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DETERMINANTS OF CAPITAL STRUCTURE OF OIL AND GAS COMPANIES IN TANZANIA

Henry Chalu[1], Evelyn M. Richard[2] and Angela H. Ngohelo[3]

ABSTRACT

This study examined the determinants of capital structure of oil and gas companies in Tanzania. Based on two theories - Pecking Order and Trade-Off - the study tested tangibility, firm size, growth, profitability and tax shield. To test these variables, secondary data of eight oil and gas firms operating from 2008 to 2014 was used. Using multiple regression analysis, the study found that the effect of the independent variables on leverage differs with the level of operations. When all firms are considered, the size of the firm, profitability, tax effect and growth rate tend to be negatively but insignificantly related with the capital structure. Tangibility has an insignificant positive relationship with capital structure. When considering only firms that are at the selling level, profitability, tangibility and growth variables significantly but negatively relate with capital structure. Tax significantly affects the capital structure positively while size has no effect. The study contributes to the Pecking Order Theory that firms tend to use for internally generated funds before using external sources. It challenges the Trade-Off Theory which suggests that there is a positive relationship between tangible assets and leverage. Practically, the study suggests that determining factors differ along the project life cycle. Their effect on the capital structure may not be significant at the initial and developmental stage but significant during the selling and growth stages.

***Key words**: capital structure, determinants, oil and gas, Tanzania.*

INTRODUCTION

Capital structure which refers to the permanent financing of a firm is attained through long-term debts, preferred stocks and/or owner's equity. Having an appropriate capital structure for any business ensures a stable platform for profitable growth which is one among the key variables towards achieving business investors' main objective. It is well known that the main objective of any business owner is to maximise the value of the returns. Having an optimal capital structure therefore cannot be overemphasised (Drobetz & Rogers, 2003; Acaravci, 2015). Capital structure is characterised by a trade-off between risks and returns (Acaravci, 2015). While on the one hand, more debt lowers the cost of capital hence increase the returns to shareholders, on the other hand, it increases the risk of default as it increases the fixed obligations to the firm. Organisations therefore strive to achieve the capital structure whereby the benefit from debt financing is equal to the risk of bankruptcy from the same.

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Literature provides different arguments concerning factors that influence the capital structure of a firm. Modigliani and Miller (1958, 1963) while assuming the scenerio of a perfect market, tax free and bankruptcy free, argued that financial leverage is unrelated to firm value. Miller (1977) argued that the optimal debt use occurs at macro level but it does not exist at the firm level when personal taxes are introduced, i.e. interest deductibility will be offset at investor's level. Daskalakis and Kokkinaki (2011) argue that capital structure decisions are highly influenced by personality traits (referred to as behavioural finance). Personality traits are found to be closely related to specific value maximisation force of a firm, such as aversion to vagueness, illusion of knowledge, anchoring and the availability heuristic. Ullah *et al.* (2012) argued that managers' behaviour can affect capital structure. They have risk averse behaviour and tend to use debt when there is high profitability, avoid the use of debts during high rates of earning variations and avoid running into liquidation when the situation worsens.

According to the Pecking Order Theory, there exist certain hierarchies of selecting financing sources (Myers & Majluf, 1984). Executives choose sources of finance by trying to select those at the highest position in the hierarchy (*ibid*). The source chosen will be the one with the lowest cost and lowest risk; that is, the internal sources have to be exhausted before seeking external sources. The theory argues that there is a negative relationship between profitability and the level of debt but does not explain about the optimal capital structure.

The Trade-Off Theory explains that firms borrow up to the point where the tax benefit from an extra shilling of debt is exactly equal to the cost that comes from the increased probability of financial distress (Kraus & Litzenberger, 1973). It further explains that tax benefit is said to increase as debt financing increases, but it reaches a point where the risk of bankruptcy becomes more pronounced and hence the cost exceeds the tax benefit of the debt. Therefore, the optimal capital structure will exist at a point where the tax benefit equals the added financial distress cost if a firm is unchanging in terms of its assets and operations. The theory acknowledges a combination of different sources of capital thus proposes that the optimal capital structure does exist where a firm's combination of debt and equity finance maximises its value and minimises their overall cost of capital.

Hardiyanto *et al*. (2014) confirmed that capital structure among industry sectors is significantly different. Gathogo and Ragui (2014) observed that there is still a deviation regarding which factors significantly affect the capital structure. A number of studies done in Africa report about specific sectors such as banking (Kipesha & James, 2014), and insurance (Tornyeva, 2013). This study thus aimed at researching the factors that determine the capital structure of oil and gas companies operating in Tanzania. For centuries, oil has been used for lighting purposes (Devold, 2013) and ever since the discovery of oil and gas, its demand has attained a positive trend especially after the introduction of automobiles. All over the world, the oil and gas industry has been treated as a leading economic sector because of its extensive economic linkages[4]. The industry is having a strong multiplier effect on the growth of any economy and hence it is capable of being the driver of economic growth. On the one hand it plays a major catalytic role in developing the transport sector, while on the other hand, it helps the industrial sector to grow faster and thereby generate significant employment opportunities (*ibid*).

