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EXAMINATION OF CAUSAL RELATIONSHIP BETWEEN QUANTUM OF DEBT IN CAPITAL AND PROFITABILITY- EVIDENCE FROM INDIAN STEEL SECTOR

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Abstract

Optimal capital structure leads to value maximization in a firm. An appropriate debt equity mix is a challenge as debt being a cheaper source of capital is always attractive though it increases the financial risks of the company. Steel sector is one of the highly geared sectors in India with huge debt in its capital employed. Indian steel sector had ample opportunities to grow however, trade war, protectionism, Government apathy towards building up a mature manufacturing sector, heavy financing costs, high logistics costs, management costs, heavy taxes, disruptive global trade, international steel prices, environmental norms, digital disruption have all added to the misery of Indian steel companies. This study purports to examine whether quantum of debt capital employed has affected the financial performance of steel companies in India. Financial performance of 194 listed companies in steel sector were studied to investigate the impact of debt capital on profitability. It is observed that there is a significant relationship between financial performance and quantum of debt capital. Size of the assets and volume of sales are also important factors.

Key words: Steel sector, Debt capital, financial performance, Panel regression, India

1. Introduction

A healthy capital structure is key to a firm's performance and survival. Capital structure is the debt – equity mix employed by a firm to fund its business. An optimum capital structure minimizes the cost of capital thereby maximizing firm value. Given that a firm's ultimate objective is value maximization, decision as to an appropriate debt equity mix is a challenge for every finance manager. Debt being a cheaper source of capital is attractive but at the same time increases the financial risk of the firm. A high debt leads to poor interest servicing, affecting profitability, (Vaidya and Patel, 2019). It also increases the bankruptcy risks of the firm. Balancing risk and cost of capital becomes important for long term survival of firm. There is a close relationship between capital structure and firm performance, (Cole et al, 2015). Debt financing enables a firm to make profitable investments leading to economic growth, (Mitton, 2007). A positive link between debt financing and economic growth has been established in several studies, (Rajan and Zingales, 1998; Beck et al, 2000; Wurgler, 2000 in Mitton, 2007). At the same time, availability of debt financing may prompt managers to take excessive financial risks leading to financial distress. This is especially observed in emerging markets where huge availability of debt appears increase emerging market leverage. (Krugman, 1999; Bris and Koskinen, 2002; Mitton, 2007). The problem intensifies in developing economies like India, where markets are less efficient. Financial decisions of firms are inconsistent in inefficient markets, Eldomiaty, (2007). Detailed studies on capital structure and its impact on financial performance of Indian

manufacturing companies is far and few. Analysing the relationship between capital structure and financial performance of Indian firms can provide useful information as to how debt equity mix has affected the performance of the firms. Hence, the present study focuses on the impact of debt on financial performance of steel producing companies in India.

2. Why Steel Sector?

Steel sector is one of the most critical sector impacting an economy's growth and development. Global steel production growing at a CAGR of 4% is estimated at 2175 million tons by 2024. Growing urban population leading to expanding infrastructure, construction and auto sectors have largely contributed to the demand of steel worldwide. India produced 5.42 million tons of Pig Iron, 37.1 million tons of Sponge Iron and 102.62 million tons of finished steel respectively in 2019-20. It contributes to approximately 2% of country's GDP. However, it has a large supply chain thereby leading to an output impact of 1.4X and employment multiplier of 6.8X. Over the last decade, India has witnessed a steady increase in steel sector output enjoying a net exporter status. Backed by sustained local demand from construction, railways, automobiles, capital goods, consumer durables sectors, Indian steel sector had ample opportunities to grow. The National steel Policy, 2017 lays down the vision of the Government to promote this sector. However, in the last two years factors like trade war, protectionism, Government apathy towards building up a mature manufacturing sector has led to India becoming a net importer. This coupled with other challenges like heavy financing costs, high logistics management costs, heavy taxes, disruptive global trade, international steel prices, environmental norms, digital disruption have all added to the misery of Indian steel companies. Many steel companies are facing bankruptcy proceedings. As of 2018, loan default by steel sector was pegged at approximately Rs.57000 crores. The Indian steel sector is clearly in distress. This paper purports to study the financial performance of Steel sector in India and examine the impact of capital structure on financial profitability of listed steel companies in India.

