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The Determinants of Capital Structure of the GCC Oil and Gas Companies

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ABSTRACT

This study aims to investigate the determinants of capital structure (CS), how they differ among levels (upstream, midstream, and downstream), and to identify Which CS theory is more relevant to the oil and gas companies in the GCC. It uses secondary data of 22 listed oil and gas companies in the GCC over ten years (2010 and 2019). The study will add to the literature as there is few studies about CS in the petroleum industry and it is the only study about the GCC oil and gas sector. Using pooled ordinary least square (OLS) random effect model, the main findings of this study are; the CS has a positive significant relationship with the size and tangibility, negative with profitability, and insignificant with growth in sales, market to book value, and price to earnings ratio. the research concluded that the GCC oil companies are aligned with both trade-off theory and pecking order theory. The results show that only the determinants of downstream companies are significant, while middle stream and upstream have no significant impact on CS. One of the limitations is unavailability of data of some governmental oil companies and further research is needed to include non-financial determinants and investigate relationships between CS and the value of companies.

Keywords: Capital Structure Determinants, GCC Oil and Gas CS, CS Theory, Debt Asset Ratio, Debt Equity Ratio
JEL Classifications: G32, Q40, N75, L95

1. INTRODUCTION

The driving force behind activities of world economy is the oil and gas industry. U.S. Energy Information Administration in 2017 (EIA) stated that the demand for the world's energy will increase up to 56% by year 2040, and its future demand as well as supply will increase and dominate for long time. By its nature, this industry is subject to a variety of challenges such as political, technological, environmental risks, and the need for large investments. Oil and gas form the backbone of all the economies in the Gulf Council Countries (GCC), which are composed of six countries (Saudi Arabia, United Arab Emirates, Kuwait, Oman, Qatar, and Bahrain).

The oil proven reserve in Arab countries is more than any other part of the world (713.6 billion barrels), comprising more than 43% of the world's total proven reserves. The Arab world produces nearly a third of world oil supply. The Oil reserves in the GCC countries are among the cheapest in the world to explore, drill, and produce. The U. S. Energy Information Administration (2018) stated that the Arabian Gulf encompasses 55% to 68% of the world's oil reserves and more than 40% of the gas reserves. Shahad et al. (2020) expected very high future growth of energy demand and consumption in Saud Arabia and the GCC at large.

The study of capital structure (CS) of such large companies is of great importance to the policy makers, investors, consumers, and the public at large.

Capital structure is a fundamental topic in finance and this study will add deep insights to the CS in the oil and gas sector. Many studies have been conducted on the determinants of capital structure at the theoretical and empirical levels. However, whether CS of companies will influence their performance or not, is a

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topic that remains largely not investigated especially in the case of developing countries. Furthermore, many contradicting results from past studies exist. Among the examples of these studies are Lewellen and Roden (1995) discovered that total debt and the profitability of a firm are positively related. Another study of Hadlock and James (2002) concluded that companies prefer debt financing because they expect higher returns from more borrowing. In addition, Abor and Biekpe (2005) proved that capital structure has a positive relationship with profitability. Kester (1986) found a negative relation between capital structure and corporate performance. Such contradictions encourage us to conduct empirical study on the determinants of CS in this region.

Hardiyanto et al. (2014) confirmed the significant differences of the capital structure among the different sectors. Gathogo and Ragui (2014) observed that there is still a deviation regarding which factors significantly affect the capital structure. Several studies had been conducted about specific sectors such as banking Kipesha and James (2014), and insurance Tornyeva (2013).

Although oil is the backbone of the GCC economies, no single study was conducted on capital structure about the oil and gas companies. Rawan (2017) studied the determinants of conventional leverage in a sample of listed corporations based in three of the GCC. The main finding is that the determinants of leverage are firm's size, profitability, tangibility, age, and tendency to pay dividends. Although it is the only relevant study but oil and gas companies are not represented in this study. Rohan (2017) found that financial capital supports transition to more capital-intensive energy types. This creates demand for more capital to be invested in energy project. In addition, oil prices are currently leading stock prices as evidenced by Cheema and Scrimgeour (2019). The previous financial crisis encourages oil companies to diversify sources of finance (Rossi et al., 2019).

All previous studies concluded that the patterns of financing between industry sectors differ significantly. They further concluded that, in general, the difference is due to industry characteristics. Therefore, we prefer to empirically study this different sector (Oil and Gas). Petroleum companies are still very large and most profitable companies in the world. Estimating the factors influencing the preferences and developmental trends of a sector with such a critical prescription, capital structure, will contribute significantly to the literature, which has not been adequately addressed by previous research. Almutairi (2014) stated that the GCC economies have usually specific tax legislations that can influence the capital structure of large investment projects. With the exception of Oman, GCC countries did not historically levy corporate income tax on locally owned domestic companies. The significance and justification of conducting this study stems from different angles:

- Sources of finance in the GCC oil and gas companies are different from that of other countries and even other companies in the GCC because the governments look to oil companies as strategic and very special ones and all of them are established and financed by governments. Recently, the governments allow companies to be more independent and create their own sources of finance. This enhances the importance of studying the determinants of capital structure
- Lack of research on capital structure in this industry in the GCC, which is a very rich region
- This study contributes to the body of knowledge through determination of the suitable CS theory and enhance the decisions of the policy makers in the GCC.