[4] https://www.scribd.com/document/.../Final-Capital-Structure-in-Oil-and-Gas-Sector downloaded on 18th January 2018 at 10:15am

The oil and gas industry is generally divided into three categories: upstream, midstream and downstream. The upstream activities involve all processes and facilities for production and stabilisation of oil and gas. The reservoir and drilling community often uses upstream for the wellhead, well, completion and reservoir only (Devold, 2013). All activities done in exploring, drilling and bringing the oil/gas to surface fall under this category. Such activities can either be carried out onshore (when oil and gas is extracted from the land) or offshore (when extraction is done in deep sea water). The midstream is broadly defined as gas treatment, Liquefied Natural Gas (LNG) production, degasification plants, and oil and gas pipeline systems (*ibid*). It involves the transportation, storage, and wholesale marketing of crude or refined petroleum products. Refinery offsite such as tank storage and distribution terminals are included in this segment. The downstream involves marketing and distribution of products derived from crude oil and natural gas. The downstream sector touches consumers through products such as gasoline or petrol, kerosene, jet fuel, diesel oil, heating oil, fuel oils, lubricants, waxes, asphalt, natural gas, and liquefied petroleum gas as well as hundreds of petrochemicals such as plastic and fertiliser.

The oil and gas industry is very important to any economy as it is a source of energy to the society, yet investment in the same is very costly and risky. The decision to engage in exploration and extraction of oil and gas from the oil fields, for instance, is very risky given the fact that it requires substantial amount of money and a long payback period. There are several unknowns when drilling the oil and gas; these include but not limited to the reservoir and fluidic properties, trap size and the geometry, porosity, seal containment of the oil and gas in place, expulsion force, and losses due to migration development costs (Owusu-Ansah, 2008). Such uncertainties increase the challenges of getting low cost finances, yet the main objective of the investors is to maximise the value of the investment; thus, their returns need to be met.

The oil and gas industry in Tanzania is a blooming industry due to the fact that there is a ready market as well as large discoveries of oil and gas reserves both onshore and offshore. Gas in Tanzania was discovered in 1974 in Songo Songo area in Lindi, then in Mtwara, Pwani and Kiliwani area in Lindi. The total volume of all discoveries is about 41.7 trillion cubic feet. There are more than twenty companies that operate in the oil and gas businesses in Tanzania; some of these include Petrobras, Statoil, Swala Energy, Ophir Energy, BG-Shell and Orxy. Financial markets and especially the capital and stock exchange markets in Tanzania are still underdeveloped. This situation reduces the available options of finance sources to highly risky investments like oil and gas businesses. Given this context, the study therefore sought to find out the determinants of capital structure of oil and gas companies operating in Tanzania. The rest of the article is organised in the following sections. Section two presents the literature review followed by Section Three, which presents the methodology. Section Four provides the results and discussion while Section Five is the conclusion.

THEORETICAL BACKGROUND AND REVIEW OF LITERATURE

Theoretical Perspective

The Pecking Order Theory elaborates that there is a certain hierarchy of selecting financing sources (Myers & Majluf, 1984). When executives want to choose sources of finance, they do so by trying to select the sources that are at the highest position in the hierarchy. The choice of the source will be determined mostly by the associated level of costs and risks. The theory

stresses that the internal source has to be exhausted before seeking external sources. Further, in the absence of investment opportunities, firms retain profits and build up financial slack to avoid having to raise external finance in the future (*ibid*). The theory therefore explains that there is a negative relationship between profitability and capital structure (i.e. the level of debt); and that, the more profitable the company is, the lesser the use of debt in financing the investments. With regard to this theory, firms will not focus on attaining the optimal capital structure since they are not targeting at balancing the different sources of finance. Further, literature indicates that the cost of debt is relatively cheaper than equity. This is explained well with the Trade-Off Theory.

Modigliani and Miller (1963) argued that corporate taxes favour debt over equity since interest expenses are tax deductible. The theory argues that firms borrow up to the point where the tax benefit from an extra shilling of debt is exactly equal to the cost that comes from the increased probability of financial distress (Kraus & Litzenberger, 1973). The theory suggests that the firm's focused capital structure is influenced by taxes, cost of financial distress (bankruptcy costs) and the agency conflicts (Drobetz & Rogers, 2003; Deverenx *et al.* 2015). It further suggests that tax benefit is said to increase as debt financing increases, but it reaches a point where risk of bankruptcy becomes more pronounced and hence the cost exceeds the tax benefit of the debt. Therefore, if a firm is unchanging in terms of its assets and operations, then an optimal capital structure will exist at a point where tax benefit equals to the added financial distress cost. The theory suggests a positive relationship between tax shield and the use of leverage in the firm's capital structure.

Empirical literature and study hypotheses

Modigliani and Miller (1958,1963) argued that in the frictionless world, financial leverage is unrelated to firm value. But existence of some imperfection in the real world, such as tax deductible and interest payment make the firm value and capital structure positively related. Myers (1984), Myers and Majluf (1984) and Jensen and Meckling (1976) argued that if capital structure decision is irrelevant in a perfect market, then imperfections which exist in the real world may be evidence for its relevance. Such imperfections include bankruptcy and agency costs exhaustion of tax gains. Ross (1977) argued further that a firm with the expectation of higher profit will expect to take more debt. Therefore, the news of taking more debt will signal to the investors that the firm's value is higher regardless of the intention of such a firm to take debt where the cost of debt will be determined by market competition. Literature in agency cost also indicates that the use of debt financing is a way of monitoring managers of the firm to focus on overall objectives of the organisation instead of their own interests.

