

DETERMINANTS OF CAPITAL STRUCTURE OF LISTED OIL AND GAS FIRMS IN NIGERIA

¹Alematu Agbo & ²Fanen Anande-Kur

¹Department of Accounting Benue State University
agboalematu@gmail.com. +234 7031613675

²Department of Accounting Benue State University
gberwuadi@gmail.com +234 8105261601

ABSTRACT

This study investigates capital structure determinants of listed oil companies in Nigeria based on a panel data set for a period covering 2012 to 2017 representing 56 firm-year observations. The determinants of capital structure that were considered include Firm size, Growth, Profitability, Tangibility, Earnings Volatility and Non-Debt Tax Shield using Regression analysis and OLS estimations. Findings reveal that there is a significant relationship between Profitability and the Capital Structure of listed oil and gas firms in Nigeria. The study also discovered that the oil and gas sector had a capital structure that was highly tilted towards debt financing. Also, the study found the prevalence of the pecking-order theory as against the moderate presence of the static trade-off theory. The study recommends that future studies should focus on differentiating between long term and short term debts as against using total debt as the dependent variable.

Key Words: Static trade-off theory, pecking order theory, signaling theory, corporate capital structure, oil and gas firms.

Introduction

The success of a firm is dependent on the decisions that are taken by management in raising funds from different sources. The motive for this is to minimize the financial costs of raising finance. Non-financial firms require capital to fund the acquisition of properties, equipment and the expansion of their business interests.

There is ongoing debate on the determinants of capital structure, however, most of the research work on this topic is carried out in developed economies that have similar institutions, while little research work has been done to determine the reasons for capital structure decisions in developing countries that have different institutional structures (Booth, Alvazian, Demirguc-kunt and Maksimovic, 2001). (Bhaduri, 2002) offers several reasons for this.

Firstly, he suggests that little importance has been placed on the role of firms in economic development by development economics. Secondly, constraints were placed on the corporate sector in developing countries in the 1980s regarding sources of funds. Lastly, access to equity markets has been limited as a result of underdeveloped stock markets in developing countries.

The pioneering work of (Modigliani and Miller, 1958), on capital structure, resulted in the development of theories such as trade-off and pecking order theory that sought to explain what determines capital structure in firms. The Trade-off theory sees debt as tax shields. It suggests that the use of more debt is advantageous to firms because the interest on debt is a tax-deductible expense. The trade-off theory emphasizes the challenge of asymmetric information that exists in

the financial markets. The pecking order theory serves as an alternative to the trade-off model. It asserts that retained earnings are considered firstly as a source of finance for the firm, equity then follows and debt is used to finance assets only as a last resort. The theory assumes that companies want liquid assets. This suggests that firms favor cash generated internally as a source of financing its projects and to take quick decisive decisions when necessary. Both theories believe that managers act in the interest of shareholders. However, the trade-off theory caters to both existing and potential shareholders while Pecking Order theory caters to only the existing shareholders.

Concerning the theories of capital structure decisions, firm-level characteristics that affect leverage decisions have been identified by empirical studies. These characteristics include firm size, age of the firm, growth prospects, liquidity, profitability, the tangibility of assets and non-debt tax shield. However, (Harris and Raviv 1991), believe that the choice of relevant explanatory variables is contentious because what might be relevant in one geographical location or economic sector may not necessarily be the same with other locations or sectors. According to (Quian, Tian and Wirjanto, 2007), the classification of the industry is an important factor in capital structure decisions of a firm. The classification is as a result of the difference in industry-specific attributes (ownership structure, business risks, and ownership structure) across firms. The oil and gas sector is important to the country's economy. For instance, the Nigeria oil sector which is largely controlled by the Nigerian National Petroleum Company (NNPC) which has distinctive aspects that affect capital structure decisions.

The research is aimed at determining the role the static trade-off and pecking order theory plays in capital structure decisions of oil and gas firms listed on the Nigerian Stock Exchange during the period covering 2012-2017.

