

Analysis of the Determinants of Capital Structure: Evidence from Unlisted Agro-Based Firms in Nigeria 2005-2010

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Abstract: The study furthers evidence of capital structure theories in developing countries by investigating the determinants of capital structure of a sample of 60 unquoted agro-based firms in Nigeria. Data collected through a multi-stage random sampling for the period 2005-2010 were analyzed using the Ordinary Least Square (OLS) regression and descriptive statistics. The result revealed that only growth and educational level of firms' owners were significant determinants of both long and short-term debt ratios. While asset structure, age of firms, gender of owners and export status impacted significantly on long-term debt ratios, only business risk, size and profitability of firms were major determinants of short-term debt ratio for the firms under investigation. This, therefore, informed the need to pursue policies that would encourage asset accumulation, promote exportation, address gender inequality and reduce business risk as policy measures.

Keywords: Debts; long- term, short- term

1. Introduction

The pivotal role of capital in corporate sector growth and the overall economic development of Less Development Countries cannot be undermined. All kinds of business firms either directly or indirectly involved the acquisition and use of funds. These funds are at times required for the procurement of both tangible and intangible real assets (Pandey, 1999), as well as meeting the daily expenditure of the firms. These real assets in the form of plant, machinery and furniture are crucial for the survival of the firm. As a result, agro- investment managers are often confronted with financial decisions as to what constitute the optimum capital requirement of their firm. Even though required capital for business start-up may be suggested by feasibility study report, decisions pertaining to the source and composition of such capital posed crucial challenges to firms.

Undoubtedly, one of the greatest problems facing agro- allied investors in Nigeria is how to finance their operations. Raising funds to finance the firm's investment is an important function of the financial manager. To achieve this objective and ensure all round liquidity of fund for firms, agro financial managers employ a combination of both debt and equity in its finances. Thus, the combination of this financial mix reflects the capital structure of the firm. An optimal capital structure is itself one where the mix of this proportion creates a financial structure for a company to maximize its potential value (Owualah, 1998). Appropriate capital structure is a critical decision for any business organization. The decision is important not only because of the need to maximize

returns to various organizational constituencies, but also because of the impact such a decision has on an organization's ability to deal with its competitive environment (Simerly & Li, 2002).

Study on capital structure in developing countries has increased tremendously for several reasons. First, the rate at which capital is borrowed has serious implication on the earning capacities of businesses (Pandey, 1999). Secondly, corporate financing decisions have been found to be associated with a wide range of policy issues (Abor, 2008). This invariably, affects certain macro and micro economic variables like security price and interest rate determination and regulation, capital market development, corporate government and company development (Green, Murinde, & Suppakitjarak, 2003) as well as profitability, exchange rate and inflation rate stability.

In spite of these, numerous studies on capital structure in developing countries still utilized data from developed countries. For instance, Rajan and Zingales (1995) used data from G-7 countries.; Bevan and Danbolt, (2002) used data from the UK; Antoniou, Guney, and Paudyal (2002) used data from the UK, Germany and France while Hall, Hutchinson, and Michaelas (2004) utilized data from Thailand. Few available ones in the literature which adopt data from developing countries do not even agree on the basis of their findings. Studies on capital structure in Nigeria are few. Ezeoha (2010) used fixed effect panel regression technique to examine whether industry specific factors played a more significant role in financing decisions of firms than firm specific characteristics. His findings revealed that highly profitable firms used fewer debts while highly tangible firms used more long term debts. Iwarere and Akinleye (2010) used chi square and mean score to examine the factors considered in choosing appropriate amount of equity and debt capital in Nigerian banking sector. From the outcome of their study, credit rating, volatility of earning, cash flow, financial distress, transaction cost and financial flexibility were the major factors in choosing appropriate amount of debt for banks. Among the factors liable for making equity a major source of capital for expansion included ownership structure, management control line, growth opportunities, profitability, issuing costs and tax economics associated with debt financing. Also, Simon-Oke and Afolabi (2011) adopted the panel regression method to examine the impact of capital structure on industrial performance of five quoted firms from 1999-2007. The study revealed a positive relationship between firm's performance and equity finance and debt equity ratio. It also revealed a negative relationship between firm's performance and debt financing. However, none of these studies done in Nigeria have considered the agro-based sector independently considering the central position occupied by this subsector in addressing rural hunger and ensuring economic development. It is therefore, imperative for agro financial managers and firms in developing countries to be able to find out the appropriate financial mix that would ensure the continuous survival and profitability of the firms, if she is to continuously generate employment and income in terms of profit, dividend and wages to household and foreign exchange to the government as well as being up to date with regards to their discharge of corporate social responsibilities. Consequently, this study investigates the determinants of capital structure of unlisted agro-based firms in Nigeria.