Gathogo and Ragui (2014) conducted a study on the determinants of capital structure in Kenya by selecting a sample of 200 firms from various industries. They used a descriptive research design and their study revealed that the size of the firm, asset growth of the firm, profitability, liquidity and cost of debt had positive effect on the capital structure of the firm. They also found out that the risk of the business and the industry type were not very strongly correlated to the capital structure of the firm.

Tornyeva (2013) conducted a study on the determinants of capital structure of insurance companies in Ghana. A sample of 12 underwriting insurance companies from the National Insurance Commission that had data for six consecutive years (2002 – 2007) was used. Data was extracted from the financial statements and a panel regression model was used to analyse

the data. The study found out that firm size and growth on the one hand have a positive relationship with leverage due to the fact that insurance companies are more diversified and hold a high leverage rate and they depend much on debt for their growth. Profitability on the other hand has a negative relationship with leverage. Tangibility and risks were statistically insignificant. Baltagi *et al*. (2004) stated that panel data methodology facilitates testing of economic relationships over time and across companies which cannot be merely tested either by time series or cross-sectional methods alone.

Oppong-Boakye *et al*. (2013) conducted a study in Ghana using a dataset of 33 listed and non-listed companies during the period 2003-2007. Pooled-cross sectional and time-series observations were used for data analysis. They found that size, tangibility, profitability, risk and taxation significantly influence the firm leverage while growth is statistically insignificant. Furthermore, Lee and Kwok (1988) conducted an explanatory study in the US on international environmental factors and determinants of capital structure. They used a sample of 834 firms: 421 domestic corporations and 413 multinational corporations listed in COMPUSTAT tapes. They controlled the size and industry factors. They found that multinational corporations have higher agency costs of debt than domestic corporations. Further, the multinational corporations have lower bankruptcy costs compared to domestic corporations. When companies were separated into different industries, the findings varied significantly. The study included only the agency and bankruptcy costs variables and left others like non-debt tax shield, liquidation costs and market power.

Chen *et al*. (1997) investigated the relationship between capital structure and international activities for the US companies using a sample of 18,495 observations from COMPUSTAT tape from the year 1984 up to 1993. This was an extension of the study by Lee and Kwok (1988) which had controlled the traditional capital structure determinants and concentrated on the international activities. It was explanatory in nature and employed multivariate analysis. The study found out that leverage is negatively related to both bankruptcy costs and growth options. It was also found out that multinational corporations have a lower leverage rate compared to domestic corporations, and within the multinational corporations the debt-equity ratio is positively related to degree of internationalisation.

Sangeetha (2013) did a study of determinants of capital structure in the context of Sri Lanka. Stratified sampling was used to get a sample of 50 companies from 13 industries representing 21% of the mean number of companies listed in the Colombo Stock Exchange Ltd. as of 2006. The time period of the study was five years. The sectors included chemicals and pharmaceuticals, construction and engineering, health care, hotels and travels, trading, services, manufacturing, motors, plantations, oil palms and land and property. Variables such as tangibility, size, growth, profitability, liquidity and dividend payout were studied and only size, profitability and growth were found to be statistically significant in determining the capital structure in Sri Lanka.

Sabir and Malik (2012) and Saleem *et al.* (2013) conducted their studies on the determinants of capital structure in the oil and gas sector in Pakistan. The former study used a sample of 5 listed companies whose data was available at the period of study (2007-2010) and the research design was explanatory in nature. Findings depicted that 61% of variations in leverage was explained by liquidity, size, tangibility and profitability. Profitability was the only variable which showed a negative relation to leverage while the rest were positively related. The latter study used a sample of 12 listed companies on Karachi Stock Exchange,

basing on the non-probability and convenient sampling technique. They used secondary data of the sample for the six years (2006-2011) to examine the relationship between leverage and profitability, size, sales growth and tangibility. The findings revealed that independent variables have a significant effect on the leverage of the firm. It was concluded that firm size, tangibility of assets and profitability have a positive relationship with leverage, but sales growth showed a negative relationship with leverage.

Hardiyanto *et al.* (2014) studied the difference of capital structure among industry sectors in Indonesia. They used both parametric and non-parametric models on data from 228 public listed companies from a group of eight industry sectors. They concluded that the patterns of financing between industry sectors differ significantly. They further concluded that, in general, the difference is due to industry characteristics. Specifically, they established that industries that have most of uncontrollable high risk will tend to push their management to use equity than debt due to its zero fixed burden, for example, agriculture. They further argued that those industries that are capital-intensive and have a project life cycle will tend to adjust their financing pattern to fit the life cycle of project development activities. They added that the use of debt might be a viable option because management has a flexibility to adjust the amount of funds needed at different points in time. The study thus proposes the use of more debt for investments in upstream and middle stream oil and gas businesses. These results are somehow mixed up as the latter industry involves also high uncontrollable risks.

