Capital Structure and Firm Performance among the listed Agro-Allied Firms in Nigeria

Noah OLASEHINDE and Olanrewaju YUSUFF

Department of Economics, University of Ibadan, Nigeria

Email: lanfaithfulness@hotmail.com

Abstract

The study empirically investigated the effect of capital structure on firm performance among agro-allied firms listed on the Nigerian Stock Exchange from 2003 to 2017. Pooled OLS, random effect and fixed effect regressions were used to analyse the data. Performance was measured by return on investment, return on assets and earnings per share while capital structure was captured by leverage and equity finance. Equity finance was found to have a significant effect on returns on investment and assets while leverage impacted earnings per share. Also, firms' growth and age were positively related to performance while size had an inverse relationship. Therefore, firms should adopt an efficient equity-debt ratio that significantly improves performance over a specific production period.

Keywords: Agro-allied; Capital structure; Earnings per share; Firm performance

Introduction

Agriculture remains an indispensable component of the Nigerian economy and is considered to be the pillar of growth and development of the country's economy (Olorunwa, 2018). It has also played an extensive role in improving economic development over the years. According to Vink (2014), one of the major important criteria for food availability in Africa is agricultural production per capita, whether this is in the form of total

output, disaggregated commodity type such as field crops horticulture and livestock, or by region, or whether food items are considered separately. The agriculture sector is estimated to employ more than 60% of the country's working population and contributes immensely as a source of food for the teeming Nigerian populace (Babalola and Babalola, 2013). Indeed, the importance of agriculture to industrial and economic growth is critical. Beyond the production of food, the agricultural sector in Nigeria doubles as a source of livelihood for many small and medium-scale farmers in the country (Olorunwa, 2018). Agricultural production also serves as ancillary to other sectors of the economy, including hotel industry, carriage and transport, and feed production (Afzal and Khan, 2017).

Despite the high rate of return associated with agriculture, the performance of agro-allied firms in Nigeria is still constrained by several factors including imperfections in the market for credit, which makes it difficult and costly for farmers to access loans needed to finance production (Ugwu, 2009). According to Bauman, McFadden and Jablonski (2018), the asset turnover ratio is a farm's ability to create gross sales effectively and thus, the strong financial performing operations could be a result of different strategies which entail the decision to lease or own resources. As Benjamin and Phimister (2002) observed, the information asymmetry that characterizes imperfect credit markets implies that credit providers base their lending decisions on the availability of collateral even when it seems profitable to lend to farmers. However, specialized agricultural credit institutions exist, both private and state-owned, that provide credit in many developing countries (Benjamin and Phimister, 2002). High competition for funds provided by such institutions do little to alleviate the scarcity of capital for investment in agribusinesses and agro-allied firms. The implication of the debt-equity mix for firm performance has been widely investigated in the literature (Chowdhury and Chowdhury, 2010; Oladeji, Ikpefan & Olokoyo, 2015).

Available empirical evidence is mixed. In a review of past studies, it was found that a highly leveraged firm that finances its operations with more debt than equity enjoys tax reductions on interests earned on debt and this constitutes a real addition to the firm's value (Cekrezi, 2013). On the other hand, higher debts imply higher bankruptcy risk which induces shareholders to expect higher returns and thus increase the cost of financial distress (Abeywardhana, 2017). In the same vein, higher equity financing

leads to a higher expected rate of return on equity by shareholders and therefore higher cost of equity. Hence, firms are believed to strive towards optimum leverage or a debt-equity mix that maximizes firm performance and value (Cekrezi, 2013). Contrary to this view, some scholars have argued that the value and performance of a firm will not be related to its choice of finance source provided imperfections do not exist in the capital market (Modigliani and Miller, 1958).

In Nigeria, one of the most prominent sectors driving the growth of the economy is the agricultural sector despite the production hurdles that significantly stifle the performance of the sector (Olorunwa, 2018). With an estimated population of 195.9 million in 2018 and an annual population growth rate of 2.6 percent (Olasehinde, 2018), the demand for agricultural products in Nigeria is quite high and continues to grow. Aside from rapid population growth, the high demand has also been attributed to its high protein quality and content (Heise, Crisan & Theuvsen, 2015). Aromolaran, Ademiluyi and Itebu (2013) identified inadequate capital due to limited financial opportunities as a major cause of the deficient agricultural production in the country. Also, Olorunwa (2018) identified a poor capital base as one of the major setbacks impeding poultry farming in Nigeria along with ineffective traditional disease management approaches and economic inefficiency.