2. Research Methodology

2.1 The Study Area

The study was carried out in Nigeria which is part of the African countries that are situated in West Africa. It lies between Latitudes 4° and 14° North and Longitudes $2^{\circ}21'$ and $14^{\circ}30'$ East of the Greenwich Meridian. It has a total population of 140,003,542 (National Population Commission [NPC], 2006) and land area of approximately 923,708sq km (Federal Office of Statistics [FOS], 1989). Of this, arable land account for 31%, permanent crops 3%, meadows and pasture 23%, forest and woodland 15%, others 28% with total irrigated land of 8,650sq km (Central Intelligence Agency [CIA] World Factbook 2007 estimate). In terms of 1993 estimate, the Federal Ministry of Environment of Nigeria [FMEN] (2001) put Nigeria's irrigated land at 9,570km² and arable land

about 35%, pasture 15%, forest reserve 10%, settlement 10% and the remaining 30% uncultivable. Location wise, the country has a total boundary of 4047Km and borders the Gulf of Guinea and lies between Benin in the South West 773Km, Cameroun to the South East 1690km, Niger in the North 1,497km and Chad 87km.

2.2 Sampling Methodology

The study employed multi stage sampling techniques for selecting the firms. The first stage involved the selection of three geopolitical zones out of the existing six in the country. The selected geopolitical zones were South South, South West and South East. The second stage involved the selection of one State each from the three geopolitical zones. These States were Lagos State (South West), Abia State (South East) and Rivers State (South South), Kano (North West), Jos (North central). The third stage entailed selecting ten (10) agro-allied firms from each of the States except Lagos where twenty was selected due high concentration of agro-based industries in the State, making a total of sixty (60) agro-based firms through which information were collected.

2.3 Data Collection

Sixty large unquoted agro-based firms (SMEs) were sampled from the Register of Small and Medium Scale Enterprises Development of Nigeria (SMEDAN) based on our ability to access their financial statements. Data used for the study were gotten from the financial statements of these firms during the period 2005-2010. Other information such as gender of firm owners, educational qualification, and nature of business were obtained with the aid of an interview schedule.

2.4 Data Analysis

Ordinary Least Square (OLS) regression analysis was used to analyze those variables that affect short and long-term debt ratios. The generalized form of the multiple regression models is specified as;

$$Y = \alpha + \sum \beta X + \epsilon \dots \quad (1)$$

Where

Y = Leverage of the firms and represents the dependent variable in the model i.e the firm debt ratios.

α is the constant intercept of the equation.

β represents the coefficients for the explanatory variables in the estimated model.

X is the vector of explanatory variables in the estimation model.

ϵ is the error term.

\sum is the summation sign.

Accordingly, the empirical investigation model for the unquoted agro-based firms is given as follows:

$$\text{LDR} = \beta_0 + \beta_1 \text{PRFT} + \beta_2 \text{AST} + \beta_3 \text{SZ} + \beta_4 \text{GWT} + \beta_5 \text{TX} + \beta_6 \text{OWN} + \beta_7 \text{AGE} + \beta_8 \text{DIV} + \beta_9 \text{RSK} + \beta_{10} \text{EDU} + \beta_{11} \text{FRM} + \beta_{12} \text{EXP} + \beta_{13} \text{GEN} + \epsilon \dots \quad (2)$$

$$\text{SDR} = \beta_0 + \beta_1 \text{PRFT} + \beta_2 \text{AST} + \beta_3 \text{SZ} + \beta_4 \text{GWT} + \beta_5 \text{TX} + \beta_6 \text{OWN} + \beta_7 \text{AGE} + \beta_8 \text{DIV} + \beta_9 \text{RSK} + \beta_{10} \text{EDU} + \beta_{11} \text{FRM} + \beta_{12} \text{EXP} + \beta_{13} \text{GEN} + \epsilon \dots \quad (3)$$