Kipesha and James (2014) assessed the impact of capital structure on bank performance in Tanzania using secondary data of 38 banks for a period of 5 years. The data was obtained from institutional websites, Central Bank of Tanzania and respective bank websites. The study involved 3 dependent variables which were return on total asset (ROA), return on equity (ROE) and firm operational cost efficiency (measure of the extent to which banks minimise their operating costs) and one independent variable - capital structure (ratio of debts to equity). The findings revealed that the impact of capital structure on firm performance depends on the variables and indicators that are used to approximate capital structure and performance. The results indicated that there was trade-off between the use of debts and firm performance when capital structure was measured using the ratio of debts to equity and performance.

The reviewed studies reveal that the variables that influence capital structure as well as their relationships differ with context. They are different in not only different economies but also sectorwise. Variables that were identified as influencing the capital structure and that have contradictory relationship are firms' tangibility, size, growth, profitability and corporate tax. Profitability, for instance, was found to be positively related with capital structure in Kenya for the composite of industries while it was negatively correlated with leverage in insurance industries in Ghana. Furthermore, tangibility was found not to have any significant effect on capital structure in insurance companies in Ghana while the same had a positive significant effect on capital structure in Pakistan. This study therefore poses the following hypothesis:

Hypothesis 1: *There is a positive relationship between firm's asset tangibility and capital structure.*

Tangibility of a firm refers to how much of the firm's assets are made up of fixed assets which can be used as collateral at a time of borrowing. This implies that the higher the level of tangibility the higher the debt ratio since with high collateral one can be charged lesser

interest on debt compared to the one without. Rajan and Zingales (1995) concluded that there is a positive relationship between tangibility and leverage. Harc (2015) observed that tangible assets are positively and significantly related to long-term leverage, such that tangible assets usually portray positive signal to the financial institutions and that they can dispose them in case of bankruptcy. However, when Tornyeva (2013) studied the determinants of capital structure of insurance companies in Ghana, it was found that there was a negative relationship between tangibility and leverage.

Hypothesis 2: *There is a negative relationship between firm's size and capital structure.*

Size of the firm refers to the number of assets that a firm holds, amount of revenue that a firm can generate and also its production capacity within a given time. The larger the size of the firm, the lesser asymmetric the information is and this reduces the possibilities of undervaluation of new equity issues (Rajan & Zingales, 1995). This means that firms opt to issue more equity than using debt financing. This could be more so in economies with well-developed capital markets. Karadeniz *et al.* (2011) observed that big-sized companies have a lower target debt ratio compared to medium- and small-sized companies. They argue that the former prefer internal sources of funds more than debt compared to the latter. Their argument supports the Pecking Order Theory. According to Zhang *et al.* (2014), firm size reflects the enterprise's comprehensive strength. The larger the company's strength, the stronger the anti-risk ability, and the stronger its ability to borrow. They revealed that the two are positively related. Following the contradiction, this study tested the negative relationship between size of the firm and leverage level.

Hypothesis 3*: Firms growth rate has a negative effect on capital structure*.

Growing firms look out for external funds to finance the growth. Firms with a higher percentage of their market value explained by growth opportunity will have high debt ratio. Arasteh *et al.* (2013) found out that there is a positive relationship between sales growth and financial leverage, and that companies with higher sales growth tend to use debt as they have the ability to repay the same. Rajan and Zingales (1995), Shah and Khan (2007), and Onofrei *et al.* (2013) however found there is a negative relationship between growth of the firm and the level of debt; and that, the more they grow, the higher the chances of making profits thus financing their businesses using retained earnings. Their argument is consistent with the Pecking Order Theory. This study thus tested the negative relationship, as stated in the following hypothesis.

Hypothesis 4*: There is a negative relationship between profitability and capital structure.*

Profitability of a firm plays a major role in determining its capital structure. This relationship is explained by the Pecking Order Theory which states that firms prefer internal sources of finance to external sources (Myers & Majluf, 1984). Shubita and Alsawalhan (2012) and Oino and Ukaegbu (2015) found a significant negative relationship between debt and profitability. They report that profitable firms depend more on equity as their main financing option. All things being equal, firms with high profit rates would maintain a relatively lower debt ratio since they are able to generate such funds from internal sources.

Hypothesis 5*: There is a positive relationship between corporate tax and capital structure*

Corporate tax refers to tax levied on income generated by a firm. Interest expense is tax deductible whereas dividend is not. This encourages the use of debt rather than equity so as to enjoy the tax shield. In his study concerning impact of tax on financing decision, Mackie-Mason (1989) found that desirability for debt finance changes positively in relation to effective marginal tax. Klapper and Tziqumis (2008) and Faccio and Xu (2015) observed also that low taxes result to increased use of equity than debt. This is consistent with the Trade-Off Theory which suggests that low taxes decrease the incentive to hold debt due to decreasing interest tax deductability. Figure 1 summarises the proposed study model.

