline while total sales have a significant positive influence on return on assets and the more their sales, the more will be their tendency to increase their earnings from assets. Also, the R<sup>2</sup> of 0.4148 implies that only 41.48% variation in return on assets can be explained by all the explanatory variables while the F-statistics of 3.85 with a p-value of 0.0030 implies that the overall model is statistically significant at 1% level of significant. Based on the result of return on equity, it was observed that only leverage that was significant in determine return on equity and therefore, a percentage increase in leverage will bring about 163.23% decrease in return on equity. Therefore, the more the firms in the building industry used the fund borrowed to purchase asset, the lower will be their return on equity. None of the four variables of size was statistically significant indicating that size is insignificant in determine return on equity of the selected firms in the building industry in Nigeria. Total assets and sales have an insignificant positive impact on the return on equity and there positive effect shows that as firms in the Nigeria building industry have higher assets and sales, the profits generated from the money shareholders invested increases. Lastly, the R<sup>2</sup> of 0.1202 implies that only 12.02% variation in return on equity can be explained by all the explanatory variables while the F-statistics of 0.74 with a p-value of 0.6386 implies that the overall model is statistically insignificant at all level of significant.

Table-5. Effect of Firm Size on Productivity Performance of Firms

Variables	Fixed Effect (FE) Model			
	Q/L		Q/K	
	Coefficients	p-value	Coefficients	p-value
TA	-0.0002	0.194	3.190008	0.394
TS	0.0003	0.000*	1.530008	0.377
K	0.0002	0.315	-4.350008	0.249
L	-12.1257	0.012**	.0004809	0.628
LEV	-5831.203	0.014**	.3258778	0.505
LIQ	1518.107	0.195	.4330591	0.087***
AGE	375.1518	0.028**	-.0926225	0.012**
CONS_	-3710.049	0.601	3.505131	0.025**
R <sup>2</sup>	0.6928		0.2983	
F-Stat.	12.24 (0.0000)*		2.31 (0.0460)**	
Observation	70		70	

Source: Author's Computation from Stata12

Notes: \* Statistical significance at 1% level; \*\* Statistical significance at 5% level; \*\*\* Statistical significance at 10% level.

From Table 5, also two out of the four variables used as an indicators of size were statistically significant in determine output per labour which are total sales and age of firm since incorporated and both have positive effect output per labour. Therefore, total sale and age of firm since incorporated can boost productivity (output per

labour) of selected firms in the building sector in Nigeria. Also, labour that is the total number of employee and leverage which is the fund borrowed to purchase asset has a negative significant impact on output per labour. This result is not suppressing because the more the number of employment without proper management will lead to decrease in output which will affect output per labour. Also, if the interest rate charged on the fund borrowed to purchase asset (leverage) increases, the amount of output per labour will fall. Also, the  $R^2$  of the model was 0.6928 implies that only 69.28% variation in output per labour can be explained by all the explanatory variables while the F-statistics of 12.24 with a p-value of 0.0000 implies that the overall model is statistically significant at all level of significant. On the other hand, only age of firm since incorporated as a measure of size that was significant in determine output per capital out of the four measurement of size. Also, liquidity ratio has a positive significant effect on output per capital implying that a percentage on liquidity ratio will bring about 0.087% increase in output per capital of the selected firms in the building industry in Nigeria. Lastly, the  $R^2$  of the model was 0.2983 implies that only 29.83% variation in output per capital can be explained by all the explanatory variables while the F-statistics of 2.31 with a p-value of 0.0460 implies that the overall model is statistically significant at all level of significant.

## 6. SUMMARY AND CONCLUSION

The study examined the impact of firm size on firm's performance in Nigeria: A comparative study of selected firms in the building industry in Nigeria. The selected firms used in the building industry are Nigeria Wire and Cable plc, Lafarge WAPCO plc, Cement Company of Northern Nigeria, Nigeria Ropes and Ashaka Cement plc. The annual data from 2004 to 2017 was collected from companies' annual reports and financial statement on key variables for firm's size and performance which are return on asset, return on equity, output per labour, output per capital, total asset, total sales, capital, number of employees, leverage, liquidity and age of the firm. The technique used in the research work was panel analysis using both fixed and random effects and the Hausman test indicated that fixed-effect (FE) model is more appropriate than the random effect (RE) model. The effect of firm size on firm's performances was analysed base on financial (accounting measure) and productivity (economic measure) performance of firms. Based on the financial measurement of performance using both return on assets (ROA) and return on equity (ROE), two out of the four variables used as an indicators of size were statistically significant in determine return on assets which are total sales and age of firm since incorporated and total sale has positive effect on return on assets while age of firm since incorporated. Also, liquidity ratio which was used as one of the control variables was also significant in determine the return on assets of the selected firms. Furthermore, it was observed that only leverage that was significant in determine return on equity. Based on productivity measurement of performance of the selected firms in the building industry in Nigeria using both output per labour and output per capital, also two out of the four variables used as an indicators of size were statistically significant in determine output per labour which are total sales and age of firm since incorporated and both have positive effect output per labour and total number of employee and leverage has a negative significant impact on output per labour. Also, only age of firm since incorporated as a measure of size that was significant in determine output per capital out of the four measurement of size and liquidity ratio has a positive significant effect on output per capital.

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