Given these issues, it is clear that access to favourable channels for raising debt and availability of adequate equity are likely have significant implications for the performance of the listed agro-allied firms in Nigeria despite their enormous potentials. It is therefore expedient to make empirical inquiry into the financing of the firms and its implication for the performance of the agricultural sector in Nigeria. Therefore, this study examines the relationship between capital structure and performance of agro-allied firms in Nigeria from 2003 to 2017. The period was chosen basically for data availability. The study is divided into five sections. The second section presents the structure of the agricultural sector in Nigeria while the third section discusses the methodology adopted for the study. In the fourth section, the empirical results and discussion are presented and the fifth section concludes and outlines policy recommendations based on the findings of the study.

Structure of the Agricultural Sector in Nigeria

Agriculture has always been a mainstay of the Nigerian economic system. The country is blessed with abundant resources which supports agriculture, with an estimated land of about 91 million hectares out of which 81 million hectares are fertile enough for production. This rich soil is accompanied with adequate rainfall and humid temperature (Ayoola 2001). About 22% of these hectares of land is typically available for permanent pasture and livestock production. Agriculture has always been a major employer of labour engaging approximately 75% percent of Nigerians. The Nigerian agricultural sector is currently made up of four major sub-sectors: crop production, livestock, fishery, and forestry. Table 1 contains each sub-sector and its products while Figure 1 shows the sectoral contribution to GDP.

Table 1: Components of the agricultural sector in Nigeria

S/N	Components	Products
1	Crop Production	Yam, cassava, onions, cotton for textile industries, melon, beans, rice, wheat, sugarcane, oranges, potatoes, etc.
2	Livestock	Poultry, cattle, pig, rabbit, goat, horse, etc.
3	Fishery	Cyprinus carpio, Tilapia spp., Clarias spp., etc.
4	Forestry	Timber, medicinal plant, firewood, cuttings, decorative wood, etc.

Source: Compiled from Olomola and Nwanfor (2018)

In 1981, agriculture contributed about 15.5% to total real GDP in Nigeria. The upward trend continued up till 1988 when the contribution peaked around 20% and declined to about 18% in 1990. The increased attention given to the sector at the onset of democratic governance in the country in 1999 ensured that it contributed about 27% in 2002. The contribution oscillated between 23% and 25% in 2018. A close look at the sector (Figure 2) confirms that the sector was mainly driven by crop production for almost four decades.

The contribution of crop production to GDP which stood at 78.4% in 1981 steadily increased to 89.9% in 2017 while the contribution of the other sub-sectors kept shrinking. The contribution of livestock reduced from 14.4%

in 1981 to 7.0% in 2017, forestry reduced from 3.3% in 1981 to 1.0% in 2017 while fishing diminished from 3.8% in 1981 to 2.1% in 2017.
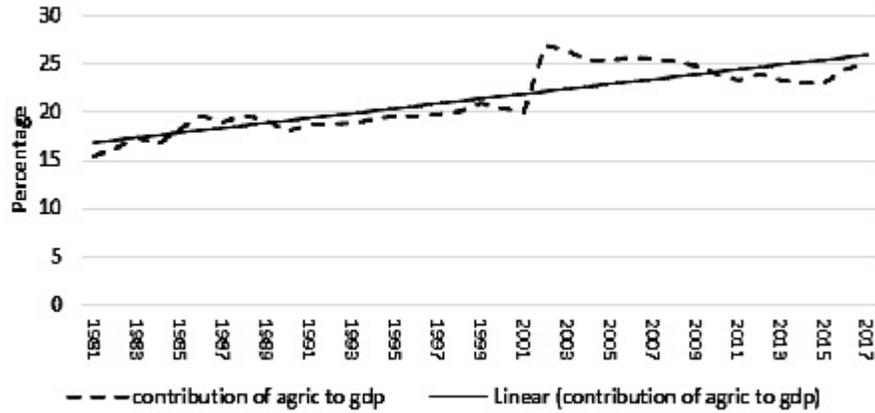

Figure 1: Contribution of agriculture to GDP in Nigeria.

Source: Drawn from underlying data from CBN (2018).

Figure 2: Agriculture sub-sectoral contribution of GDP in Nigeria.

Source: Drawn from underlying data from CBN (2018).

Methodology

Model and estimation technique

This study adopts the trade-off theory of capital structure since the major postulation of the theory is based on the equi-marginal principle that equates the marginal benefit of debts to marginal costs in order to maximize any capital structure decisions made by firms and organizations. The tradeoff theory, according to Shyam-Sunder and Myers (1999), states that at a low leverage level, firm performance is high and at high-level leverage, firm performance is low. This implies that a positive relationship exists between low leverage and firm performance while a negative relationship exists between high leverage and firm performance. This relationship between leverage and firm performance as described by the tradeoff theory was further expressed by Coricelli et al. (2012) to be non-monotonic and thus characterized by an inverted U-shaped relationship.