The study aims to analyze the determinants of capital structure decisions for the Oil and Gas Companies in the Gulf Council Countries (GCC). Furthermore, the study aims to answer the following questions:

- To what extent the determinants of CS differ among different sectors (upstream, midstream, and downstream)?
- Which CS theory is more relevant to the oil and gas companies in the GCC?

The remainder of this paper is organized as follows. Section 2 discusses the selected theories on capital structure, as well as previous relevant studies in the field. Section 3 is about research methodology, data collection and variable constructions. Section 4 presents results from the empirical analysis. Section 5 is about the conclusion, recommendations, and suggestions for further research.

2. LITERATURE AND HYPOTHSES

Decisions of capital structure are very important decisions that companies must make because they have their significant influence on the value of the company in general and on the weighted cost of capital (WACC) that is composed of cost debt and cost of equity. Capital structure has a direct impact on shareholders' value and management must strike a balance between risk and return to maximize this value through the creation of the optimal capital structure. Diana et al. (2016) stated that optimal capital structure maximizes the market prices of shares through the balance between risks and returns.

The CS theory attempts to explain how different determinants impact the relationship between a firm's capital structure and the value of the company. These capital structure theories investigate the impacts of the sources of finance, the relevant tax benefit from leverage, and the returns required by investors. Up to now, no general agreed up on theory that explains what the optimal capital structure. However, several conditional theories exist. By considering the above stated market imperfections, trade-off theory, the pecking order theory and the market timing theory emerge as more applicable real-life versions of the M&M-theorem Myers (2001) and Graham and Leary (2011). The CS may differ among oil companies based on the nature of activity of upstream (exploration and production), midstream (pipelines), and downstream companies (refining).

Seon and Choi (2019) stated substantial differences between upstream and downstream oil and gas projects in the likelihood and effect of hedging the future price risk. Empirical results in different countries show different variations about the three prominent CS theories, which are available in the literature. All the following theories are concerned with the sources of finance and their implications.

2.1. The Trade-off Theory

Is the oldest theory of capital structure that was developed by Modigliani and Miller (1958), which assumes that there is an optimal level of debt-to-equity financing. Whereas, the current trade-off theory assumes that there are positive effects to debt-financing within the structure of capital. The modern theory differs from that of Miller and Modigliani, in the way that it takes into consideration bankruptcy risk, risk of financial distress, and income tax (Myhre, 2016). Basically, under this theory the debt is the preferred source of financing until a specific point. Since the interest paid on debt is tax deductible, it is advantages for the company to increase its debt-to-equity ratio. The trade-off theory expect a negative relationship between the market to book and leverage. It is expected that a company with a large amount of fixed tangible assets to have lower costs associated with financial distress (Tangibility). Drobetz et al., (2013) found a negative relationship between firm size and expected bankruptcy costs, which again gives a positive relationship between leverage and firm size. The theory is more relevant to firm specific factors.

$$V_L = V_{U+} PV_{ITS} - PV_{BC} \quad (1)$$

Where;
V_L is the value of levered firm
V_U is the value of unlevered firm
PV_{ITS} is the present value of future interest tax shields
PV_{BC} is the present value of bankruptcy costs

2.2. The Pecking Order Theory

It was developed by Myers and Majulf in 1984. This theory is concerned with the determinants of an optimal capital structure. This theory challenges the Trade-off Theory by stating that the company initially prefers internal over external sources of finance, and hence the company prefers debt over equity financing if it issues securities. It assumes that the firm holds unique internal knowledge about itself that allows insiders to make CS decisions. Most of the previous studies are in line with the trade-off theory and claims that there is a significant negative relationship between debt ratios and market-to-book ratio. It is also indicated that a major part of the empirical research done finds a significant positive relationship between firm size and leverage (Drobetz et al., 2013; Rajan and Zingales, 1995; Frank and Goyal, 2015).

Although the pecking order theory is one of the most accepted it has some challenges. In spite of its ability to predict the choice of financing source it does not predict an optimal capital structure, in contrast with the trade-off theory. Another challenge with this theory is that it is more likely to hold when the extent of asymmetric information is large (Baker Hughes, 2018).

2.3. The Market Timing Theory

This theory is proposed by Baker and Wurgler (2002). They studied how equity market timing affected the choice of capital structure. Their main finding is that firms only issuing equity when the market is perceived as favorable. New equity will therefore be issued if the firm is perceived as overvalued, while new debt will be issued if it is perceived as undervalued. This theory might also suggest that firms issue debt when the debt markets are considered favorable. The theory is hence based on the assumption that markets are inefficient. Baker and Martin (2011) argue that a firm's capital structure is not a result from optimization strategies, but rather a cumulative outcome from past market timing attempts.