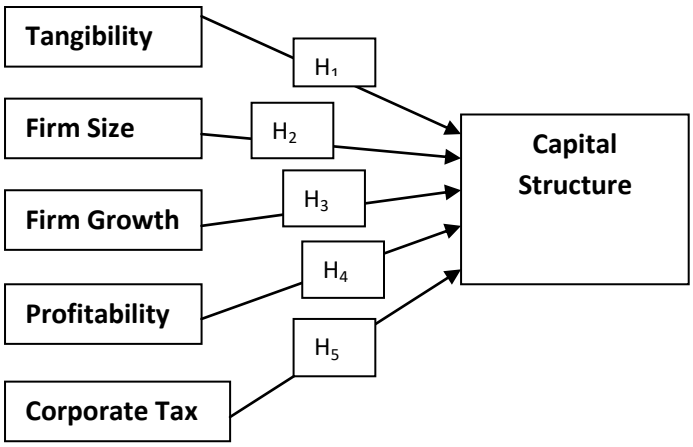

Figure 1: Proposed study model
Source: Developed from the Literature

RESEARCH METHODOLOGY

The study adopted the positivist approach given that it needed to test well-established hypotheses. Explanatory design was used to examine the causal effect relationship between the independent and dependent variables. The population of the study was the total number of oil and gas companies operating in the United Republic of Tanzania. These included all the companies in the upper, midstream and downstream operations. A non-probabilistic sampling technique was used to select the sample of the study. This was necessary because most companies are private thus their annual reports are not publicly available. Eight companies therefore participated in the study.

Secondary data for 7 consecutive years, i.e. 2008 to 2014 was used. The data was obtained from financial reports and was collected through a desk review method. A set of questions was prepared to serve as a guiding tool so that all the information required was obtained. Information collected was related to how much of the firm's assets are made up of fixed assets (tangibility); amount of assets that the firm holds; amount of revenue that the firm could generate and its production capacity within a given time (firm size); annual percentage change in assets (growth rate); return on assets (profitability); amount of tax levied on income (tax) and leverage ratio (capital structure). The unit of analysis of the study was the oil and gas companies. The pooled regression panel data analysis was used to facilitate investigation of cross-sectional and time series data. Multiple regression analysis was used to establish the relationship of the variables (Greener, 2008; Kothari, 2004). The multivariate regression model provided below was used.

$$LGi,t = \beta 0 + \beta 4TNi,t - \beta 3SZi,t - \beta 2GRi,t - \beta 1PFi,t + \beta 5TAi,t + \varepsilon t$$

Where:
LGi,t = the leverage of the firm i at time t
TNi,t = tangibility of the firm i at time t
SZi,t = the size of the firm i at time t
GRi,t = growth rate of firm i at time t
PFi,t = profitability of the firm i at time t
TAi,t= the ratio of tax paid to operating income for firm i at time t
εt is an error term at time t

β0, β1, β2, β3, β4 and ***β5*** are regression coefficient (unknown constant to be determined from the data). The data was coded and entered into STATA software that was used as a tool of analysis.

RESEARCH FINDINGS

Descriptive statistics

A descriptive analysis for the independent variables and dependent variable is presented in Table 1.

Table 1: Summary of descriptive statistics

	Mean	Median	Standard Deviation	Sample Variance	Range	Max	Min	Sum	Count
Leverage (Debt ratio)	2.734	0.834	6.076	36.915	34.288	34.328	0.040	114.838	42
Firm Size	20.01	19.590	4.073	16.587	14.671	25.90	11.23	150.720	42
Profitability	-3.16	0.043	12.053	145.279	69.433	0.413	-69.0	132.722	42
Tangibility	0.842	0.258	1.492	2.225	5.109	5.110	0.000	35.384	42
Tax effect	0.244	0.060	0.479	0.229	3.109	2.808	-0.30	10.246	42
Growth	4.433	0.125	18.85	355.54	108.48	107.7	-0.77	150.720	34

Source: Field Data (2015)

On average, the oil and gas firms use approximately 3% of debt to finance their total assets. The firms with higher debt that finance their assets have a leverage ratio of 34%. Some have almost total equity financing their investments as the minimum leverage ratio is almost 0%. On average, the industry is experiencing loss (-3.16); the maximum profit is 0.41 and the minimum is a loss of -69.02, indicating very limited profitability. A possible explanation can be the fact that most of the companies included in the sample are operating in the upstream and they have not yet started selling their products. Further, the high operating costs could be another reason, given the nature of the industry. Generally, the industry has a high level of fixed assets and this was expected given the nature of the industry. Most of the studied firms do not grow much as indicated in the average growth rate of around 4%. This is expected as most of them are at the developmental stage. Overall, the tax effect on most studied firms is very small. The fact that most of the studied firms have not started selling the final product explains these results.

Table 2 provides results of the correlation analysis between independent variables: tangibility, firm size, firm growth, profitability and tax and the dependent variable-capital structure (leverage).

Table 2: Summary of correlation analysis

	Leverage/Debt ratio	*Profitability*	*Tangibility*	*Firm size*	*Tax effect*	*Growth rate*
Leverage/ Debt ratio	1.000					
Profitability	-0.470	1.000				
Tangibility	-0.222	0.094	1.000			
Firm size	-0.440	0.448	0.580	1.000		
Tax effect	-0.305	0.170	0.177	0.275	1.000	
growth rate	-0.021	0.039	-0.239	-0.239	-0.182	1.000

Results show negative correlation between all independent and dependent variables. Growth rate has a weaker negative correlation while profitability has a relatively higher negative correlation with capital structure. This implies that the growth rate of oil and gas firms in Tanzania has the least effect on capital structure decisions than all other variables. It should be noted that the oil and gas industry in Tanzania is not so prominent and especially the upstream activities as some of the firms have been in operation for less than six years. The regression analysis was therefore done twice; the first time included a full sample and the second time included only those firms which are not only in operation but also have generated income from the same operations. The results show that the model is fit as the probability of Chi is <0.0329. This is within the acceptance level of Chi<0.05. The test shows that all coefficients in the model are different than zero. This indicates that the model fits to explain the relationship between independent variables and the dependent variable. This gave the researchers the confidence to test the hypotheses developed in the study. Table 3 provides the respective results when all studied companies were involved.