Where

LDR = long term debt ratio for the firm (i.e long term debt/ equity +debt)

SDR = short term debt ratio for the firm (i.e short term debt/ equity+ debt)

PRFT = Profitability: Proxied by the ratio of earnings before interest and taxes (EBIT) to the book value of total assets for the firm

AST = Asset structure of the firm. This was measured by the ratio of tangible fixed assets to total assets for firm

SZ = size of firm measured by the natural log of total assets

AGE = number of years in business

GWT = Growth rate in total sales for firm measured by the percentage change in the value of assets of firm i in time

TX = The ratio of Tax paid to operating income for firm

DIV = Dividend payable as a proportion of operating income for the firm: proxied as a ratio of dividend to total income available to shareholders. It is taken here to imply only cash and not stock

FRSK= Absolute coefficient of variation in earnings before interest and tax i.e $\frac{\partial \text{EBIT}}{\mu \text{EBIT}}$

Where ∂EBIT = expected earnings before interest and tax

μEBIT = the standard deviation of earnings before interest and tax

EDU = Education measured as a dummy (1 if CEO has a degree or professional Qualification, otherwise 0)

Gender = Constructed as a dummy (1 if male owned, otherwise 0)

FRM = Form constructed as a categorical variable (0 if firm is solely owned, 1 if Partnership,2 if limited liability,3 if public corporation)

EXP = Export constructed as a binary (1 if owner is engaged in export, otherwise 0)

GEN = Gender constructed as a dummy (1 if male owned, otherwise 0)

ϵ = the error term.

Additionally, the Z-statistics was used to find the statistical significance of the independent variables. It enables us to determine the contribution of each independent variable to the dependent variable.

3. Findings and Discussions

3.1 Descriptive Statistics of Agro-Allied Firm's Variables

The descriptive statistics for the various explanatory variables for unlisted agro-based firms are presented in Table 1. Results revealed an average long and short- term debt ratios of 0.1651 and 0.5044. The firms had a mean fixed asset and profitability values of 64.4 and 28.65 percents.

The firms further recorded a dividend payout of 0.0971 and mean growth rate of 25.3. Further, the firms had a mean risk and tax rates of 1.5048 and 33.23 percent with mean age of 8.5 years.

The table also showed that while about 76.7 percent of Chief Executive Officers of these firms had a degree or professional qualification, 80 percent of the sampled agro firms were male owned.

While about 73.3 percent of the firms under investigation engaged in export, majority of the sampled firms were limited liability companies (68.4%), followed by sole proprietorship (23.5%) and partnership (8.3%).

Table 1. Descriptive statistics of variables for unlisted agro-based firms

Variable	Mean	Std Dev	Min	Max	No. of observation
Long term debt ratio	0.1651	0.2714	0.0000	1.0101	60
Short term debt ratio	0.5044	0.1553	0.0965	0.8740	60
Size	22.6267	4.6361	10.4211	29.6246	60
Asset structure	0.6441	0.2232	0.0032	0.9972	60
Profitability	2.8653	2.9800	0.0000	8.8470	60
Dividend	0.0971	0.2640	0.0000	0.7174	60
Growth	2.5336	4.0639	0.2440	14.3041	60
Tax	0.4504	0.2487	0.0023	0.8980	60
Age	8.5883	3.9849	2.0000	18.5000	60
Risk	1.5048	1.8360	0.1117	9.3004	60
Education	0.7667	0.4265	0.0000	1.0000	60
Gender	0.8000	0.4034	0.0000	1.0000	60
Export	0.7333	0.4459	0.0000	1.0000	60

Form : Sole proprietorship = 23.3%,
Partnership = 8.3%,
Limited liability = 68.4%

Source: Author's computation

3.2 Determinants of Short Term Debt Ratios of Unlisted Agro-Allied Firms

Table 2 present the estimates of the short- term debt ratio equations in the Nigerian unlisted agro-based firms. Of the four functional forms that were used to run the regression, the linear form was chosen as the lead equation due to the results of the diagnostic tests and the number of significant independent variables. The result of the diagnostic test for the lead equation revealed the R^2 value of 0.753, which indicated that the specified explanatory variables explain about 75.3 percent of the total variability in the short term debt ratio. The F-statistics value of 11.06 was significant at 1 percent level of probability, showing the significance of the estimated R^2 and the goodness of fit of the estimated model. Both normality and RESET tests were significant at 5 percent, depicting the appropriateness of the ordinary least square regression technique. It also shows that the functional form is not mis- specified.

