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Factors Affecting Capital Structure Decision: Empirical Evidence from Indian Oil and Gas Sector

Dharmendra S. Mistry*, Pallavi C. Vyas**

Abstract

In the existing research, analysis has been done on finding out the impact of the independent variables, i.e., profitability (ROA), liquidity (CR), and tangibility (FA to TA ratio), on the dependent variable, i.e., capital structure (debt-equity ratio) of the oil and gas public sector in India during the period of 5 years, i.e., 2015-2016 to 2019-2020, through the statistical model. The study found that the independent variables, i.e. ROA and current ratio, have a negative/indirect impact on capital structure decision, while the independent variable, i.e., fixed assets to total assets was found to have a positive/direct impact on capital structure decision.

Keywords: Capital Structure, Liquidity, Profitability, Tangibility

Introduction

One of the most significant monetary decisions facing firms is determining mix of debt and equity capital, i.e., capital structure decision, which can be defined as debt to assets, and stimulus on profitability and precariousness of the business. Looking to the requirements of the companies, short-term and long-term debt (Chen, 2004) are preferred by them, and there are several factors that affect capital structure decision. It is important to determine an ideal combination of debt and equity to attain maximum value for a firm; it is equally vital to evaluate the worth of tax shield contrary to several expenses of monetary distress, agency costs and moral hazard (Myers, 1984), and to indicate projections to the less-informed investors (Ross, 1977). It has an influence on the cost of capital and its capability to deal with its modest atmosphere. It is one of the effective decisions to accomplish the cost of capital. An optimum capital structure is touched at a point where the cost of the capital is the minutest. The capital structure is consequently one of the most imperative problems in corporate finance, and financial managers go all-out to keep a capital structure that lessens monetary and business risks, while capitalising on shareholders' wealth.

In the present research, analysis has been done on finding out the impact of the independent variables, i.e., profitability (ROA), liquidity (CR), and tangibility (FA to TA ratio), on the dependent variable, i.e., capital structure (debt-equity ratio) of the oil and gas public sector in India during the period of 5 years, i.e., 2015-2016 to 2019-2020 through the statistical model. The regression technique has been used to study the level of impact of the independent variables on the dependent variable of the selected companies in the public sector oil and gas industry in India. It is hypothesised for the study that profitability (ROA), liquidity (CR), and tangibility (FA to TA Ratio) collectively do not have an impact on capital structure (debt-equity ratio) of the oil and gas public sector in India. The study has been carried out as follows: this section gives an introduction about the present research work; the second section discusses the literature review on research work carried out on capital structure; the third section outlines the methodology of the present study; the fourth section discusses the result; and the last part of the study outlines the conclusion.

Literature Review

The study on capital structure begun with the introduction of the irrelevance theory – known as MM theory (Modigliani & Miller, 1958), followed by trade-off theory (Modigliani & Miller, 1963), pecking order theory (Myers & Majluf, 1984), and market timing theory (Baker & Wurgler, 2002). Corporate funding behaviour in developing nations can be influenced by an identical set of aspects as in developed nations (Booth et al., 2001). Capital structure decision can be affected by various factors, such as owner's attitude in the direction of debt (Matthews, 1994); profitability, size (Cinde, 2016) (Kaur,

* Prin M. C. Shah Commerce College, Gujarat University, Gujarat, India. Email: dsmistry76@yahoo.co.in
** Prin M. C. Shah Commerce College, Gujarat University, Gujarat, India. Email: pvyas1985@yahoo.com

2018), tangibility, and liquidity (Ronoowah, 2004) (Sabir & Malik, 2012); firms' characteristics (Gonenc, 2003); ownership structure (Chen, 2004); financial distress costs (Titman, 2007); interest coverage ratio and growth (Mat Kila & Wan Mansor, 2008); leverage and enforcement system (Cariola, 2010); age, financial constraints, and government ownership (Khaki & Akin, 2020); legal structure of the organisation and taxation policies (Skalická et al., 2017); investment risk (Merlo et al., 2013); firm size and maturity, inflation or market conditions, and market to book assets ratio (Frank & Goyal, 2009); corporate governance and customer base (Juliet et al., 2018); firm-related characteristics, such as future growth options, earnings volatility, profitability, and control (Titman & Wessels, 1988); access to capital markets, and lender's attitude towards the firm (Nyanamba et al., 2013); and risk (Sureshbabu & Chalam, 2014) (Soni, 2017). In short, conventionally, most investigations focussed solitarily on the firm's characteristics while analysing the factors of corporate capital structure; however, recently, investigators divided elements of capital structure into 3 characteristics: firms' features, industry's features, and country's features, despite clearing up the capital structure decision.