Table 3: Summary of regression results for all companies

Independent variables	*Coefficients*	*Standard Error*	*z-Value*	*P-value*
Size	-0.452	0.414	-1.090	0.761
Profitability	-0.186	0.103	-1.800	0.072
Tangibility	0.360	1.186	0.300	0.761
tax effect	-0.452	6.659	-0.640	0.523
Growth	-0.0293	0.058	-0.500	0.614

Hypothesis 1 (H_1) stated: “There is a positive relationship between firm’s tangibility and capital structure”. This means that firms with a higher percentage of tangible fixed assets will be highly leveraged. The study results indicate that tangibility is positively related to leverage but insignificant. The findings do not conform to the first hypothesis of the study as it is not significant enough to explain the variation in leverage.

The second hypothesis (H_2) stated: “There is a negative relationship between size and capital structure”. The study found out that the size of the firm is negatively related to leverage ratio but the effect was not significant. The third hypothesis (H_3) stated: “Firm’s growth rate has a negative effect on capital structure”. The results of this study show that firm’s growth has a negative but insignificant effect on capital structure. The fourth hypothesis (H_4) stated: “There is a negative relationship between profitability and capital structure”. The study

results show that profitability is negatively related to capital structure but not significant. The last hypothesis (H_5) stated: "There is a positive relationship between corporate tax and capital structure". The results indicate not only negative but also insignificant effect of tax on capital structure. Therefore the fifth hypothesis is rejected.

Further analysis was conducted to include only those firms which are already selling their final product. The reason for such analysis was to get a better understanding of the effect of each independent variable on the dependent variable given the fact that all the independent variables are influenced by the level of sales. It should be noted further that firms that are in operation but do not earn income do not yet incur corporate tax. Further analysis results are presented in Table 4.

Table 4: Summary of further regression analysis (Only firms that have revenue from operations)

	Coefficients	***z-Value***	***Standard Error***	***P-value***
Size	-0.014	0.013	-1.060	0.289
Profitability	-1.185	0.372	-3.190	0.001***
Tangibility	-0.014	0.024	-8.360	0.000***
tax effect	0.269	0.163	1.660	0.098*
Growth	-0.169	0.077	-2.190	0.028**

*** p<0.01, ** p<0.05, * p<0.1

Results indicate that once the revenue from operations is taken into consideration, profitability and tangibility negatively and significantly affect the capital structure at 1% significance level. Furthermore, the results indicate that firm growth is negatively influencing the capital structure and is significant at 5% significance level. Tax effect was also found to influence the capital structure significantly positively though at 10% significance level. Only firm size was found not to have a significant effect on the capital structure. The results from further regression analysis do not support H_1 and H_2 but support H_3, H_4, and H_5.

DISCUSSION OF THE FINDINGS

The study results reject Hypothesis 1, that tangibility of assets is not significant enough to explain the variation in leverage. The findings of this study do not support the Trade-Off Theory which advocates that tangible assets act as collateral to obtain loans thus a positive and significant relationship between tangibility and the level of leverage held by the firm (Jensen & Meckling, 1976). The study results concur with those of Saleem, *et al.* (2013) who observed that tangibility and leverage level were insignificantly positively related. The probable explanation for the results of this study can be the fact that most firms in the sample (about 50%) are under the exploration and development phase. As a result, they highly depend on equity financing rather than debt, simply because they have not yet started to get cash inflows from their operations, which is a basic factor under consideration by the lenders. These findings are also supported with earlier descriptive results which indicate the lowest level of debt usage by most oil and gas firms in Tanzania.

Further analysis, however, shows that tangibility negatively and significantly influences the capital structure. These finding do not conform to the Trade-Off Theory which suggests a positive relationship between tangible assets and leverage of the firm and empirical studies conducted by Shah and Khan (2007) and Oppong-Boakye *et al.* (2013). The results might have been affected by the limitations in the study coverage. Relatively few organisations in

the sample sell their final products, which leads to relatively few observations. There has been some development though in Tanzania and currently liquid assets are accepted as collateral. For instance, firms operating in downstream activities pledge their inventory (oil or gas) as collateral for the debt financing.

Although the study reveals that the bigger the firm size the lesser the use of leverage, the relationship is not significant. These findings concur with the Pecking Order Theory which predicts a negative relationship between size and the leverage level of the firm. Moreover, these findings are against the findings by Rajan and Zingales (1995) on the one hand, who reported a negative and significant relationship, and those of Oppong-Boakye *et al.* (2013) and Shah and Khan (2007) on the other hand, who found that there was a positive and significant relationship. The possible reasons for the findings in this study can be the characteristics of the industry in the country. Most of the upstream firms are still at the exploration phase and still growing. The small sample size could also have been another reason.