In perfect capital markets, Modigliani and Miller (1958) claim that capital structure will not affect a firm's value or cost of capital. MM Proposition I "In a perfect capital market, the total value of a firm is equal to the market value of the total cash flow generated by its assets and is not affected by its choice of capital structure" (Berk and DeMarzo, 2014). MM Proposition II "The cost of capital of levered equity increases with the firm's market value debt-equity ratio" Modigliani and Miller (1963).

The most widely used cost of capital is the weighted values of cost of equity and cost of debt after tax, which is known as the weighted average cost of capital (WACC). According to the second proposition, the cost of equity increases with increased leverage. In perfect capital markets, the WACC remains constant, independent of the chosen leverage ratio. This increase in cost of equity is due to larger debt obligations undertaken by the firm. Hence the reduction in cost of capital from debt is offset by an increase in cost of equity, holding the WACC fixed. Assuming perfect capital markets gives the following equation:

$$WACC = E/(D+E) * rE + [D/(D+E)] * rD \quad (2)$$

Where;
$WACC$ is the weighted cost of captial ($WACC$)
rE is the cost of levered equity
rD is the cost of debt
E is the market value of equity
D is the market value of debt

Hence the assumption of perfect capital markets is strong and highly unlikely, which has led to several papers trying to explain why capital structure is relevant.

Many previous studies are available on the determinants of capital structure theories as well as many empirical evidences. However, whether CS of companies will influence their profitability or not, is a topic that still needs to be studied especially in the case of developing countries. The findings from past studies about the determinants of CS seems to be varying and contradicting in different cases and conditions. Some of the examples of these studies are shown by studies conducted by Lewellen and Roden (1995) who discovered that total debt and the profitability of a firm are positively related. Also, Hadlock and James (2002) concluded that companies prefer debt financing because they expect to generate higher returns accordingly. Abor and Biekpe (2005) provided an evidence that CS has a positive relationship with profitability in Ghana. On the other hand, there are researchers that obtained different results. Kester (1986) found a negative relation between CS and corporate performance (profitability) for United States and Japanese manufacturing companies. Rajan and Zingales (1995) found that profitability is negatively correlated with financial leverage. Other findings indicated that financial

leverage has negative relationship with market value to book value ratio but a positive relationship with the value of tangible fixed asset and firm size. Similar evidence by Wiwattanakantang (1999) where there is a negative relationship between CS (measured by book and market debt value) and performance (measured by ROA). All mentioned studies were conducted in different countries and proved different findings and results. This proves that the empirical results obtained cannot be applied directly in every country. Below are various empirical studies that investigate this relationship in developed countries.

Saleem et al. (2013) found a significant relationship between the debt finance and EPS of the company. If degree of financial leverage is high and the return on investment is greater than the cost of debt, then the impact of leverage on EPS will be more favorable. The impact of financial leverage is unfavorable when the earning capacity of the firm is less than the cost of debt.

Arasteh et al. (2013) and Steffen (2018) 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. Bjarne (2020) found great variations among cost of capital among different countries, which also have significant impacts on CS.

Salim and Yadav (2012) used panel data analysis for a sample of 237 Malaysian public listed companies. They included the firm size in their model to control the effects of firm size on the dependent variables. Their findings indicated a negative relationship between CS and firm performance when measured by ROE. Furthermore, Varian et al. (2015) found that capital structure has negative impact on firm's ROA. However, results showed that Tobin's Q has a positive relationship with CS with size as the control variable.

It was stated by Inkpen and Moffett (2011) that taxes reduce both the net cash flow available to investors and raises the break-even barrels production requirement. However, the taxation of the GCC oil and gas companies will have limited impact on the CS.

2.4. The Variables and Hypotheses

2.4.1. The dependent variable

The dependent variables are related to the percentage of debt finance as compared to total resources (assets) or only to equity. Total debt is defined as total long-term debt plus total debt in current liabilities. Hence, debt is measured using both long-term and short-term debt, and reflects the interest-bearing liabilities. The amount of debt finance is referred to as leverage. The current literature has several definitions of leverage to choose from, and there is no clear choice of measure from previous empirical research. This study used two different definitions of leverage; (1) Total-Debt-to-Assets and (2) Total-Debt-to Capital.

Different views and debate in the previous studies of choosing between market and book leverage. Supporters of market leverage argue that the balance sheet is managerially irrelevant but the market is forward looking. Although, Frank and Goyal (2015) confirmed that market leverage would be the most appropriate variable, they also observed that market leverage was too volatile to serve as a proper foundation when issuing new finance. On the other hand, those who believe that using book value is the most appropriate variable when analyzing a firm's capital structure. Myers (2001) do not argue that book values on the balance sheet is more accurate than market values, but that they are based on assets already in place.

This study prefers to select book leverage for both dependent variables, which are measured as:

Debt -Asset Ratio = (Long term debt + Short term portion of LTD)/Total book value of assets, and Debt-Equity = Total debt/ Total equity

2.4.2. The independent variables

Previous empirical studies provide clear evidence that many variables have either a positive or negative on CS, no single CS theory is superior or applicable everywhere, and the results differ among different contexts. This study has empirically investigated the common variables in GCC oil and gas companies.