The Nigerian Oil Sector

The global oil and gas industry has witnessed dramatic changes over the last few decades. The global reliance on oil as the major energy source has increased consumption of oil to over 99 million barrels a day as of 2018. (Lee, 2006) suggests that the changes in the oil sector include amongst others, the increase in the price of oil; increase in demand for renewable energy such as water, wind, solar, biofuel and increase in energy demand.

The Nigerian oil and gas industry has been in existence since the shell group discovered crude oil in 1956. However, the sector was dominated by multinational corporations until the 90s until Nigerian firms began participating in the industry. The implementation of the Nigerian content directives by the NNPC increased local participation in the oil and gas industry. With the promulgation of the Nigerian Oil and Gas Industry Content Development Act in 2010, Nigerian firms were patronized in the award of oil licenses, contracts, and projects.

Nigeria is estimated to have proven oil reserves of about 36.97bn barrels. Based on the 2018 organization of petroleum exporting countries (OPEC) ranking, Nigeria is the second-largest oil producer in Africa and the 8th largest in the world. Concerning gas, Nigeria has proven natural gas reserves of 5.29 trillion cubic meters, 2.82% of the world's estimated reserve according to OPEC. In terms of daily production, Nigeria produces 1000 barrels per day of crude oil.

Determinants of capital structure

Non-debt tax shield

Non-debt tax shields are other components not including interest payments suchlike tax deduction for depreciation which reduce tax payments. A Firm that possesses large non-debt tax shields has lower debt in its capital structure. According to (Myers & Majluf, 1984), the static trade-off and pecking order theories indicate a negative relationship between non-debt tax shields and leverage. However, studies such as (Karadeniz, Kaandir, Balcilar & Onal 2009) indicate a positive relationship between non-debt tax shields and leverage. This is because, tax deductions on items such as tax credits and depreciation are considered substitutes for the tax benefits secured from debt financing (Titman & Wessels, 1998). The proxy for non-interest tax shield is depreciation/ total assets is supported by (Chen, 2004).

Firm Liquidity

Liquidity is used in investigating the pecking-order theory. The pecking order theory proposes a negative relationship between liquidity and leverage. This suggests that liquid firms have more internal funds that will be considered first in their financing decisions. The trade-off theory proposes a positive relationship between liquidity and leverage. A positive relationship suggests that liquid firms can settle their obligations as they materialize. The proxy for liquidity as regards this study is current assets/current liabilities is supported by (Titman and Wells, 1988).

Firm Profitability

The static trade-off theory proposes a positive relationship between profitability and leverage. The positive relationship can be attributed to 'signaling'. A high debt level is likely to infer a

higher firm value to investors. By using debt, managers use debt to send a signal on firm prospects to investors who are not adequately informed as a result of information asymmetry. It also suggests that more profitable firms will have a higher income to shield tax. This suggests that firms take advantage of tax benefits by increasing their leverage. The pecking order theory, on the other hand, indicates a negative linear relationship between profitability and the debt ratio of a firm. The reason as attributed by (Myers and Majluf, 1984) is that with sufficient internal generated funds firms prefer to finance with retained earnings rather than debt as a result of information asymmetry. The proxy for profitability in the model used is, (EBIT- depreciation)/total assets as supported by (Titman and Wells, 1988).

Firm size

The trade-off theory indicates a positive linear relationship between the size of the firm and leverage owing to low debt ratios and no impact on firms with high debt ratios. As a result of this large firms more capable of reducing the transaction costs associated with the issuance of long-term debt. In contrast, the pecking-order theory indicates a negative effect on the debt ratio because small firms incur more costs than large firms when issuing new equity. As a result, small firms tend to be more leveraged than larger firms. The proxy for firm size is the natural logarithm of sales which is consistent with the work of (Huang & Song, 2002).

Tangibility

Tangible assets are used as collateral. Owing to this, firms that have a high ratio of tangible assets have a greater capacity to borrow and as a result, reduces the risk of a lender suffering the agency costs of debt. The static trade-off theory proposes a

positive relationship between tangibility and leverage. As a result, the lender's risk of suffering agency costs can be reduced when firms possess relatively high tangible assets that can be used as collateral. The pecking-order theory also assumes a positive relationship as a result of asset mispricing. The proxy for tangibility as regards this study is fixed assets/total assets this is supported by (Booth et al. 2001) and (Rajan and Zingales, 1995).