The empirical result revealed that the profitability variable had a significant negative relationship with short term debt ratio at 10 percent level of probability. This indicated that highly profitable firms do not depend on short- term debts for their finances. Arguably, highly profitable unlisted firms will prefer internal financing because of their inability to access debts. Highly profitable firms are perceived to be liquid enough to finance their new investment opportunities. This support the pecking order theory (POT) which suggest that firms will prefer internally generated funds and would only seek for costly external financing after their internal sources have been depleted. This finding is consistent with Abor (2008), Ezeoha (2011), Chen and Strange (2005), Esperança, Gama, and Gulamhussen (2003) and Hall *et al.* (2004).

The estimated coefficient for size was significant and positively related to short term debt at the 1 percent probability level, implying that larger sized firms used more short term debts. Large sized firms are considered by debt providers to possess high tangible assets that can be confiscated should they default, hence, are given short term trade credits than their smaller sized counterparts. Also, smaller firms find it more costly to resolve information asymmetries with lenders. As a result, they are either offered less capital or offered capital at higher costs than larger firms. Similar findings were made by Al-Sakran (2001), Abor (2008) and Chen and Strange (2005).

In terms of asset structure, the estimated coefficient revealed a negative relationship with short term debt ratio. This showed that firms with highly tangible assets do not depend on short term debts for their finances. With such tangible assets, they prefer to go for long terms debt. This negative relationship is justified by Um (2001) to be consistent with an equity agency cost explanation. According to him, if a firm's level of tangible assets is high, management for monitoring cost reason may choose a low level of debt to mitigate equity agency cost. Arguably, firms with high tangible assets will prefer to use such assets for long term debts at the expense of short term debt. This finding lend credence to those of Abor (2008), Teker, Tasseven, and Tukul (2009) Michaelas, Chittenden, and Poutziouris (1999), Hall *et al.* (2004), Jordan, Lowe, & Taylor (1998). It also contradicted studies like Buferna, Bangassa, & Hodgkinson (2005) and Esperança *et al.* (2003), who reported a positive relationship between asset structure and short term debt ratio.

The growth variable was found to be positive and significantly related to short term debt ratio at 1 percent level of probability, implying that any increase in the growth of the firm would increase their use of short term debts. This might be attributed to the huge capital requirement for financing the firm's growing investment opportunities. Since growing firms do not have enough tangible assets to secure long term debts nor accumulated retained earnings, it is expected to depend more on short term debts. This findings support Michaelas *et al.* (1999) who argued that future growth opportunities is positively related to leverage, in short term debts. According to their findings, the agency cost and cost of financing is reduced if the firm issues short term debts. Also, given their limited operating history, growing firms are not always acquainted with cheap long term debt providers and hence, tend to be heavily dependent on short term debts due to difficulty in securing long term debts. This finding support Buferna *et al.* (2005) in Libya, Jordan *et al.* (1998). It is also at variance with Al-Sakran (2001).

The empirical evidence further revealed that the coefficient for firm's risk was negative and significant at 1 percent probability level, implying that firms which undertake risky investments do not depend on short term debts. They tend to prefer long term finances so as to reduce unnecessary short term debt repayment pressure on them. Another justification for this inverse relationship is that they may avoid taking more debts so as to reduce excessive debt repayment pressure. This is true because the more firms undertakes risky investments, the greater their incentive to reduce their debt level. This finding is consistent with those of Fred and Lang (1988) . It also contradicted Jordan *et al.* (1998), Michaelas *et al.* (1999), Esperança *et al.* (2003) and Abor (2008) who reported a positive relationship between business risk and short term debts.