Profitability: The CS theories deal differently with profitability. Profitable firms are expected to generate large amounts of free cash flows, which makes them more exposed to agency costs (Jensen, 1986). This can be mitigated by using debt financing. Thus, the tradeoff theory predicts a positive relationship between profitability and leverage.

The pecking order theory, on the other hand, predicts that more profitable firms should have lower leverage. More profitable firms are expected to have better accessibility to retained earnings, which according to the theory is the preferred financing source. It is hence expected that firms with higher profitability use less debt financing.

Previous empirical research finds a negative relationship between profitability and debt finance, which is consistent with the pecking order theory. However, profitability can be measured using different accounting items. Inkpen and Moffett (2011) claim that return on equity (ROE) is a common financial performance measure in the petroleum industry. Hence, the study used this measure as proxy for profitability. Others measures for profitability have been used in previous empirical research such as return on assets (ROA), earnings per share (EPS), and price earnings ratio (PER). This is in accordance with Faulkender and Petersen (2006), Bancel and Mittoo (2011), Drobetz et al. (2013), Danis et al. (2014), and Shambor (2017). The profitability Measures are:

1. Return on assets (ROA) = NI/Total BV of assets
2. Return on equity (ROE) = NI/Shareholders Equity
3. Earnings Per Share (EPS) = NI/Number of outstanding shares
4. Price-Earnings Ratio (PER) = Market price per share/EPS

The profitability hypotheses are:
Hypothesis 1: There is a significant relationship between firm's profitability and CS.

Hypothesis 2: There is a significant relationship between price earnings ratio and CS.

Size: Previous empirical studies have given miscellaneous results concerning firm size's effect on leverage. Faulkender and Petersen (2006) find a negative relationship between size and leverage, which is consistent with the pecking order theory. However, Frank and Goyal (2015), Danis et al. (2014) and Shambor (2017) find a positive relationship between size and leverage, giving support to the trade-off theory. The size measure is: Size = Ln (BV of total assets)

Thus, the hypothesis related to the relationship between CS and the company's size can be written as: Hypothesis 3: There is a significant relationship between firm's size and capital structure.

Tangibility: The tangibility of a firm's assets can serve as collateral for the firm's creditors. Fixed assets would hence give security to creditors in case of bankruptcy. Due to this security, higher tangibility makes debt less risky, and vice versa. Based on this argument, the trade-off theory predicts a positive relationship between tangibility and leverage.

When it comes to the pecking order theory, it predicts a negative relationship between tangibility and leverage. Higher tangibility reduces asymmetric information between management and the market, making equity less expensive to issue. Consequently, there should be less debt in firms with higher asset tangibility. The most common measure for asset tangibility used by this study is net property, plant and equipment (PP&E) to total book assets. This study excludes intangible assets such as patents since these may not represent the true level of collateral offered to debtors. This is in accordance with Drobetz et al. (2013), Danis et al. (2014), Thu and Khuong (2018), and Shambor (2017).

The measure: Tangibility = Net PP&E/BV of assets

Hypothesis 4: There is a significant relationship between firm's asset tangibility and capital structure.

Market to BV: Most of previous studies have used market-to-book as a proxy for future growth opportunities. Frank and Goyal (2015) argue that growth increases costs of financial distress, thus augmenting the costs of using debt.

Previous empirical research finds mixed results, but a major part of previous studies finds market-to-book to be negatively related to leverage. Faulkender and Petersen (2006) and Danis et al. (2014) find a negative relationship between market-to-book and book leverage. However, Frank and Goyal (2015) and Drobetz et al. (2013) find different results depending on the choice between book and market leverage. They find a positive relationship between market-to-book and book leverage but find opposite results for market leverage. We used current values of market-to-book in my regression models to proxy for future growth opportunities. This is in accordance with Faulkender and Petersen (2006), Drobetz et al. (2013), and Danis et al. (2014).

Measures:
1. Price to book value ratio (PBV) = MV of assets/BV of assets
2. Sales Growth (SG) = (Sales t-1 – Sales t)/Sales t

Hypothesis 5i: There is a significant relationship between firm's growth measured by market price to book value and capital structure.

Hypothesis 5ii: There is a significant relationship between firm's growth measured by growth in sales and capital structure.