The volatility of a firm

According to (Karacae, Temiz and Gulec 2016), The risk of financial distress is an important component in capital structure decisions. The trade-off theory proposes a negative relationship between a firm's earnings volatility and leverage. This is because firms are expected to balance tax advantages achieved from debt with the costs of financial distress. On the other hand, pecking order theory proposes a positive relationship between a firm's earnings volatility and leverage. The proxy for risk is (annual percentage change in Earnings Before Interest and Taxes (EBIT)). This is supported by (Ganguli, 2013).

Growth prospects

According to Myers (1977), firms with high future growth prospects tend to employ equity financing, because a firm that is highly leveraged in most cases will forgo a profitable investment opportunity. The static trade-off theory proposes a negative relationship between growth prospects and leverage because both the firm and creditors are unwilling to lend and borrow money respectively. On the other hand, the pecking order theory proposes a positive relationship between growth prospects and leverage because firms with more growth opportunities are more likely to acquire more debt in the long run. The proxy for growth prospects as regards this study is the

percentage change in sales. This proxy is also used by (Amidu, 2007)

Capital Structure Theories

Static Trade-Off Theory

Trade-off theory according to (Scott, 1977) suggests that a firm's optimal leverage is determined by a trade-off between the tax advantage of borrowing and the cost of financial distress. The tax-deductibility of interest payments on debt makes debt financing more beneficial. the cost of debt is represented by a higher probability of bankruptcy and the loss suffered in the event of financial distress. Financial distress indicates the difficulty or the inability of a firm to fulfill promises to creditors a condition that leads to bankruptcy. The Static Trade-off Theory, suggests that the optimal leverage varies across firms. The profitability of firms reduces the expected costs of distress and gives them the room to add to their tax benefits by increasing their leverage. A firm with a good number of tangible assets and are highly profitable have high leverage. Such firms will provide collateral for debts and hence can avoid bankruptcy.

Signaling Theory

The signaling theory is gotten from information asymmetry challenges, the theory suggests that managers in most cases use the capital structure as a signal to investors. This suggest that management uses leverage to signal firm prospects to outside investors who are poorly informed and believe these signals (Ross, 1977). Debt issued by a firm is considered a positive signal to the market about how well a firm is performing and also shows the confidence of management in the firm's future returns. However, increased debt levels lead to bankruptcy. Higher value firms issue more debt as a signal to investors that they are stable and

doing well. The Ross model indicates a positive relationship between bankruptcy, debt level, and profitability. Several empirical studies such as (Krasker, 1986) support the signaling theory.

The Pecking Order Theory

The pecking order theory is considered as one of the most influential theories in corporate finance (*Jibrán, Wajid, Waheed and Muhammad, 2012*). (Donaldson, 1961) brought about the idea of prioritizing the different sources of finance. He suggested that firms should choose internal financing over external financing. In furtherance of the theory, (Myers and Majluf, 1984), believe that capital structure is steered by a firm's desire to finance new investments firstly with internal funds (retained earnings), after that with low-risk debt, and then lastly with equity when all the previous sources are inadequate. This can be attributed to the huge costs associated with the issuing of new capital. However, in terms of retained earnings, there are practically no costs and in the case of debt, the costs are less than equity but higher than retained earnings hence the hierarchy of financing options. (Myers and Majluf, 1984) also argued that if a firm maintains its liquid financial resources, issue no new securities and use only its available internal funds (retained earnings) for financing new investments then information asymmetries between the insiders (management) and outsiders (investors) can be removed.

Review of Empirical Works

(Chechnet, Garba and Odudu, 2013) in their study on Determinants of Capital Structure in the Nigerian Chemical and Paints Sector which covered the period of 5 years from 2005 to 2009. Regression analysis Ordinary least squares (OLS) was used. The study revealed that all of five explanatory variables (size, growth, profitability,

tangibility, and age) are statistically significant with the dependent variable with size and profitability having a negative relationship while tangibility, growth, and age have a positive relationship.