Within the framework of Margaritis and Psillaki (2010) and following the tradeoff theory, this study adopted three different measures of agro-allied firms in Nigeria – return on investment (ROI), return on assets (ROA), and earnings per share (EPS). Thus, the empirical models adopted for the study are presented as follows:

$$ROI_{i,t} = \beta_1 + \beta_2 LEV_{i,t-1} + \beta_3 LEV_{i,t-1}^2 + \beta_4 lnE_{it} + \beta_5 lnP_{it} + \beta_6 lnS_{i,t} + \beta_7 A_{i,t} + \mu_{it} \quad (1)$$

$$ROA_{i,t} = \beta_1 + \beta_2 LEV_{i,t-1} + \beta_3 LEV_{i,t-1}^2 + \beta_4 lnE_{it} + \beta_5 lnP_{it} + \beta_6 lnS_{i,t} + \beta_7 A_{i,t} + \mu_{it} \quad (2)$$

$$EPS_{i,t} = \beta_1 + \beta_2 LEV_{i,t-1} + \beta_3 LEV_{i,t-1}^2 + \beta_4 lnE_{it} + \beta_5 lnP_{it} + \beta_6 lnS_{i,t} + \beta_7 A_{i,t} + \mu_{it} \quad (3)$$

where:

$ROI_{i,t}$ =   return on investment for firm *i* in year *t*

$ROA_{i,t}$ =   return on assets for firm *i* in year *t*

$EPS_{i,t}$ =   earnings per share for firm *i* in year *t*

$LEV_{i,t-1}$ =   leverage type adopted by firm *i* in year *t*-1

E_{it} =   equity finance for firm *i* in year *t*

$A_{i,t}$ =   age of the firm *i* in year *t*

$S_{i,t}$ =   size of the firm for firm i in year t

P_{it} =   profit of the firm for firm i in year t

ln   =   natural logarithms of variables

μ_{it} =   captures the error term of firm i in year t

Equations 1, 2 and 3 are non-linear regression models formulated to capture the tradeoff theory that postulates that the relationship between firm performance and leverage is not monotonic. Also, time lags are included because the impact of leverage on firm performance or efficiency is not expected to be immediate and instantaneous (Margaritis and Psillaki, 2010).

The ordinary least squares (OLS), fixed effect and random effect estimation techniques were adopted to estimate the models. The OLS was adopted since it endeavours to limit the impact of inalienable stochasticity in the regressand to deliver appraisals of parameters of connections that depict the watched information precisely and accurately (Koutsoyiannis, 1978). According to Gujarati and Porter (2010), the OLS is a system that is broadly desirable for the alleged wanted properties of its parameters such as unbiasedness, effectiveness, and consistency. The fixed effect estimation technique has a unique advantage because it allows for heterogeneity and estimates the impact of this heterogeneity in the dataset (Gujarati and Porter, 2010). The random effect estimates on their part are a good representation of the population because it is assumed that data used are a sample from the population (Hsiao, 2014). However, the Hausman test was used to select the appropriate model between the fixed effect and random effect estimates.

The Hausman test is usually adopted to choose the appropriate model between random effect and fixed effect. The null hypothesis under the Hausman test specifies that the random effect model is the appropriate model since it is more efficient while the alternative hypothesis specifies that fixed effect model is appropriate because it is more consistent (Greene, 2012). Also, the Breusch-Pagan LM test was conducted to determine the appropriateness of the random effect and the pooled OLS regressions. The null hypothesis in the LM test is that variances across entities are zero, which implies that there is no significant difference across units, that is, no panel effect.

Data and sources

The study included all publicly-quoted agricultural firms operating in Nigeria. The spread of the firms covers the four sub-sectors – livestock, crop production, fishing and forestry. Table 2 presents the firms, their date of establishment and the dates when they were enlisted on the Nigerian Stock Exchange (NSE).