The firm growth was found to have a negative relationship with leverage ratio but the relationship was not significant. Our findings are contrary in terms of significance to those of Rajan and Zingales (1995), Shah and Khan (2007) and Saleem *et al.*, (2013) who found that growth rate was negatively significant compared to leverage ratio. It should be noted that firms in Tanzania have been in operation for a shorter time and this can be a plausible explanation. However, when further analysis was conducted by taking only firms which had started selling their products, the findings changed to be significant. This indicates that there is significant influence of revenue generation on capital structure of the firms.

The effect of profitability of the level of leverage is not significant when all firms' data is considered. This could be explained by the reason that most firms within the sample have not been enjoying their profits yet. The findings however change and accept Hypothesis 4 when only firms that have started selling their final products are considered. The latter findings conform to the Pecking Order Theory that firms use internally generated funds before going for external sources (Myers & Majluf, 1984). They are also consistent with Abor and Biekpe (2005), Shah and Khan (2007) and Sangeetha (2013) but contrary to findings by Oppong-Boakye *et al.* (2013) who established a positive relationship between the two. The findings suggest that most oil and gas firms in Tanzania are more likely to use their profit as a source of finance. A good explanation for these findings is that growing firms do take up new projects which are presumed to be risky. Lenders charge high interest for financing such projects, hence borrowing becomes dearer. Managers will then prefer to use equity rather than debt.

Considering all firms in the sample, the study findings indicate that tax effect is an insignificant predictor of the level of leverage for the firm. This is in contrast to the studies done by Mackie-Mason (1989) and Oppong-Boakye *et al.* (2013). Further, it does not conform to the Modigliani and Miller theory which states that debt is cheaper due to the tax shield advantage gained by firms which hold debt instruments. Our results could be explained by the nature of the data which included big proportion of firms that have not started enjoying the tax shield. When the only firms with sales were involved in the analysis, we find a positive and significant effect of corporate tax on leverage.

CONCLUSION AND IMPLICATION

The thrust of this study was to find out the determinants of capital structure for oil and gas companies that are operating in Tanzania. Five independent variables - tangibility, firm size, growth, profitability and tax - were tested. The study was grounded on the Pecking Order Theory and Trade-Off Theory. It utilised secondary data from the financial statements of eight[5] oil and gas firms operating in the country from 2008 to 2014. Two levels multiple regression analyses were done: level one included all firms in the sample, while level two included only firms which had started selling their final product. The effect of the independent variables on the leverage level differs from the level of operations. When a mixture of firms is considered, the size of the firm, profitability, tax effect and growth rate tend to be negatively related with the capital structure but their relationship is insignificant. Tangibility on the other hand has an insignificant positive relationship with capital structure. However, when considering only firms that are at the level of selling their final products, profitability, tangibility and growth variables change to be significantly but negatively related to capital structure. Tax on the other hand significantly affects the capital structure positively while size has no effect on the capital structure.

This study has theoretical and practical implications. It contributes to the Pecking Order Theory which holds that firms tend to use internally generated funds before going for external sources. It challenges the Trade-Off Theory which suggests that there is a positive relationship between tangible assets and leverage of the firm. These results should however be taken cautiously given the limitation of the study coverage. Practically, the study highlights the factors that influence firms while choosing sources of financing the oil and gas investments. The study further suggests that the variables also differ along the project life cycle that their effect on the capital structure may not be significant at the initial and developmental stages but can be significant during the selling and growth stages. The study recommends that the Government of Tanzania should improve the Dar es Salaam Stock Exchange to enable oil and gas companies raise larger capital. Further, the debt market should be improved so that firms are able to raise long-term debts for their operations when the need arises.

This study has some limitations. First, there is limited access to financial reports of oil and gas companies. Among all the firms in Tanzania only one oil and gas firm is listed in the stock markets; this is the only one that has its annual reports publicly available. Second, the majority of companies (particularly in the upstream) are still in their exploration stage, hence the study used an unbalanced panel of 8 oil and gas companies for the period of 7 years from 2008 to 2014. Further studies need to be conducted to assess benefits and costs for oil and gas companies listed in the stock exchange. The same study could be conducted to include a larger sample of oil and gas firms as well as increase the period of analysis. Also, as the oil and gas industry is growing in the country, future studies may be conducted to find out what happens if analysis is done according to classes of operation. These include upstream, downstream and midstream activities. Moreover, another study could be conducted to explain the determinants of capital structure of oil and gas companies based on the type of ownership, i.e. private or public.

[5] BG Tanzania, Oryx, PanAfrican Energy, Swala Energy, Statoil Tanzania AS, Songas, Total and Wentworth Gas Ltd.