(Ogbulu and Emeni, 2012) in their work Determinants of Corporate Capital Structure in Nigeria, covering a period of five years from 2000 to 2005. Using regression analysis ordinary least squares, the study identified age and size of firms as the major significant determinant of the capital structure of these firms while tangibility, growth, and profitability had a negative relationship with the capital structure of the selected firms.

(Amidu, 2007) in his study determinants of the capital structure of banks in Ghana covering a period of 6 years from 1998 to 2003. Using a panel regression model, the study showed that profitability, corporate tax, growth, asset structure, and bank size influence bank financing.

Methodology

Our data consist of oil and gas firms listed on the Nigerian Stock Exchange (NSE). The population of the study consisted of 11 firms listed on the NSE. We constructed our data from audited annual reports of 9 oil and gas quoted companies covering a period covering the period 2012 to 2017 (56 firm-year observations). The study relied on a simple random sampling method to arrive at the sample size. The study adopted seven explanatory attributes (Non-interest tax shield, profitability, tangibility, growth prospects, liquidity, size, and Volatility) as proxies for the determinants of capital structure. A Panel data regression analysis ordinary least squares (OLS) estimations were constructed to analyze the relationship between leverage (dependent variable) and these proxies.

Model Specification

According to the model specification for this study, a firm's capital Structure (DER) is a function of seven independent variables which include: profitability (PROF), firm size (FS), growth opportunities (GROW), Liquidity (LIQ), tangibility (TAN), business risk, earnings volatility (EVOL) and non-interest tax shield (NDTS). The equation is represented as, $DER = f(FS, GRW, PROF, TAN, EVOL, NDTS, LIQ)$ with the linear expression: $DER_{it} = \alpha_0 + \beta_1 FS_{it} + \beta_2 GRW_{it} + \beta_3 PROF_{it} + \beta_4 TAN_{it} + \beta_5 EVOL_{it} + \beta_6 NDTS_{it} + \beta_7 LIQ_{it} + \epsilon_{it}$

Analysis and Results

Descriptive Statistics

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic
DER	53	.42	6.34	.8395	.11160
TAN	52	.11	.82	.4504	.02651
PROF	53	-.30	.64	.0991	.01751
NDTS	52	.00	.06	.0199	.00195
FS	53	12.45	20.33	17.7606	.27266
EVOL	44	-8.83	3.31	-.5395	.31141
LIQ	52	-.48	.48	.0154	.02666
GRW	44	-.79	1.82	.0673	.06494
Valid N (listwise)	43				

Table 1 Descriptive statistics

Table 1 demonstrates the descriptive statistics for the variables used in our analysis. The data consists of 9 firms listed on the Nigerian stock exchange covering six years from 2012-2017. The mean of leverage is 83.95 percent which suggests remarkably high Leverage in our sample. A high debt ratio generally indicates that a firm has been aggressively financing its growth with debt. Profitability has a mean of 0.0991 suggesting an average return on assets of 9.91 percent. Growth had a mean of 0.673 which indicates that, on average, the growth rate in sales was 67.3 percent during the period covered. Tangible assets had a mean statistic of 0.4504 which indicates that, on average, fixed assets accounted for 45.04 percent of total assets of the oil and gas firms sampled.

Model Summary ^b										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.705 ^a	.498	.397	.15509	.498	4.954	7	35	.001	1.363

a. Predictors: (Constant), GRW, LIQ, PROF, NDTS, TAN, EVOL, FS

b. Dependent Variable: DER

Table 2 Regression Statistics

The model summary above has an R² and Adjusted R² 49.8% and 39.7% respectively as its coefficient of variation. This suggests that most of the variations in the capital structure of listed oil and gas firms in Nigeria are to a great extent determined by the independent variables selected for this study. The P-value of .001 shows that the overall model is statistically significant at the 5% significance level. The Durbin- Watson test result of 1.363 indicates a tolerable level of serial correlation within the period of the study.