Table 2: Agro-allied firms, date established and date enlisted

S/N	Names of Selected Firms	Date Established	Date Enlisted
1.	FTN Cocoa Processors PLC	26 August 1991	26 August 1991
2.	Flour Mills of Nigeria PLC	01 January 1979	14 August 1979
3.	Dangote Flour Mills Nigeria PLC	01 January 2006	04 February 2008
4.	Okomu Oil Palm PLC	11 March 1991	11 March 1991
5.	Nestle Nigeria PLC	25 September 1969	20 April 1979
6.	Unilever Nigeria PLC	04 November 1923	01 January 1973
7.	Presco PLC	10 October 2002	10 October 2002
8.	Livestock Feeds PLC	20 March 1963	01 April 1978
9.	Cadbury Nigeria PLC	09 January 1965	09 January 1965
10.	Nascon Allied Industries PLC	30 April 1973	20 October 1992
11.	Nigeria Flour Mills PLC	29 October 1971	29 October 1971

Source: Authors' compilation from The Nigerian Stock Exchange website

http://www.nse.com.ng/issuers/listed-securities/listed-companies)

Description of variables

This study adopted three different types of dependent variables to capture firm performance; these are ROI, ROA, and EPS. Also, leverage and equity finance, taken as the independent variables, captured the capital structure of the firms, while other covariates were included as control variables. Detailed description and definition of the variables are presented in Tables 3 and 4.

Table 3: Description and measurement of variables

Variables	Measurement	Definition	Reference
	Dependent Variables		
Firm Performance	Return on Investment (ROI)	$\dfrac{\text{Net Profit after Tax}}{\text{Total Assets}}$	Chinaemerem and Anthony (2012)
	Return on Assets (ROA)	$\dfrac{\text{Net Income}}{\text{Total Assets}}$	Khodavandloo, et al. (2017)
	Earnings Per Share (EPS)	$\dfrac{\text{Net Profit after Tax}}{\text{No. of Ordinary Shares}}$	Chowdhury and Chowdhury (2010)
	Independent Variables		
Capital Structure	Leverage (LEV)	$\dfrac{\text{Total Debt}}{\text{Total Asset}}$	Margaritis and Psillaki (2010)
	Equity Finance (E)	$\dfrac{\text{Total Equity}}{\text{Total Asset}}$	Abor (2007)
	Control Variables		
Firm Age	Age of the Firm (A)	Years of Operation from Inception.	Margaritis and Psillaki (2010)
Size of firm	Size of the Firm (S)	Firm Sales	
Profit of firm	Profit of Firm (P)	Net Profit after Tax	Anwuyo-Vitor and Badu (2012)

Source: Authors.

Table 4: Definition of the variables and a priori expectations

Variable	Discussion	A priori
Lag of Leverage	Leverage is the debt to total asset ratio and it was lagged because financial decisions of agricultural firms take time to have effect on production, following the cobweb model.	The apriori expectation according to the tradeoff theory is positive (+)
Lag of Leverage square	The lag of leverage is squared in order to capture the non-monotonicity effect of leverage on firm performance according to the tradeoff theory	The a priori expectation according to the tradeoff theory is negative (-)
Equity	According to La Porta et al (2002), equity finance is important in the performance model because it is more likely to have a positive effect on firm performance.	The a priori expectation according to Margaritis and Psillaki (2010) **is** (+)

Variable	Discussion	A priori
Profit	Profit measure by after tax returns to firms is important to determine the level of performance among agro-allied firms	The a priori expectation of profit to performance is positive (+)
Size	Size, measured by firm sales, is a determinant of firm performance, it is expected that a higher sales level will improve financial performance.	The a priori expectation of firm size to performance is positive (+)
Age	Age, measured by years of operation from inception, represents the 'experience' of a firm and it is expected that experience will improve financial performance.	

Source: Authors.

Results and Discussion

This section contains the empirical analysis on how capital structure affects the performance of agro-allied firms in Nigeria following the process outlined under the methodology section. Table 5 gives the descriptive statistics of the firms and the data comprises samples of firms listed in Table 2.

Table 5: Descriptive Statistics

Variables	OBS	Mean	SD	Skewness	Kurtosis
ROI	152	0.115	0.223	6.749	65.241
ROA	152	0.115	0.223	6.760	65.396
EPS	152	104.501	336.105	3.901	29.909
LEV	152	0.091	0.093	2.109	10.052
EqFinance	152	0.504	0.451	-0.647	26.289
Profit/million	152	33.084	258.721	8.600	75.361
Size/million	152	39.670	60.889	2.657	10.970
Age	152	40.684	20.152	0.798	3.591

Source: Authors' computation using STATA 12.

On the average, the performance of the listed agro-allied firms was similar using ROI and ROA (mean = 0.115) and this value is very low when compared to EPS (mean = 104.5). For capital structure, equity finance appears to be much higher than leverage on average. The growth of the

industry stood at about ₦33 million on the average while the average size was about ₦39 million. The industry is averagely above 40 years old. However, the distributions were positively skewed except for equity finance that had a negative skewness. Also, positive kurtosis indicates peaked distribution.