3. Literature Review

Capital structure refers to various sources of funds employed in the business. It mainly comprises of equity share capital, preference shares capital, debt capital viz loans, debentures, bonds, public deposits, notes payable, etc. Equity shareholders are owners of the firm and hence are interested in long term growth and survival of the business. Preference shareholders and lenders of debt capital are creditors of the firm and hence are keener on interest payments and debt servicing. Debt capital is cheaper than equity but makes the firm riskier. Theory states that an optimum capital mix is the one which maximizes firm value and minimizes cost of capital. Many theories have been propounded establishing the relationship between capital structure decisions and firm performance. Modigliani and Miller's (1958) in their seminal paper had suggested that capital mix is not related to firm value under the assumption of perfect markets, absence of tax, agency cost, transaction cost and perfect information availability. Subsequently, tax benefits from debt were added as a factor affecting firm value. According to pecking order theory, (Myers and Majluf, 1984), managers have better information about firm business opportunities and associated risks. Hence existence of high transaction and distress cost of external funds, internal financing through retained earnings is the most preferred source of funds followed by debt and equity. As per trade off theory, optimal capital structure is attained when there is a balance between tax benefit of debt and distress cost of debt. Many studies have empirically examined this relation and has provided evidence to a strong link between capital structure and profitability of a firm, (Harris and Raviv, 1991; Rajan and Zingales, 1995), Fama and French (2002) found a positive relationship between leverage and profitability. Demirguc-Kunt and Maksimovic (1996) stated that large firms in developing countries become more leveraged as stock markets develop. Gill, Biger and Mathur (2011) also found a positive relationship between leverage and profitability. Ramachandran and Candasamy (2011) proved that a strong one-to-one relationship exists between capital structure and profitability variables. Zeitun and Tian (2007) have considered ROA and Tobin's Q as the most powerful measures of performance in the Jordan case. The paper concluded that a firm's capital structure has a significantly negative impact on the firm's financial performance. Onaolapo and Kajola (2010), in their study on Nigerian companies, have stated that the debt ratio has a significantly negative impact on the firm's financial measures. San and Heng (2011) have investigated into the relationship of the capital structure and financial performances. ROA has been taken as one of the variables for financial performance. Their paper concluded that there is a significant relationship between the capital structure and financial performance. Pramit and Pramit (2015) studied the impact of liquidity, efficiency and capital structure on profitability in selected textile companies and observed that capital structure does impact profitability. Safiuddin et al. (2015) studied the effect of financial structure on the performance of the firms during recent years in Bangladesh and observed that they are closely related.

Nurlaela et al (2019) found a close relationship between capital structure and financial performance amongst listed Indonesian companies. Hiran (2016) examined the relationship between liquidity and profitability, and between leverage and profitability in Indian automobile sector and indicated a strong relationship between profitability and leverage. In capital intensive companies in India, leverage was found to have a negative impact on profitability, (Vaidya and Patel, 2019). Pal and Bhattacharya (2013) in their study of three major Indian steel units found that profitability depends on other financial indicators like liquidity, activity and financial leverage. Raheman et al. (2007) demonstrated that the capital structure of non-financial firms listed on Islamabad Stock Exchange had a significant effect on the profitability of the firms. Azhagaiah, R., & Gavoury, (2011) observed a strong relationship between capital structure variables and profitability in IT Industry in India. Sarkar and Zapatero (2003) also found a positive association between leverage and profitability. Das, C. P., & Swain (2018) found a significant relationship between capital structure and profitability amongst manufacturing companies in India. However, Abeywardhene, (2015) in their study of MSME in UK observed a negative relationship between capital structure and profitability. Shubita and Alsawalhah, (2012) also noted as negative relationship between leverage and profitability in industrial companies listed in Amman Stock Exchange. Goyal (2013) too revealed a negative relationship of debt with profitability in their study on Indian banks. Similar trend was also observed in Indian pharmaceutical companies, (Reddy and Narayan, 2018). Studies have used different variables to represent profitability and leverage. Asset turnover, size, age and tangibility are positively related to ROA, (Muritala, 2012). Salim and Yadav (2012) observed that there is a negative correlation between ROA, ROE and financial leverage but a positive correlation between Tobin's Q and financial leverage. Chinaemerem and Anthony (2012) found a negative relationship between ROA, ROE and financial leverage. No impact of leverage was observed on the firm's financial performance parameters like ROA and ROE, (Chadha and Sharma,). Ali and Iman (2011) found no corelation between ROE and leverage but observed a negative relationship between ROA and leverage. Salehi and Biglar (2009) observed an inverse relationship between ROE and D/E. To conclude, empirical studies provides varied observations about the relationship between capital structure and firm performance.