The model of this study is summarized in Figure 1 below:

3. DATA AND METHODOLOGY

The study is based on panel data of 22 GCC listed oil and gas companies in the upstream, midstream, and downstream levels that publishes financial reports over the last 10 years (2010-2019). The total number of firms in upstream are about 8, where as in midstream of about 4 and in downstream which makes majority of companies in GCC of about 10. The data was mainly collected from DataStream and the annual financial statements of each company, in which relevant financial data were extracted from the income statement, the statement of financial position, and the statement of cash flow. Using unit root test before using the analyses we made sure that data are stationary its important as non-stationary data properties changes over time. The study uses descriptive statistics, correlations, pooled (OLS) ordinary least square random effect model to investigate the relationships among the stated dependent and independent variables. Two models about the determinants of the dependent variables are:

$$DA_{i,t} = \beta_0 + \beta_1 Prof_{i,t} + \beta_2 SZ_{i,t} + \beta_2 Tan_{i,t} + \beta_3 PTB_{i,t} + \beta_4 SG_{i,t} + \varepsilon_t \quad (3)$$

$$DE_{i,t} = \beta_0 + \beta_1 Prof_{i,t} + \beta_2 SZ_{i,t} + \beta_2 Tan_{i,t} + \beta_3 PTB_{i,t} + \beta_4 SG_{i,t} + \varepsilon_t \quad (4)$$

Where: $DA_{i,t}$ = the leverage (debt to asset) of the firm i at time t, $DE_{i,t}$ = debt to equity ratio of the firm i at time t, $Prof_{i,t}$ = profitability of the firm i at time t, $SZ_{i,t}$ = the size of the firm i at time t, $Tan_{i,t}$ = tangibility of the firm i at time t, and $PTB_{i,t}$ = growth in terms of market price to book value of firm i at time t, SG = growth in sales, and ε_t is an error term at time t.

β_0, β_1, β_2, β_3, and β_4 are regression coefficient (unknown constant to be determined from the data). The data was coded and entered into EViews software that was used as a tool of analysis.

4. FINDINGS AND DISCUSSION

The descriptive analysis of the both dependent and independent variables is presented in Table 1.

The GCC oil and gas companies have an average debt to asset ratio of 30% but the average debt to equity is more than 100% (1.03). There are great variations among the companies as indicated by a maximum debt to asset ratio of 74% and a minimum of 0% and also the debt to equity ratio is ranging between a minimum of 0% to a maximum of 102%. The average ROE and ROA are almost similar of around 4% but they vary among companies as indicated by a negative ROE of around 7% to a maximum positive of 39% and ROA ranges between