Leverage and equity finance of listed agro-allied firms in Nigeria

The average leverage of listed agro-allied firms in Nigeria over the period of analysis is presented in Figures 3 to 7; each figure represents an average of three years. From Figure 3, Cadbury had the highest leverage with a leverage value of 0.256 between the year 2003 and 2005. This implies that the percentage of total debt out of total assets for Cadbury was approximately 25.6% and therefore, the most dominant among the firms during the time period. This was closely followed by Nascon with an average of 0.172 while the firm with the lowest average leverage was Nigeria Flour Mills.

Between the year 2006 to 2008, Dangote Flour Mills had the highest leverage with a leverage value of about 0.139 which implies that the total debt out of total assets for Dangote is about 13.9% and therefore the most dominant firm during the time period. This was closely followed by Livestock Feeds with an average of about 0.1266 while the firm with the lowest leverage was Unilever Nigeria PLC.

Dangote Flour Mills maintained its dominance among the agro-allied firms in Nigeria in terms of leverage during the period 2009 to 2011 with an average leverage value of about 0.2044, which implies that the percentage of total debt out of total assets for Dangote Flour Mills during the time period was approximately 21.44%. Other firms average leverages were far below that of Dangote but closely equal. However, Livestock Feed Mill followed Dangote with an average leverage value of about 0.105 while Nascon went from highest between 2006-2008 to the lowest between 2009 to 2011.

Similarly, Dangote Flour still dominated the sector between the years 2012 and 2014, with a leverage value of about 0.204. This implies that the percentage of total debt out of total assets between the time period is approximately 20.4% making it the most dominant firm, followed by Nestle with an average value of leverage of about 0.176 while Okomu Oil Palm Plc had the lowest average leverage level of 0.002. The generally low level of

leverage during the period 2008 to 2011 largely reflects the global economic meltdown of the period which made it difficult for agricultural firms to use leverage to finance their production and business.
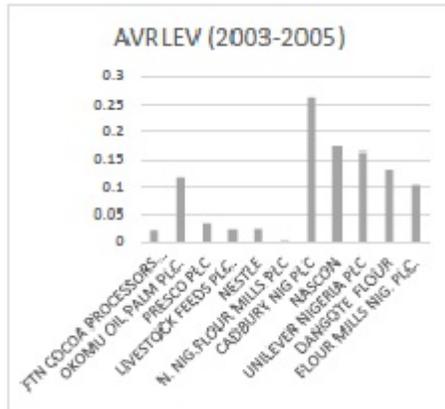

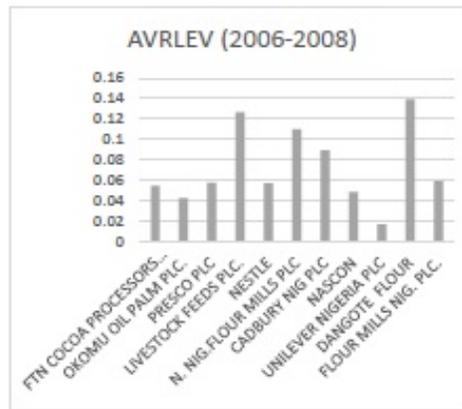**Figure 3: Average leverage value of listed agro-allied firms (2003-2005)**

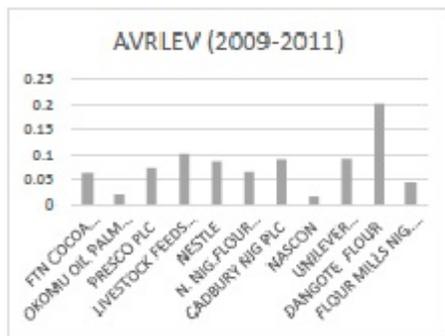**Figure 4: Average leverage value of listed agro-allied firms (2006-2008)**

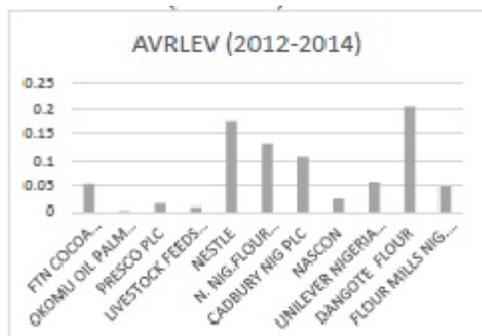**Figure 5: Average leverage value of listed agro-allied firms (2009-2011)**

Figure 6: Average leverage value of listed agro-allied firms (2012-2014)