Also, form of business, taxation, and export status as well as dividend payout were negatively related to short- term debt ratio. The negative coefficient for dividend supports the bankruptcy cost theory. It can also be argued that firms with high dividend payout are liquid enough to finance her short term financial obligations at the expense of borrowing and hence, used lower short- term debts. The negative coefficient of taxation might be that unlisted firms which are worst hit by illegal taxes avoid taking more short term debts so as to reduce excessive pressure on debt servicing and repayments. This contradicts Abor (2008) in Ghana who found out unlisted SMEs with high tax rates relies more on short term debts. Furthermore, the negative coefficient of export status shows that exporting firms with their highly diversified nature patronizes more long term providers.

The estimated coefficient for education was significant at the 10 percent level of probability, indicating that more educated entrepreneurs' uses more short term debts. Previous studies such as Storey (1994) and Bates (1997) also documented that availability of educated entrepreneurs signals a better human capital and a greater access to debt capital. This finding corroborates Abor (2008).

However, even though gender of firm owners and age of firms were positively related to short term debt ratio, they were not statistically significant. The implication for gender is that contrary to theoretical literature, male owned firms are not likely to use more debts than women. This finding contradicts previous studies such as Aryeetey, Baah-Nuakoh, Duggleby, Hettige, and Steel (1994), Abor (2008) and Riding and Swift (1990).

Table 2. Determinants of short term debt ratio equation of unlisted agro-allied firms

Variable	Linear (L)	Exponential	Semi log	Double log
Constant	0.4701(2.5806)**	- 0.7847(-1.785)*	0.2887(0.7860)	-1.1431(-1.281)
Size	-0.0003(7.765e-05)***	0.0011(0.0946)	0.0481(0.4531)	0.0997(0.3850)
Asset St.	-0.120(-1.2167)	-0.2421(-1.0111)	0.0173(0.2645)	-0.0028(-0.0170)
Profitability	- 0.0002(2.0245)*	0.0018(0.1036)	-0.0030(0.2645)	-0.0018(-0.017)
Growth	0.0025 (0.0007)	0.0026(2.2074)**	-0.0069(-0.3430)	0.0060(0.1223)
Dividend	-0.0539(-0.6128)	0.1446(0.6806)	0.0125(0.871)	0.0359(1.0290)
Risk	-0.0345(-2.8698)***	-0.6784(-2.336)**	0.041(2.1680)**	0.0844(1.8260)*
Tax	- 0.1495(-1.5887)	-0.3093(-1.3618)	-0.0282(-1.7090)*	-0.0594(-1.4800)
Age	0.0004(0.0641)	-0.0010(-0.0789)	0.0126(0.2731)	0.0302(0.2685)
Education	0.0936(1.7806)*	0.1692(1.3330)	0.0468(0.7941)	0.0860(0.6001)
Gender	0.0189(0.0527)	0.0293(0.2292)	0.0062(0.1071)	0.0069(0.0493)
Form	-0.0046(-0.1814)	-0.0122(-0.1871)	-0.0173(-0.6211)	-0.0377(-0.5571)
Export	0.0475(0.9774)	0.0616(0.5250)	0.0402(0.7251)	0.0284(0.2110)
R ²	0.753	0.151	0.194	0.152
Fstat	11.06	0.69	0.77	0.57
Norn Test	2.059	22.277	1.108	17.440
RESET	0.0903	0.003	0.352	7.72
Akaike criterion	-42.61	63.05	-30.09	60.51
Hetero test	11.769	7.007	12.697	9.506
Schwarz criterion	-15.39	90.28	-4.99	85.63
Log- likelihood	34.30	-18.52	28.05	-17.25

Note: *= significant at 10%, ** significant at 5%, *** significant at 1%

3.3 Determinants of Long Term Debt Ratio of Unlisted Agro-Allied Firms

Table 3 shows the estimate of the various forms of long term debt ratio equation in the Nigerian agro unlisted firms. The linear form was selected as the lead equation. From the chosen equation, R² had a value of 0.886, implying that about 88.6 percent of the variability in long term debt ratio is explained by the estimated independent variables. The F-statistics of 8.13 is significant at 1 percent level of probability and shows that the R² in the lead equation is significant and that the estimated equation has goodness of fit. The normality test is significant at 10 percent level, indicating that the selected equation is not mis-specified.