From the above review of empirical works, it is clear that different authors have approached their research on capital structure decision in different ways, with varying levels of analysis. These different approaches helped in the emergence of more literature on the subject over a period of time. It gives an idea of extensive and diverse works on capital structure decision. It has been noticed that the studies on factors affecting capital structure decision in various aspects provide divergent results, because of an overlap or coinciding study period. The main reason for the divergence in the results is the use of different methods for the measurement of factors affecting capital structure decision. All the studies aimed to analyse factors affecting capital structure decision in India and abroad. The survey of the existing literature reveals that no specific work has been carried out to examine and ascertain determinants of capital structure decision of the oil and gas public sector companies in India. Moreover, varying outcomes by preceding studies provided the system for future studies, precisely on the oil and gas industry, as the theory of capital structure from the oil and gas industry's standpoint has not been stretched (Hamzah & Marimuthu, 2019). The present study is an attempt in this direction, and therefore, aims to enrich the literature on the identification of determinants of capital structure decision of oil and gas public sector companies in India. Hence, the present study has been carried out with the following objective:

To study the impact of profitability (ROA), liquidity (CR), and tangibility (FA to TA ratio) on capital structure (debt-equity ratio) of the oil and gas public sector in India.

Methodology

Geographical Coverage and Duration: The present research work had geographical coverage of India. It has taken into account the duration of 5 years, i.e., 2015-2016 to 2019-2020.

Population, Sampling Method and Sample Size: There were 7 public sector companies in the oil and gas sector in India during the study period. The researcher wanted to take the entire population as sample for the present study. However, out of the 7, the present study is based on 6 public sector companies, due to the availability of data and time. The reason for omitting one company was the non-availability of data. Hence, the sample has been good enough to give an entire picture of the oil and gas sector in India in general, because the public sector dominated the oil and gas sector in India during the study period.

Data Collection: The study has been based on secondary data collected from annual reports of the companies under study and different websites.

Variables Used: In this research endeavour, capital structure (debt-equity ratio) of the firm has been taken as the dependent variable, whereas profitability (ROA), liquidity (CR), and tangibility (FA to TA ratio) of the firm have been taken as the independent variables.

Hypothesis: The following hypothesis has been framed to carry out the research work.

Null Hypothesis: Independent variables, i.e., profitability (ROA), liquidity (CR), and tangibility (FA to TA ratio) are statistically insignificant in explaining the capital structure decision (debt-equity ratio) of the companies under study.

Alternate Hypothesis: Independent variables, i.e., profitability (ROA), liquidity (CR), and tangibility (FA to TA ratio) are statistically significant in explaining the capital structure decision (debt-equity ratio) of the companies under study.

The above hypothesis has been tested through the techniques of regression and correlation. The following regression model has been developed to test the hypothesis:

$$y = \alpha + \beta1x1 + \beta2x2 + ….. + e$$

Where, y - Dependent variable

x1, x2, ….. xk - Independent variables

β1, β2 …. - Regression coefficients

$$D = \alpha + \beta1x1 + \beta2x2 + ….. + e$$

Where, D = Dependent variable (debt-equity ratio)

x1, x2, = Independent variables, i.e., profitability

(ROA), liquidity (CR), and tangibility (FA to TA ratio)

β1, β2, … = Beta value/slop coefficients/parameters of the model show the rate of change in independent variable(s) for a unit change in debt-equity ratio

Table 1: Definitions and Predicted Signs of Dependent and Independent Variables

Variable	*Definition*	*Predicted Sign*
Dependent Variable		
Debt-Equity Ratio	Borrowed Funds/Owners' Funds	+/−
Independent Variables		
Return on Assets	Profit/Assets	+/−
Current Ratio	Current Assets/Current Liabilities	−
Fixed Assets to Total Assets Ratio	Fixed Assets/Total Assets	+

Table 1 shows the variables used, their definitions, and predicted impact of the independent variables on the dependent variable (Pahuja & Sahi, 2015).

Limitation: The present study has been based on secondary data. The outcome of the study has been based on the accuracy of the data so collected. The study has been limited to the public sector only.

Result and Discussion

Table 2: ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	39.0181	13.00603	12.21942	0.0000354650617466254
Residual	26	27.67373	1.064374		
Total	29	66.69183			

Table 2 shows ANOVA result of the regression models. As far as the Significance F value is concerned, it gives an idea that the regression result has been reliable (statistically significant). As Significance F is less than 0.05 (5%), the regression model has been fit, and hence, the selected independent variables have been significant in explaining the dependent variable. The models fitted have been the best in describing the behaviour of the dependent variable against suitable alternatives, and there has been a significant impact of independent variables on capital structure decision.