Between the year 2015 to 2017, the general average value of leverage of agro-allied firms in Nigeria improved. The dominant firm during this time period was Nestle with an average leverage value of about 0.437 which implies that the percentage of total debt out of total assets for Nestle was about 43.7%, Okumu and Flour Mills Nigeria Plc followed closely in terms of their average leverage values of 0.219 and 0.216 respectively. PRESCO

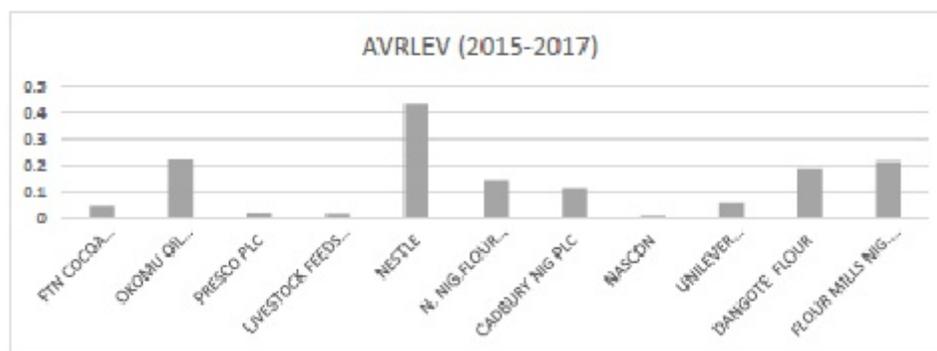Livestock Feeds (0.014) and NASCON (0.001) had the lowest average leverage level during the time period.

Figure 7: Average leverage value of listed agro-allied firms (2015-2017).

Source: Drawn by the authors with underlying data from NSE Fact Book (2003-2017).

      Figures 8 to 12 present the average equity finance of the listed agro-allied firms in Nigeria over the period of analysis.

      Dangote Flour and Flour Mills Nigeria Plc had the highest value of equity ratio finance for the period 2003 to 2005, with a value of 1 each (see Figure 8). This implies that Dangote and Flour Mills financed their operations mostly by equity finance. They were followed closely by Okomu Oil with an average equity finance ratio of about 0.8799 which implies that approximately 88% of Okomu finance was funded by the shareholders of the firm during the time period. However, FTN Cocoa had the lowest level of equity finance ratio with an average of about 0.0654.

      Dangote Flour Mills continued its dominance among the agro-allied firms in Nigeria in terms of equity finance ratio during the period 2006 to 2008 (Figure 9) with an average equity finance value of 1 which implies that Dangote financed their operation mostly by equity finance. Flour Mills followed Dangote closely with an equity finance ratio of about 0.766 which implies that approximately 76.6% of Flour Mills finance was funded by the shareholders of the firm during the time period. And Cadbury had the lowest equity finance ratio of a negative equity finance ratio of -0.016.

      Between 2009 and 2011, Dangote Flour Mills still maintained the dominance in terms of equity finance ratio with a value of 1 (Figure 10),

although it was matched by Livestock Feeds Plc. which also had a value of 1. They were followed by NASCON with an equity finance ratio of about 0.574 which implies that approximately 57.4% of NASCON finance was funded by its shareholders. FTN Cocoa had the lowest equity finance ratio with a value of 0.0653.

Dangote solely continued its dominance in terms of equity finance ratio during the years 2012 to 2014 (see Figure 11). It was followed by Livestock Feeds Plc while Unilever had the lowest equity ratio in terms of finance. Figure 10 also depicts an equity finance ratio chart where Dangote Flour Mills dominated, followed closely by Okomu with an equity ratio of about 0.74, which implies that about 74% of the finance of Okomu was by its shareholders. FTN Cocoa remained at the bottom of the ladder with the lowest equity finance ratio of about 0.054 during the period 2015 to 2017.
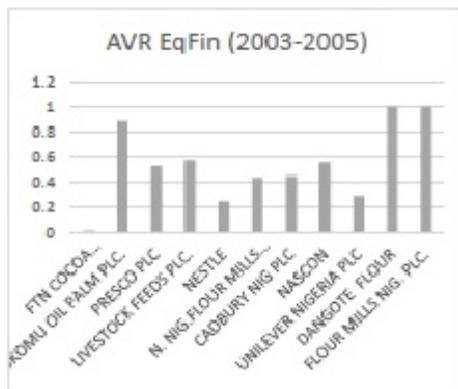