Figure 1: The Research model

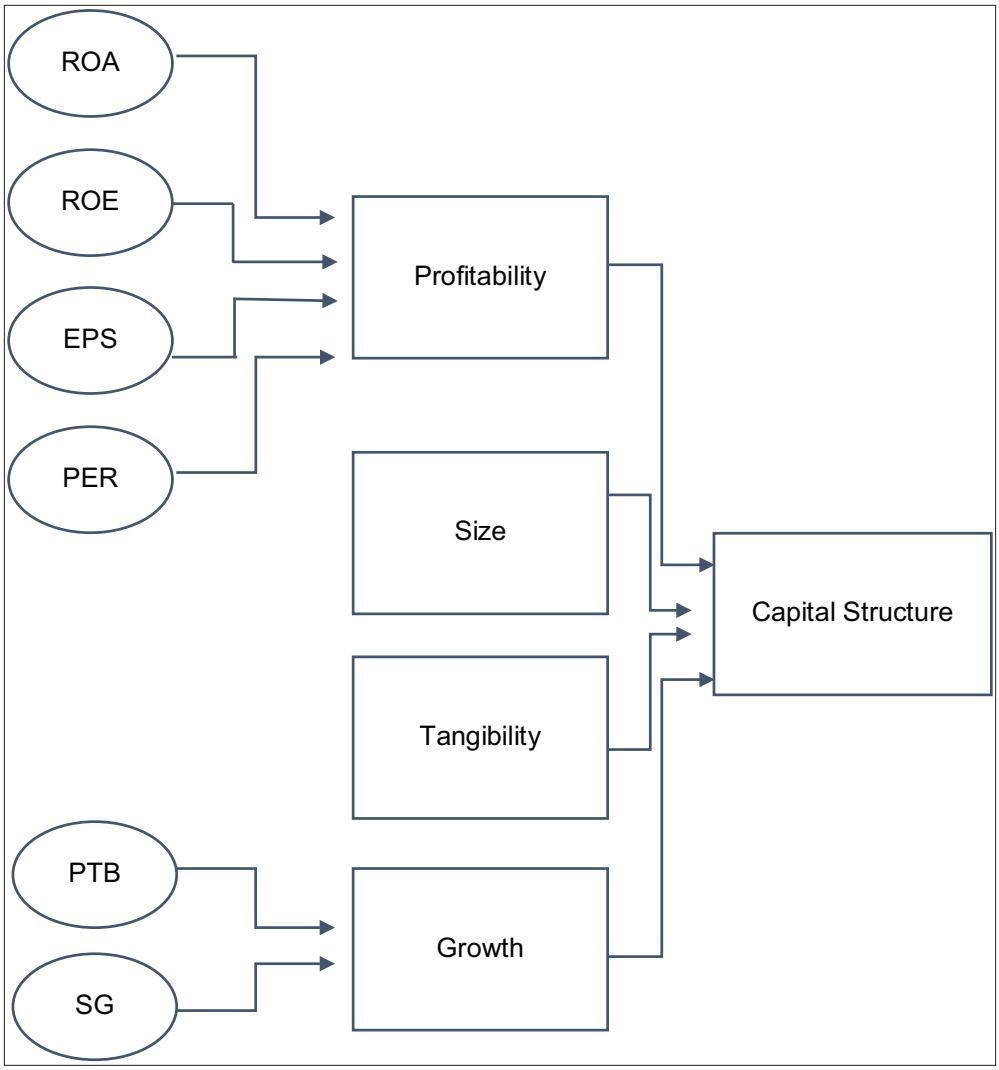

Table 1: Descriptive statistics

	TAN	SZ	ROE	ROA	PTB	PER	SG	EPS	DTOE	DTOA
Mean	0.42	6.36	0.04	0.04	0.95	12.74	0.93	0.34	1.03	0.30
Median	0.41	5.93	0.07	0.04	0.86	11.90	0.06	0.04	0.28	0.26
Maximum	0.94	11.72	0.39	0.28	3.19	375.00	125.67	4.86	10.19	0.74
Minimum	0.18	2.13	-6.55	-0.42	0.00	-250.56	-25.19	-3.14	0.00	0.00
Std. Dev.	0.27	2.63	0.48	0.08	0.50	43.44	9.36	0.74	1.81	0.21
Skewness	0.00	0.46	-12.59	-1.30	1.39	1.14	11.61	1.50	2.84	0.34
Kurtosis	1.76	2.15	173.36	10.25	5.96	34.97	153.83	11.26	11.56	1.93
Jarque-Bera	13.37	13.61	258243.40	516.33	143.79	8945.46	202806.10	672.47	919.22	13.92
Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sum	86.60	1329.08	8.00	8.51	197.76	2661.75	193.48	70.22	214.80	63.21
Sum Sq. Dev.	15.45	1435.62	47.70	1.45	52.32	392527.9	18207.47	114.55	679.56	9.36
Obser.	209.0	209.00	209.00	209.00	209.00	209.00	209.00	209.00	209.00	209.00

Dependent variable DTE (debt to equity) and DTA (debt to asset). Independent variables ROE (return on equity), EPS (earning per share), SG (sales growth), PER (price earnings ratio), PTB (Price to book value ratio), ROA (return on asset), Size (Book value of total asset), Tang (Tangibility)

−42% and 28%. The average EPS is $0.34 with a minimum of −3.14 and a maximum of 4.86. In addition, the price to earnings is 13% on average with a very high variation among companies (−251-375). On average the GCC oil companies have a high annual growth in sales of 93% and the market to the book value of assets is 95%. The size of companies in general is very large as the average size is $6.4 billion with the smallest company's assets of $2.13 billion and the largest of around $12 billion. Average tangible assets represent a high ratio (42%), which is an indicator of high security for future debt.

4.1. Correlation Analysis

The correlation among dependent and independent variables is summarized in Table 2.

The results show that there is a strong positive correlation between debt to asset ratio and two independent variables, which are tangibility (55%) and size (59%). On the other hand, the debt asset ratio and debt to equity ratio are weak and negatively correlated with the performance ratio of ROE, ROA EPS which indicates that firms in GCC follow pecking order theory that is the more profitable the firm is the less likely leverage ratio. Which also means they are using internal resources for financing rather than borrowing. The pecking order theory is also confirmed with fact that there is positive relationship between size and debt indicating that the large firm have the tendency to be more leveraged also they have huge fixed asset that is used as collateral. The results are aligned with findings of Oinoa and Ukaegbub (2015), Vătavu (2015), and Francesca et al. (2020).

The debt to asset ratio had a negative relationship with ROE (−12%), ROA (−4%), PER (−16%), EPS (−1%), growth in sales (−9%), and with market to book value of assets (−8%). Same results are consistent with the other dependent variable, which has only one strong positive correlation with the size of the company (65%), low positive correlation with tangibility (42%), and low negative correlation with the rest of the variables. This implies that all performance indicators and growth measures of the GCC oil and gas companies have the least effect on capital structure decisions than the other variables of size and tangibility. All independent variables have no strong positive or negative correlations among each other's, which indicates that there is no serial correlation among variables and absence of multicollinearity.

4.2. Regression Analysis

The regression analysis is shown on Table 3. The study conducted two types of regression analysis; the first one with debt to asset ratio and the second with debt to equity ratio.

Tables 3.1 and 3.2 depict the results of regression analyses of dependent variables that is debt to asset and debt to capital to

Table 2: Correlation matrix

	TANG	SIZE	ROE	ROA	PTB	PER	SG	EPS	DTE	DTA
TANG	1.00									
SIZE	0.44	1.00								
ROE	−0.05	−0.17	1.00							
ROA	0.04	−0.13	0.42	1.00						
PTB	0.08	−0.11	0.16	0.50	1.00					
PER	−0.19	−0.13	0.04	0.09	0.10	1.00				
SG	−0.11	−0.01	0.00	−0.01	0.08	−0.25	1.00			
EPS	0.16	0.24	0.41	0.26	0.30	0.10	−0.05	1.00		
DTE	0.42	0.65	−0.38	−0.22	−0.15	−0.11	−0.05	−0.19	1.00	
DTA	0.55	0.59	−0.12	−0.04	−0.08	−0.16	−0.09	−0.01	0.71	1.00