Table 3: Summary Output

Regression Statistics	
Multiple R	0.764886
R Square	0.585051
Adjusted R Square	**0.537172**
Standard Error	1.031685
Observations	30

Table 3 divulges the summary of regression statistics. It can be seen that adjusted R square is 0.53, which indicates

that after adjustments the model explains 53% variation in capital structure because of a set of predictors. The model also states that the dependent variable, i.e., capital structure, can be predicted from a linear combination of factors affecting capital structure decision, i.e., return on assets, current ratio, and fixed assets to total assets ratio. The remaining change in capital structure behaviour is due to the other factors not taken into account; it represents all those factors that affect capital structure but are not taken into account explicitly/clearly. The model summary reveals that a set of selected determinants of capital structure strongly influence capital structure and have an impact on their fluctuation. It shows that a 100% change in the set of predictors, i.e., return on assets, current ratio, and fixed assets to total assets ratio, will result in 53% change in the dependent variable, i.e., capital structure.

Table 4: Regression Result

	Coefficients	*Standard Error*	*T Stat*	*P-Value*
Intercept	1.270041	0.896109	1.417284	0.168273
ROA	−0.13462	0.035526	−3.78945	0.000808
CR	−0.80198	0.799423	−1.0032	0.325011
FA to TA	0.005866	0.002481	2.364496	0.025803

Table 4 shows the regression result. Coefficients of factors affecting capital structure decision propose that each 1% change in fixed assets to total assets ratio leads to a positive increase in capital structure, while a 1% change in return on assets and current ratio leads to a negative change in capital structure. Change in current ratio has a greater impact on capital structure, followed by return on assets and current ratio. This means that the higher the fixed assets to total assets ratio, the higher the debt in the capital structure. Or we may say that an increase in fixed assets to total assets ratio will increase the proportion of debt in the capital structure, and the change in return on assets and current ratio will adversely affect the proportion of debt in the capital structure. Hence, the regression model to determine the capital structure of oil and gas public sector companies in India will be as follows:

$$D = \alpha + \beta 1\ ROA + \beta 2CR + \beta 3FATA + e$$

$$D = 1.270041 - 0.13462*ROA - 0.80198*CR + 0.005866*FATA$$

Table 5: Correlation Result

	Debt-Equity	*ROA*	*CR*	*FA to TA*
Debt-Equity	1			
ROA	−0.67072	1		
CR	−0.45062	0.37561	1	
FA to TA	0.522278	−0.28551	−0.34467	1

Table 5 shows correlation results. It shows that the independent variables, i.e. ROA and current ratio, have a negative/indirect correlation with capital structure. This means that as independent variables, i.e. ROA and current ratio decrease, the dependent variable, i.e., proportion of debt in capital structure increases. On the other hand, the independent variable, i.e., fixed assets to total assets has a positive/direct correlation with capital structure. This means that as fixed assets to total assets increases, proportion of debt in capital structure also increases. As the values of correlation coefficient of all the independent variables are closer to 1, they are closely/strongly related to capital structure.

Looking at the results of regression and correlation, it can be said that capital structure has significantly been affected by profitability (ROA), liquidity (CR), and tangibility (FA to TA ratio) as per the predicted sign, as mentioned in Table 1. Hence, the result of the present study has been as per the predicted result based on literature review. The null hypothesis is rejected and the alternate hypothesis is accepted. It can be said that there are independent variables, i.e., profitability (ROA), liquidity (CR), and tangibility (FA to TA ratio), which are statistically significant in explaining the capital structure decision of the companies under study.

Conclusion

The study found that the independent variables, i.e., ROA and current ratio, have a negative/indirect impact on the capital structure decision. Hence, it can be concluded that as independent variables, i.e., ROA and current ratio, decrease, the dependent variable, i.e., proportion of debt in capital structure increases, to improve profitability and liquidity performance of the companies under study. On the other hand, the independent variable, i.e., fixed

assets to total assets was found to have a positive/direct impact on the capital structure decision. Hence, it can be concluded that as fixed assets to total assets increases, proportion of debt in capital structure also increases, because the companies can easily raise the required funds due to an improvement in their solvency with the increase in fixed assets for development and diversification of the companies under study. It can be concluded that capital required to purchase fixed assets can be raised with the help of borrowed funds or by increasing the proportion of debt in capital structure.

Moreover, as Significance F is less than 0.05 (5%), it can be concluded that the regression model has been fit, and hence, the selected independent variables are significant in explaining the dependent variable, i.e., capital structure decision. As the regression model explains 53% variation in the capital structure because of a set of predictors, it can be concluded that the dependent variable, i.e., capital structure can be predicted from a linear combination of factors affecting capital structure decision, i.e., profitability (ROA), liquidity (CR), and tangibility (FA to TA ratio).

The objective of this research was well served by presenting a comprehensive framework of the oil and gas public sector in India to support management in the determination of capital structure decision, fluctuations in the determinants of capital structure, and their impact on the capital structure. This research provides the firms specific factors that cause fluctuation in proportion of debt in capital structure to facilitate the management to make one of the significant decisions of financial management, i.e., capital structure decision. The concluded summary of this research offers financial managers major determinants of capital structure, which are profitability (ROA), liquidity (CR), and tangibility (FA to TA ratio). It is therefore suggested that promoters/financial managers must observe and analyse these 3 major factors for determining the proportion of debt in capital structure.

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