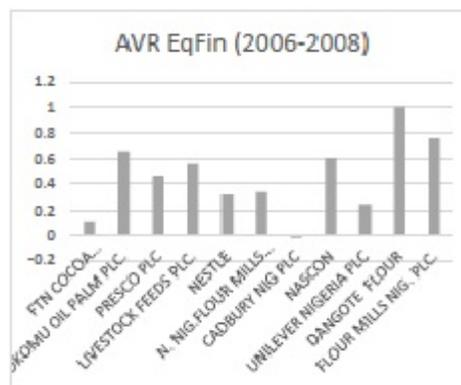**Figure 8: Average equity finance of listed agro-allied firms (2003-2005).**

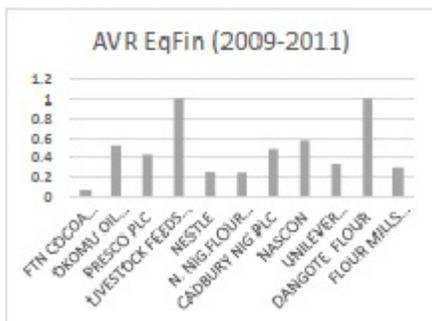**Figure 9: Average equity finance of listed agro-allied firms (2006-2008).**

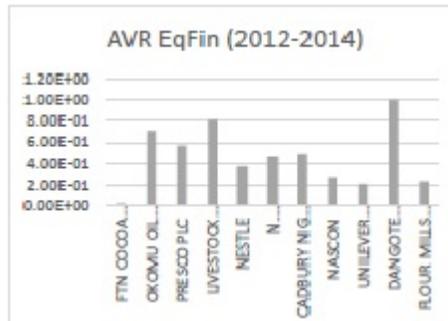**Figure 10: Average equity finance of listed agro-allied firms (2009-2011).**

Figure 11: Average Equity Finance of listed agro-allied firms (2012-2005).
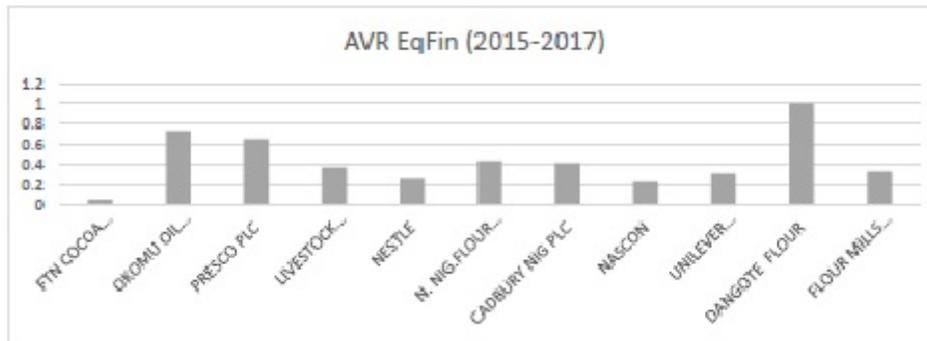
Figure 12: Average equity finance of listed agro-allied firms (2015-2017).

Source: Drawn by the authors with underlying data from NSE Fact Book (2003-2017).

Empirical Results and Discussion

Empirical results from the estimation of equations 1 to 3 are contained in Table 6. These include the pooled OLS, the fixed and the random effects results. Data was collected for 2003 to 2017 to allow for sufficient lagged structure to resolve the identification and endogeneity problems in the empirical specification of the models. It also contains the results of both the Hausman and LM tests. The result of the Hausman test shows that the fixed effect model is inappropriate for all models while the LM test reveals the appropriateness of pooled OLS for both the ROI and ROA models while the random effect is suitable for the EPS model, though each model is significant (as confirmed by each F-statistic). Moreover, measures of capital structure have differential effects on the measures of firm performance in public agro-allied industries in Nigeria.

Table 6: Results of Agro-allied Firms' Performance Regression Models

Method: Panel Least Square	*Sample:* 2003-2017	*Total Panel:* Unbalance
Dependent variables: **ROI**	**ROA**	**lnEPS**
POOLED OLS		
l_LEV	-0.446 (0.88)	-0.442 (0.87)	3.912 (0.86)
l_LEV_SQ	1.827 (1.29)	1.821 (1.28)	-17.210 (1.38)
EqFinance	0.160 (2.91)***	0.160 (2.90)***	-0.571 (0.83)
lnSize	-0.080 (4.15)***	-0.080 (4.15)***	0.480 (2.87)***
lnProfit	0.055 (4.35)***	0.054 (4.34)***	0.047 (0.43)