Table 3.1: Regression analysis: dependent variable: debt-asset

Variable	Coefficient	Std. error	t-statistic	P-value
C	−0.233821	0.077849	−3.003538	0.0030
ROE	0.019883	0.014322	1.388268	0.1666
EPS	−0.024068	0.013445	−1.790174	0.0749
SG	0.000242	0.000611	0.396380	0.6922
PER	0.000178	0.000140	1.274431	0.2040
PTB	0.003800	0.018023	0.210814	0.8332
ROA	−0.331657	0.111448	−2.975900	0.0033
SIZE	0.075999	0.010678	7.117697	0.0000
TANG	0.164784	0.043240	3.810939	0.0002
R-square	**Adjusted R-square**	**S.E of regression**	**F-statistic**	**Prob. (F-statistic)**
0.295554	0.267376	0.075989	10.48888	0.000000

Dependent variable, debt to asset. Independent variables ROE (return on equity), EPS (earning per share), SG (sales growth), PER (price earnings ratio), PTB (Price to book value ratio), ROA (return on asset), Size (Book value of total asset), Tang (Tangibility)

Table 3.2: Regression Analysis: Dependent variable: Debt-equity ratio

Variable	Coefficient	Std. error	t-statistic	P-value
C	−2.274478	0.445290	−5.107860	0.0000
ROE	−0.146962	0.095000	−1.546964	0.1235
EPS	−0.248518	0.088421	−2.810617	0.0054
SG	−0.001793	0.004052	−0.442502	0.6586
PER	0.000290	0.000928	0.312618	0.7549
PTB	0.091281	0.118728	0.768827	0.4429
ROA	−1.085317	0.735188	−1.476245	0.1415
SIZE	0.474540	0.061875	7.669386	0.0000
TANG	0.799333	0.281724	2.837290	0.0050
R-square	**Adjusted R-square**	**S.E of regression**	**F-statistic**	**Prob. (F-statistic)**
0.321845	0.294719	0.512925	11.86472	0.000000

all the independent variables. The results show that the model is fit as the probability of F-statistics is 0.00. This is within the acceptance level of F-st. <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. The further away the t-Statistics value from 0, the more likely that the effect is statistically significant. It is noticed that the t-value of all independent variables in both tables is not close to zero, which indicates some kind of relationships between CS and others independent variables. Furthermore, the size has positively significant p-value indicating that large firms have resources and assets that could be used as collateral. There is significantly negative relation between capital structure and profitability to some extent for example in case of debt to asset and ROA confirming the pecking theory however the hypotheses are not proven in case of debt to equity. The results of our analysis show a positive significant association between tangibility and capital structure indicating that the firms have capability if using its assets as collateral. All variables with $P < 0.05$ will have significant impact on the CS. Based on the regression analysis and significant relationships, the models are written as follows:

$$DA_{i,t} = - 0.234 – 0.332\ ROA_{i,t} + 0.76\ SZ_{i,t} + 0.165Tan_{i,t} + \varepsilon_t \quad (5)$$

$$DE_{i,t} = - 0.274 - 0.249\ EPS_{i,t} + 0.475\ SZ_{i,t} + 0.80\ Tan_{i,t} + \varepsilon_t \quad (6)$$

4.3. The Outcomes of Panel Data Regression Analyses

The findings of both tables and both measures of CS are highly consistent. This regression result helps us to decide on the hypotheses of the study.

Hypothesis 1: There is a significant relationship between firm's profitability and capital structure.

Based on the study findings, CS measured by debt to asset ratio has a negative relationship with EPS and ROA and a positive relationship with ROE. However, when measuring CS through debt to equity ratio, it has a negative relationship with ROA, EPS ROE. Overall, we can accept the first hypothesis. This finding is consistent with (Hasanudin et al., 2020; Hung et al., 2018, and Khamis et al., 2018).

Hypothesis 2: There is a significant relationship between price earnings ratio and capital structure. The CS has a positive but insignificant relationship with the price to earning ratio. Therefore, the second hypothesis will be rejected. For the third hypothesis, which stated as; there is a significant relationship between firm's size and capital structure. The findings provide a very significant strong relationship between the size of the company and the CS in both debt to asset ratio (7.1) and debt equity ratio (7.7) with a p-value of 0.0000. Hence, the third hypothesis is accepted.

Hypothesis 4 is about the relationship between CS and tangibility. It is clearly evident that both measures have significant relationship with tangibility, which results in accepting this hypothesis.

The fifth hypothesis is about the relationship between growth that is measured by growth is sales and market to book value of assets. The results show no significant relationship of both measures with both of dependent variables. This results in rejecting this hypothesis.

4.4. Panel Regression on Different Sector of Oil and Gas Company

Tables 4 and 5 show the results of CS or leverage (measured by debt to asset) and (measured by debt to equity) and independent variables on three different levels of oil and gas companies that are upstream, downstream and mid-streams.