4. Need for this study

The current study purports to add to literature on the impact of leverage on profitability by empirical analysis of steel manufacturing companies in an emerging economy like India. This study also assumes importance as steel sector in India is witnessing debt defaults with many companies filing for bankruptcy due to burden of debt. With steel sector visibly in financial distress, it is important for managers and lenders to understand the impact of debt on the financial health of the companies. This is a crucial area to be explored leading to critical information content to a) managers for taking capital structure decisions, b) lenders viz. banks and other financial institutions for framing lending strategies and c) government in policy framing. Hence the objective of this study is to examine the impact of capital structure on financial performance of listed companies in steel sector of India.

5. Research Methodology

Data and sources of data

Manufacturing firms in steel sector listed in Bombay Stock Exchange or National Stock have been taken for the study. Firms with missing values of dependent or independent variables during the period of study are excluded from analysis. Thus, a sample of 194 listed companies in steel sector for a period of 2016-17 to 2019-20 have been considered to study the impact of leverage on profitability. The final dataset comprises of 776 observations. Bloomberg and Capitaline database is used to extract the financial information related to the study.

Variable selection

Reference to past studies have been made to select dependant and independent variables. The dependent variable in this study is firm performance which is represented by Net Profit Margin. Net Profit margin the final profit available to the shareholders after meeting all expenses and provisions for the year. NPM indicates the effect of operating and financial leverage on profits. The independent variable is leverage which is represented by Debt/Equity ratio (D/E), Total Debt / Total Assets ratio (TD/TA) and Interest Coverage ratio (ICR). Size of the firm represented by log Sales and log Total Assets have been included as control variables. As large sized firms enjoy better economies of scale and have greater capabilities, firm size is used as control variable as size can influence the results. Table 1 provides the list of variables used and its formulae

Table 1. Variables used in the study

Dependent variable- Financial Performance		
1	NPM	PAT/ Net Sales
Independent variable – Capital Structure		
1	D/E	Total Debt/ Equity shareholders' funds
2	TD/TA	Total Debt / Total Assets
3	ICR	EBIT / Annual Interest payments
Control Variables – Size of the firm		
1	Sales	Log Sales
2	Total Assets	Log Total Assets

Model selection and specification

The study purports to examine the following relationships through panel regression analysis using panel data analysis:

NPM of a firm is affected by D/E, TD/TA, ICR, log S, log A

The profitability of a firm represented by Net Profit Margin is affected by Capital Structure represented by Debt Equity ratio, Total Debt/Total Asset ratio, Interest Coverage ratio and size of the firm

The following regression equation is used to test the relationship between firm performance and capital structure.

$$\textit{Financial Performance}_{it} = \alpha + \beta * \textit{Capital Structure}_{it} + \mu_{it}$$

where:

β = Coefficient of leverage ratio

μ = Error term

i = Number of cross-sectional

t = Time period

The following model and corresponding Alternate hypothesis are developed from the above equation:

$$\textbf{NPM}_{it} = \alpha + \beta 1\ (D/E)_{it} + \beta 2\ (TD/TA)_{it} + \beta 3\ (ICR)_{it} + \beta 4\ (\log S)_{it} + \beta 5\ (\log A)_{it} + \mu$$

H1: There is a significant relationship between Net Profit margin and debt/equity, total debt /total assets, log Sales, log Assets

6. Data Analysis and Discussion

Table 2 Correlation Matrix

NPM	DE	TDTA	ICR	LOGA	LOGS	
1.0000	0.0161	-0.0378	0.0071	0.0444	0.1555	**NPM**
	1.0000	-0.0140	0.0280	0.0153	0.0145	**DE**
		1.0000	-0.0223	-0.2437	-0.1424	**TDTA**
			1.0000	-0.0393	0.0347	**ICR**
				1.0000	0.8081	**LOGA**
					1.0000	**LOGS**