From the empirical result, the size coefficient was positive but not significant. This was surprising given that large sized firms with its high tangible assets were supposed to mortgage such assets for long term debts. The finding is at variance with Antoniou *et al.* (2002).

The coefficient of profitability is negative and significant at 10 percent level. This shows that highly profitable firms do not depend on long term debts for her finances. Highly profitable firms have in their disposal enough retained earnings and as such prefers to exhaust them before seeking for costly external funds thus supporting the pecking order theory. This findings lend support to previous studies such as Abor (2008), Chen and Strange (2005), Ezeoha (2011), Jordan *et al.* (1998). It also contradicted the findings of Voulgaris, Asteriou, and Agiomirgianakis (2004) who found a significant positive relationship between profitability and long term debt ratios.

The estimated coefficient for asset structure was found to be positive and significant at the 10 percent level of probability. This indicates that highly tangible unlisted firms use more long term debts in their finances. This is true because such tangible assets are often pledge as security for long term debts. This findings shows the importance of tangible assets and its impact on financing opportunity of agro unlisted firms. This is consistent with the agency cost argument and suggests that debt providers rely upon these fixed assets in giving out debts so as to avoid defaults. It is also in agreement with previous researches such as Um (2001), Michaelas *et al.* (1999), Jordan *et al.* (1998), Ezeoha (2011), Hall *et al.* (2004).

The result further revealed that the growth coefficient was significant and positively related to long term debts. This can be attributed to the fact that growing firms need more long term funds for financing business expansion, procurement of tangible assets as well as financing new investment opportunities and as a result used more long time debts that possesses long gestation period and do not require immediate repayment. This finding is consistent with that of Michaelas *et al.* (1999), Abor (2008) who reported a positive significant relationship between growth and long term debt ratios.

Also, age of the firm was found to have a significant positive influence on long term debt ratios at the 5 percent level of probability. This indicates that older firms depend mostly on long term debts for their finances. This is justified in that, older firms with their knowledgeable credit sources information knows available long term credit sources and patronizes them. They are also capable of sourcing for and obtaining long term credits at concessionary interest rates due to their prolonged fraternity with long term debt providers and as such, uses more long term debts. This finding support Petersen and Rajan (1994) who documented that since unlisted firms do not have access to equity market, long years of business could imply long business relationship with debt providers and ,hence, more external long term debts.

The empirical result also showed a negative significant relationship between dividend payout and long term debt ratios at 1 percent significant level. This indicates that firms which pay much dividend do not rely on long term debt for their finances. It can be argued that firms with huge dividend payout is perceived to be liquid enough to finance her new investment opportunities with internally generated funds at the expense of borrowing and hence, uses less debts. This finding lend support to Abor (2008) in Ghana.

The education variable was positive and significant at the 5 percent level, indicating that highly educated entrepreneurs uses more long term debts. This is true given that educated entrepreneurs are perceived to know where to source for long term debts at lower interest rate and with less stringent conditions. They are also good financial record keepers and as such perceived by debt providers as prudent managers of borrowed funds, thereby mitigating the conflict of interest that might have arisen as a result of non fulfillment of debt obligations. Consequently, they are viewed by debt providers as being credit worthy and, hence granted more long term debts. A similar finding was reported by Abor (2008).

Furthermore, exporting firms were also found to have a significant positive influence on long term debt ratio at 10 percent probability level. This is not surprising, given their highly diversified nature, they record huge cash inflows and acquire huge foreign exchange through which means they are able to fulfill their debt obligations and are over time viewed by debt providers as being credit worthy. This, therefore, increases their chances of securing long term debts. This findings is consistent with Abor (2008).

The result further revealed that the form of business has a positive insignificant relationship with long term debt ratios meaning that all unlisted agro firms in spite of its form do not depend on long term debts though they uses it in their businesses. This result conflicts with Abor (2008) who recorded a significant positive relationship in Ghana. This is surprising, given that limited liability companies is, for instance, is expected to access and used more long term debts than sole proprietors because of their high asset value and diversified nature as well as high turnover.