The results show that the size is not significant when we divide the companies into different sector compared to when we take in totality where size was significantly positive. The results are consistent with (Cortez and Susanto 2012; Vatavu 2015). The results of profitability are somewhat inconclusive as profitability is measured by (ROA) is aligned with pecking theory in downstream however the results are not supported in case of upstream and mid-stream and also other measure of profitability that is (ROE). The results also show that

Table 4: Regression analysis debt to assets

Variable	Up stream		Down stream		Middle stream	
	t-stat	P-value	t-stat	P-value	t-statistic	P-value
C	−0.080638	0.9360	5.081455	0.0000	−1.776347	0.0869
ROE	−1.937885	0.0579	2.817731	0.0061	−1.608816	0.1193
EPS	1.967992	0.0542	−0.624422	0.5341	0.536331	0.5961
SG	−1.890149	0.0641	−2.433805	0.0172	0.313994	0.7559
PER	0.793173	0.4311	−2.097153	0.0391	2.400578	0.0235
PTB	2.167071	0.0347	0.313515	0.7547	0.052983	0.9581
ROA	−0.574881	0.5678	−4.114333	0.0001	0.217343	0.8296
SIZE	1.982072	0.0526	0.779408	0.4380	1.880477	0.0709
TANG	2.522206	0.0146	4.889353	0.0000	0.991074	0.3304
R-square	0.415034		0.556676		0.332843	
Adjusted R-square	0.328372		0.512344		0.135167	
S.E of regression	0.053315		0.149302		0.069094	
F-statistic	4.789128		12.55686		1.683779	
Prob. (F-statistic)	0.000175		0.000000		0.148230	

Dependent variable, debt to asset. Independent variables ROE (return on equity), EPS (earning per share), SG (sales growth), PER (price earnings ratio), PTB (Price to book value ratio), ROA (return on asset), Size (Book value of total asset), Tang (Tangibility)

Table 5: Regression analysis: Debt to equity

Variable	Up stream		Down stream		Middle stream	
	t-stat	P-value	t-stat	P-value	t-statistic	P-value
C	0.466427	0.6428	1.508521	0.1354	2.714747	0.0114
ROE	1.239477	0.2205	1.671967	0.0984	−2.026411	0.0527
EPS	−0.934330	0.3543	−0.145514	0.8847	2.796124	0.0094
SG	−0.646828	0.5205	−2.113078	0.0377	−0.804468	0.4282
PER	−0.069518	0.9448	−1.716101	0.0900	2.224392	0.0347
PTB	0.290671	0.7724	1.848315	0.0683	−0.100121	0.9210
ROA	−0.755509	0.4532	−4.601679	0.0000	−0.004757	0.9962
SIZE	0.342455	0.7333	1.869468	0.0652	0.959906	0.3456
TANG	0.921608	0.3608	5.931082	0.0000	−1.137316	0.2654
R-square	0.068247		0.648830		0.336319	
Adjusted R-square	−0.069790		0.613713		0.139673	
S.E of regression	0.661445		0.760991		0.857900	
F-statistic	0.494411		18.47627		1.710278	
Prob. (F-statistic)	0.854874		0.000000		0.141551	

there is significantly negative association between capital structure and growth in down stream which is in accordance with trade off theory. The relationship between tangibility and capital structure in downstream is significantly positive which is with accordance to the trade-off theory. (Chaklader and Chawla 2016; Cortez and Susanto 2012; Rajan and Zingales 1995).

5. CONCLUSIONS AND RECOMMENDATIONS

The paper aims at exploring the determinants of capital structure of the listed oil and gas companies in GCC. The study states two main objectives firstly, to asses the determinants of CS and how much they differ among levels (upstream, midstream, and downstream) and secondly, to identify Which CS theory is more relevant to the oil and gas companies in the GCC.

Using secondary data of 22 listed oil and gas companies in GCC over 10 years period (2010-2019). Using pooled (OLS) ordinary least square random effect model the study concluded that the size of the firm has positive significant relation with capital structure indicating that the firms have the tendency to be more leveraged as the they have huge fixed asset that is used as collateral. The research concluded that the oil and gas companies in GCC are either aligned with the trade-off theory or the pecking order theory. The firms in GCC tends to have significantly negative relationship between CS and profitability which is in accordance with Myers pecking order theory rather trade-off theory. The results also confirm the trade-off theory in reference to the relationship between tangibility and capital structure indicating that the firms have capability of using its assets as collateral. The results are confirmed in level analysis (upstream, downstream, and middle stream). However, only downstream results are significant as f-statistic for middle stream and upstream are not significant. The growth had insignificant effect when taken in totality with capital structure however in reference to downstream companies are significantly negatively associated with capital structure which is in accordance with trade off theory.

The study had some limitations such as most of oil and gas companies were governmental firms until recently before they issued IPO. Also, some companies do not issue full disclosures so we had to opt the data provided by DataStream and some companies whose reports were available.

In future, there is a need to conduct research on the relationship between CS and the value of oil and gas companies. In addition, more variables other than studied to be included to know their impact on CS.

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