Correlation analysis was done conducted in order to identify the relationships between the variables included in the model, and to examine potential multicollinearity among the independent variables Correlation analysis in Table 2 shows positive correlation between NPM and D/E, ICR, LOGA and LOGS and negative correlation between NPM and TDTA. Pearson correlation Coefficient of the variables selected study are less than 0.7 for all variables. There is high correlation only between LOGA and LOGS hence it can be concluded

that is no serious problem of multicollinearity in the model. There is no linear relationship between the variables and hence there are no chances of multicollinearity in variables as per the correlation matrix.

The results of panel regression are shown in Table 3.

Table 3. Panel Regression Model for Net Profit Margin

Particulars	**Panel Regression Models**					
	Pooled Regression Model		**Fixed Effect Model**		**Random Effect Model**	
Const	-2.16375	***	−2.22008	***	−2.18279	**
DE	0.01920		0.0204173		0.0196163	
TDTA	0.0192043		−0.0773688		−0.0759807	
ICR	−0.0752666		−0.000862642		−0.000857266	
LOGA	−0.000854500	***	−1.02352	***	−1.02397	***
LOGs	0.0192043	***	1.34823	***	1.34135	***
R-squared	0.045927					
Adjusted R-squared	0.039724					
Between R-squared			0.046536			
P-value(F)	8.56e-07		2.00e-06		5.48e-007	
Durbin-Watson	1.782987		1.785138		1.785138	
Rho	0.108485		0.107397		0.107397	
Breusch-Pagan test	p-value = 0.453917		**So Pooled Regression Model**			
Hausman test	p-value = 0.559997		**So Random effect model has to be selected**			

In above Panel Regression model, Breusch-Pagan test was found non-significant, so Pooled Regression Model can be selected and Hausman test was non-significant, RE Model can selected. RE Model estimates variance components for groups (or times) and error, assuming the same intercepts and slopes is a part of the errors and thus should not be correlated to any regressor. Hence we selected RE Model. NPM is negatively related to TDTA, ICR and LOGA. A high Debt to Asset ratio leads to lower NPM. Size of Assets and Operating margins also affects NPM. Random Effect Panel Regression Model for Impact of Debt on NPM is:

$$\mathbf{NPM}_{it} = \mathbf{-2.18 + 0.019 * D/E}_{it} \mathbf{-0.075 * TD/TA}_{it} \mathbf{- 0.00 * ICR}_{it} \mathbf{- 1.023 * LOGA}_{it} \mathbf{+1.341 * LOGS} + \boldsymbol{\mu}$$

The value of Durbin Watson is 1.785138 which shows that there is no autocorrelation in residuals. The model is good fit as p value (F) is 0.000 which indicates the variation in dependent variable is explained by independent variables. So by above analysis, model can be interpreted as a good fit for defining the impact of Debt on Net Income

7. Conclusion and Recommendation

Steel sector in India is of economic significance to the nation. Hence financial health of companies in steel sector is an important influencer of the country's GDP and thereby it's economic growth. Steel companies being capital intensive tend to have considerable debt capital in their books. The objective of this study was to examine the relationship between debt capital and financial performance of the company. Using variables of 194 listed companies in steel sector for four years 2017 to 2020, the study examined the impact of debt

capital on the financial performance of the companies using panel regression. It was observed that financial performance is affected by debt capital. As shown by the regression model, profitability is adversely affected by the size of debt in relation to total assets. Size of the company is also an important factor influencing profitability. Larger companies with heavy debt are more likely to be less profitable. These results are contrary to the principle that high debt can maximise profits. Companies have to be cautious and watch the debt capacity in relation to sales and operating profits. Leverage can adversely affect the financial performance if the debt capacity is ignored. It is important for managers to be prudent while sourcing debt although debt is a cheaper source of capital. It is also important for lenders to examine the debt appetite and profitability before advancing debt to minimise Non Performing Assets. In view of the heavy debt advanced to Steel manufacturing companies, lenders can explore debt restructuring and refinancing. Government can frame suitable policies to remove systemic weaknesses in steel sector.

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