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta				Tolerance	VIF
(Constant)	-.300	.319			.942	.353		
TAN	-.128	.143	-.125	-.891	.379	.734	1.362	
PROF	.840	.215	.523	3.913	.000	.803	1.245	
NDTS	-2.388	1.944	-.169	-1.228	.228	.755	1.324	
FS	.024	.016	.234	1.468	.151	.563	1.775	
EVOL	-.010	.014	-.108	-.728	.471	.655	1.526	
LIQ	-.419	.157	-.410	-2.674	.011	.610	1.638	
GRW	.043	.060	.094	.722	.475	.852	1.174	

a. Dependent Variable: DER

Table 3 Regression Analysis

The variance inflation factor (VIF) and Tolerance level in the result in table 3 all fall below 10 and 1 respectively indicating the absence of multicollinearity. The results of the correlation reveal that firms' risk, non-debt tax shield, tangibility and liquidity all have negative relationship with leverage, while profitability, firm size and growth prospects have a positive relationship with leverage. However, of all determinants, only liquidity and profitability have a significant relationship.

Findings

Growth has a positive impact on leverage although is not statistically significant. This result contradicts the Static trade-off theory but supports to Pecking order theory. This suggests that firms with higher growth rate maintain higher debt in the

Nigerian oil and gas sector. Consequently, oil and gas firms with a relatively high growth rate will consider short-term debt first then move to more secured long-term debt to finance their growth.

Non-debt tax shield has a negative non-significant relationship with leverage. This agrees with Static trade-off and pecking order theories. (DeAngelo & Masulis, 1980) and (Myers & Majluf, 1984) believe that both static trade-off and pecking order theories suggest a negative relationship between non-debt tax shields and leverage.

Profitability indicates a Positively statistically significant relationship with firms' leverage ratio. This result is consistent with the Trade-off theory that affirms that firms prefer financing with retained earnings first before external financing. Also, the outcome of the research is consistent with the work of (Titman and Wessels, 1998).

Liquidity is estimated to have a negative statistically significant relationship with the firm leverage ratio. This result is consistent with the implication of the pecking order theory that liquid firms have more internally generated funds that will be considered first in their financing and investment decisions. This is in agreement with studies such as (Faris and Abu, 2011) and (Sheikh and Wang, 2011).

Asset tangibility variable has a positive non-significant relationship with leverage. This result contradicts both the static trade-off theory and the pecking order theory. The pecking order theory argues that firms with few tangible assets tend to finance their investments externally and as such prefer debt over equity. This result is in agreement with the work of (Seppa, Estonia, and Tallinn, 2008).

Firm Size has a positive relationship with leverage. This result is in agreement with the static

trade-off theory which suggests that obtaining the optimal capital structure involves substantial fixed costs which are relatively small for larger firms and makes it easy to acquire debt. This suggests that larger firms in the Nigerian oil and gas sector tend to borrow more than smaller firms. This result is consistent with the works of (Titman and Wessels, 1998) and (Rajan and Zingles, 1995).

Risk is found to be negatively related to leverage. This result is consistent with the static trade-off theory. This is because the earnings volatility or risk increases when more debt is acquired. This result is consistent with the findings of (Sheikh & Wang, 2011).

Conclusion

This study investigated the determinants of capital structure of listed oil and gas firms in Nigeria analyzing the six-year panel data covering a period of 6 years from 2012 to 2017. For analysis, we selected the pooled regression model. Our results show that non-debt tax shield, liquidity, risk, and tangibility have an indirect relation with financial leverage with only liquidity being statistical significance. On the other hand, determinants such as profitability, growth prospects and size have a direct relationship with leverage with profitability being statistically significant. The results also show that firms in the oil and gas sector are highly leveraged. From our results, we claim that the Pecking order theory plays a significant role in capital structure decisions of listed oil and gas firms in Nigeria. Furthermore, two (liquidity and profitability) of the six firm-specific determinants studied, are consistent with the pecking-order theory.

We recommend that future studies should focus on firstly, recognize the difference between long term and short term debts. Secondly, the Ownership structure of the oil and gas firms in Nigeria should

be considered. Then, Macro-economic factors such as debt tax shield should be adjusted for inflation to determine the actual economic depreciation. Also, we recommend that statistical significance should also be tested at 1% and 10% to achieve broader results. Lastly, since only firm-specific determinants are considered in this study, we recommend the use of country-specific factors such as bond and stock market structure, capital formation rate and GDP growth rate in future studies.

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