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APPENDICES

Appendix 1: Summary of ratios as computed by STATA-12

Firm	Year	Debt ratio	Profitability	Tangibility	Firm size	Tax effect	Growth rate
BGTanzania	2012	0.171979	-0.01049	0.003838	20.39204	0	
BGTanzania	2013	1	-0.04984	0.002908	20.74676	0	0.43
BGTanzania	2014	1	-0.10063	0.001409	20.92748	0	0.2
PanAfrican	2009	0.71599	0.146346	0.77856	18.18959	0.306909	
PanAfrican	2010	0.571932	0.244638	0.686062	18.28571	0.304325	0.1
PanAfrican	2011	0.584728	0.180658	0.528164	18.66545	0.319203	0.46
PanAfrican	2012	0.585237	0.251265	0.46348	19.20271	0.31233	0.71
PanAfrican	2013	0.5288	0.242363	0.452068	19.11113	0.077366	-0.09
PanAfrican	2014	0.661456	0.412696	0.441497	18.98992	0.347943	-0.11
Songas	2009	0.998265	0.056836	0.676195	19.71314	0.449451	
Songas	2010	0.972564	0.086232	0.662625	19.64882	0.584012	-0.06
Songas	2011	0.951335	0.059691	0.625014	19.66122	0.428232	0.01
Songas	2012	0.899365	0.10998	0.647629	19.59303	0.042306	-0.07
Songas	2013	0.849843	0.117566	0.598594	19.59422	0.219499	0
Songas	2014	0.829114	0.10195	0.581371	19.58692	0.230261	-0.01
Statoil	2008	1.721918	-35.5927	0.024695	12.96826	0	
Statoil	2009	19.52205	-69.0201	0.206513	11.48223	0	-0.77
Statoil	2010	2.547469	-0.45179	0.001412	16.17091	0	107.71
Statoil	2011	2.703958	-0.75553	0.030803	16.66114	0	0.63
Statoil	2012	0.256223	-0.16174	0.015199	19.42352	0	14.84
Statoil	2013	0.235431	-0.16254	0.008927	20.00432	0	0.79
Swala	2012	9.529535	-16.7084	0.15378	11.23194	0	
Swala	2013	4.304781	-2.97114	0.007494	14.44877	0	23.95
Swala	2014	8.47539	-7.39425	0.037661	13.89756	0	-0.42
Wentworth	2008	2.088302	-0.83836	0.006918	18.43761	0	
Wentworth	2009	34.32763	-0.62539	0.001464	17.82396	0	-0.46
Wentworth	2010	4.54913	-0.36197	0.00027	17.58652	0	-0.21
Wentworth	2011	4.239147	-0.0254	0.001541	17.68949	0	0.11
Wentworth	2012	3.68747	-0.07575	0.000859	17.90125	0	0.24
Wentworth	2013	0.07031	-0.05367	0.000732	18.07005	0	0.18
Oryx	2009	0.079222	0.058466	4.294564	24.83169	2.807819	
Oryx	2010	0.084037	0.05278	5.109635	25.01346	0.614861	0.2
Oryx	2011	0.0486	0.040463	3.895482	25.71478	0.662789	1.02
Oryx	2012	0.063751	0.046101	4.631422	25.52479	0.649999	-0.17
Oryx	2013	0.03988	0.050085	3.41934	25.90279	0.682191	0.46
Oryx	2014	0.061182	0.092181	4.825335	25.69262	0.662755	-0.19
Total	2008	0.791282	0.030177	0.275295	24.99424	-0.30078	
Total	2009	0.775947	0.005369	0.339323	24.80635	-0.29863	-0.17
Total	2010	0.791278	0.056884	0.318367	24.93516	0.154758	0.14
Total	2011	0.878305	0.064705	0.174375	25.65264	0.398252	1.05

Firm	Year	Debt ratio	Profitability	Tangibility	Firm size	Tax effect	Growth rate
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PanAfrican	2011	0.584728	0.180658	0.528164	18.66545	0.319203	0.46
PanAfrican	2012	0.585237	0.251265	0.46348	19.20271	0.31233	0.71
PanAfrican	2013	0.5288	0.242363	0.452068	19.11113	0.077366	-0.09
PanAfrican	2014	0.661456	0.412696	0.441497	18.98992	0.347943	-0.11
Total	2012	0.838577	0.065357	0.241284	25.5324	0.303899	-0.11
Total	2013	0.807023	0.065131	0.211404	25.81721	0.285706	0.33

Appendix 2: Definition of Key Terms

Capital structure is defined as the specific mix of debt and equity a firm uses to finance its operations. If corporate credit risk and good long-term financial position of one measure reflects the ability of creditors to provide capital as well as the ratio of total capital to raise funds for future business, economic strength and safety of assets of enterprises creditors is an important indicator (Zhang *et al.*, 2014). This study used leverage ratio as a measure of capital structure.

$$leverage = \frac{total\ debt}{total\ asset}$$

Asset tangibility means any asset of a company that exists physically. The more the physical assets the more the collateral available; which pleases the creditors who can finance the firm. Under this study tangibility of assets was measured by:

$$tangibility = \frac{total\ gross\ fixed\ asset}{total\ assets}$$

Profitability of a firm is measured by return on assets. It is used as a measurement for firm value because it weighs up the efficiency with which plant, equipment, and current assets are transformed into profit. In this study profitability was calculated as follows:

$$return\ on\ Assets = \frac{net\ income}{total\ asset}$$

Growth refers to the percentage change in the firm's value overtime. In this study, percentage change for each year was calculated as follows.

$$growth = annual\ percentage\ change\ in\ assets$$

Size of a company refers to its capacity to make sales. Firm size was measured by natural logarithm of firms' assets.

Size=Log of assets

Corporate tax is the amount of tax levied on the income generated by the firm. It was measured as follows:

$$\frac{Tax\ paid}{Operating\ income}$$