Method: Panel Least Square	*Sample:* 2003-2017		*Total Panel:* Unbalance
Dependent variables:	**ROI**	**ROA**	**lnEPS**
Age	0.003 (2.49)**	0.003 (2.48)**	-0.067 (6.62)***
_cons	0.508 (2.02)**	0.511 (2.03)**	-2.222 (1.00)
Observation	117	117	109
F statistic	6.71***	6.69***	8.47***
Adj R-squared	0.23	0.23	0.29
FIXED EFFECT			
l_LEV	-0.540 (0.99)	-0.538 (0.99)	5.929 (1.97)*
l_LEV_SQ	1.422 (0.92)	1.417 (0.92)	-7.628 (0.89)
EqFinance	0.098 (1.52)	0.097 (1.50)	0.882 (1.71)*
lnSize	-0.179 (4.67)***	-0.180 (4.69)***	-0.017 (0.08)
lnProfit	0.080 (5.07)***	0.080 (5.09)***	0.343 (3.89)***
Age	-0.002 (0.44)	-0.002 (0.45)	0.010 (0.50)
_cons	2.029 (3.58)***	2.041 (3.60)***	-2.412 (0.76)
Observation	117	117	109
F statistic	8.14***	8.16***	4.40***
R-squared Overall	0.15	0.16	0.01
RANDOM EFFECT			
l_LEV	-0.446 (0.88)	-0.442 (0.87)	5.856 (1.95)*
l_LEV_SQ	1.827 (1.29)	1.821 (1.28)	-10.044 (1.20)
EqFinance	0.160 (2.91)***	0.160 (2.90)***	0.840 (1.64)
lnSize	-0.080 (4.15)***	-0.080 (4.15)***	0.042 (0.21)
lnProfit	0.055 (4.35)***	0.054 (4.34)***	0.331 (3.79)***
Age	0.003 (2.49)**	0.003 (2.48)**	-0.009 (0.55)
_cons	0.508 (2.02)**	0.511 (2.03)**	-2.491 (0.86)
Observation	117	117	109
Wald Chi-square	40.25***	40.12***	25.39***
R-squared Overall	0.27	0.27	0.09
Hausman Chi-square	9.28	9.66	7.99
Breusch-Pagan Lagrangian Chi-square	0.00	0.00	96.29***

Absolute value of t(or z)-statistic in parenthesis; * $p<0.1$; ** $p<0.05$; *** $p<0.01$

Source: Author's computation from STATA 12

The pooled OLS regression shows that equity finance is the only capital structure that has a significant and direct effect on ROI as a measure of firm performance. In specific terms, a unit increase in equity finance increases ROI by 16%. The age of the firms and their growth also have a positive and significant effect on ROI while industry size was inverse and significantly related to ROI. The pooled OLS result also shows that equity finance has a positive significant effect on ROA as a measure of firm performance. Similar to what obtained under ROI, a unit increase in equity finance increases ROA by 16%. The results of other covariates are the same as obtained under ROI; all the variables are jointly significant. Using earning per share as a measure of performance, the random effect regression showed that the effect of leverage on firm performance is positive and significant. On average, if leverage increased by a unit in the public agro-allied industry in Nigeria, it would increase EPS by approximately 5.856% holding. This is similar to the findings of Njagi et al. (2017).

In summary, the results revealed that equity finance, the growth of firms and the age of firms have positive significant effects on the performance of agro-allied firms while firm size has a negative significant effect on performance when return on investment and return on asset are used to measure performance. Only leverage and growth of firms are positively and significantly related to firm performance as measured by earnings per share among public agro-allied firms in Nigeria.

Conclusion

This study examined capital structure and firm performance among public agro-allied firms in Nigeria. Capital structure was measured by leverage and equity finance while firm performance was measured by ROI, ROA and EPS. Findings from the empirical analysis indicate that equity finance was a major determinant of ROI and ROA while leverage was for EPS. The implication of this is that firms are at high risk of bankruptcy through the cost of financial distress consistent with high total debt to total assets which affects performance negatively.

Firms should adopt an efficient equity-debt level ratio that improves performance significantly over the production period. However, there should be proper management of resources so as not to expand beyond the minimum efficiency scale level as this would have a negative effect on firm performance. Moreover, firms should focus on growth as well as increasing

net profit after tax as this would have a positive impact on firm performance as well as firm survival and industry growth. Government should provide loans to agro-allied firms to enable them finance their production activities as the ROI and ROA models predict. However, as has been demonstrated that high total debt to total asset ratio inhibits performance as the EPS model predicts, adequate measures should be put in place by government to regulate loans for optimal performance of the agro-allied industry.

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