The gender variable was also found to be positive and significantly related to long term debt ratio at 10 percent level of probability. This entails that male owned firms uses more long term debts than women. This can be attributed to women's inability to access debts like their male counterparts. For instance, previous studies by Aryeetey *et al.* (1994), Kalleberg and Leicht (1991), Riding and Swift (1990) all agrees that women owned firms uses less debt due to discrimination and their high risk averse nature.

Table 3. Determinants of long term debt ratio equation for unlisted agro-allied firms

Variable	Linear (L)	Exponential	Semi log	Double log
Constant	0.3921(1.4073)	- 1.4734 (-1.4415)	0.3885(0.6751)	-1.4114 (-0.6818)
Size	0.0013(0.1840)	-0.0026(-0.1181)	0.1263(0.7581)	0.3805 (0.6328)
Asset St.	0.1205(1.793)*	0.3606(0.6395)	0.1155(1.1209)	0.4117(1.0898)
Profitability	- 0.0111(-1.0094)	-0.0349(-0.8644)	-0.0491(-2.0822)**	-0.5821(-1.8411)*
Growth	0.0028(2.3536)**	0.0046 (0.1575)**	-0.0016 (-0.0506)	-0.0344(-0.2962)
Dividend	-0.4226(-3.1376)	1.4862(2.9939)***	0.0314(1.3901)	0.1043(1.2853)
Risk	-0.0297(0.0184)	-0.1227(-1.8013)*	-0.0411(-1.3804)	-0.1745(1.6066)
Tax	0.0171(0.1191)	0.1024 (0.1939)	-0.0039(-0.1530)	-0.0822(0.0884)
Age	0.0228(2.5961)**	-0.0884(-2.7300)***	-0.1433(-1.972)*	-0.6003(-2.2931)**
Education	0.1228(2.5261)**	-0.3829(-1.2959)	-0.1659(-1.793)*	-0.5117(-1.535)
Gender	0.0946(1.9720)*	0.3397(1.1020)	0.0965(1.0719)	0.3548(1.0503)
Form	0.0576(1.4746)	-0.1747(-1.2144)	-0.0556(-1.2731)	-0.1522(-0.9663)
Export	0.1378(1.8542)*	-0.4667(-1.9033)*	-0.0694(0.7991)	-0.2188(0.6944)
R ²	0.886	0.817	0.409	0.391
Fstat	9.46	8.13	2.19	1.98
Nornn Test	6.78	8.15	4.28	5.27
RESET	16.909	10.213	14.499	10.036
Akaike criterion	8.35	161.7	15.76	143.48
Hetero test	34.08		27.37	20.89
Schwarz criterion	35.57	188.71	40.87	168.34
Log- likelihood	8.82	-67.85	5.11	- 58.74
Hanan- Quinn	18.99	172.25	25.36	152.94

Note: *= significant at 10%, ** significant at 5%, *** significant at 1%

3.4 Conclusion

The study investigated the determinants of capital structure of unlisted agro-based firms in Nigeria. Evidence suggested that growing firms and those with educated entrepreneurs depended on both long and short-term financing. The result further showed the importance of asset structure, age of firms, gender of owners and export status in securing long term debts. Also, highly profitable, large sized firms with huge investment in risky projects were found to depend on short-term debts.

3.5 Recommendations

The following recommendations emerge from the findings:

- (i) Highly tangible firms were found to use more long term debt finance, hence, policies that would encourage growing firms accumulate huge tangible assets should be pursued. Tax rebates and exemptions can be granted and if possible, equipment assembly plants where equipments are sold to agro entrepreneurs at hire purchase established.
- (ii) Unlisted firms should be encouraged to go into exportation. This can be achieved by embarking on export promotion programmes such as awareness creation, reduction of export duties and granting of special loans at concessionary interest rate to agro exporting firms.
- (iii) Also, since firms with huge investment on risky projects were found to rely on short-term financing, effort should be directed towards encouraging them to reduce their risk levels. If possible, all unlisted agro-based firms should be compelled to take a compulsory insurance protection.

3.5.1 Area for Future Research

Future research should be directed towards investigating the determinants of capital structure of listed agro-based firms in Nigeria with view of seeing whether these factors influence debt ratios in listed agro-based firms.

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