CAPITAL STRUCTURE DECISIONS OF LISTED FIRMS IN TRANSPORT EQUIPMENT INDUSTRY IN INDIA BEFORE PANDEMIC

ABSTRACT

Aims: The study predominantly attempts to examine the capital structure decisions of listed firms in Transport Equipment Industry by analyzing the relationship between leverage and profitability.

Study design: Descriptive research design is used to describe the characteristics of the firms belonging to industry. The study envisages an extensive use of data extracted from professional database CMIE prowess and from reports Ministry of Statistics and Programme Implementation, Annual Survey of Industries and Satista.

Place and Duration of Study: The sample for the study consists of all listed firms National Stock Exchange (NSE) affiliated under Transport equipment Industry (CMIE classification). There were totally 86 firms as on 31st March 2018. The relevant data sets are retrieved for a period of 10 years (2008-2018). Thus, a panel data of 860 different observations were considered for study.

Methodology: To analyze the data collected, Econometric model for longitudinal data with repeated measures known as Hierarchical linear regression model is adopted. This helps in estimation of industry grand mean, segment mean and firm mean for multilevel nested data.

Results: The result of the study indicates that segment means are approximately equal to industry mean of 0.2898. Further, the segment-level means of all eight segments follows normal distribution with firms having high and low leverage firms. Finally, the firm-level variance is comparably high indicating that firms' influence on capital structure decisions is predominant of all in this industry which has been found to be consistent over past decade.

Conclusion: The underleveraged firms in Transport Equipment Industry exhibit relatively higher average Return on Equity (ROE) and Return on Capital Employed (ROCE) compared to optimal leveraged firms. On the other hand, overleveraged firms indicate inverse relationship with profitability. This is justified by the pecking order theory that higher profitable firms incorporate internally generated funds available at lower cost compared to external financing.

Keywords: Degree of Leverage, Industry, Segment and firm-specific mean, Hierarchical linear regression model

1. INTRODUCTION

Industries have established crucial importance in the economy due to its extensive contribution in production of goods and services creating employment opportunities. This is dependent on the level of connectivity between essential services and people which in turn relies on advancement in transport and infrastructure facilities. Transport services industry provides only services related to movement of people or goods along with transportation infrastructure. Transport Equipment Industry

bridges this gap by manufacturing vehicles and related components. This industry is classified under Manufacturing Sector which primarily deals with production of equipments meant for transporting people as well as goods.

Unlike any other country, Transport sector in India plays a crucial role by fuelling rapid economic growth with ever increasing in demand since liberalization. According to Annual Survey of Industries report, Transport sector contributes to about 6% of the GDP by employing over 220 Crore people in the year 2018. However, the Industry is considered to be underperforming when compared to its potential scale of expectation. According to Satista report, revenue in Manufacture of Other Transport Equipment is approximated to an amount of Rs. 2.22 Trillion in the year 2022 with an expectation of annual growth rate of 5.80%.

Further it is noted that the total number of firms both listed and non-listed put together was around 2,307 in year 2017. Nonetheless, the number of firms listed in stock exchanges is comparatively seldom. From the report of Centre for Monitoring Indian Economy, Transport Equipment Industry had around 118 firms with market capitalization of Rs. 11,584.70 Billions that were actively traded on Bombay Stock Exchange (BSE) while there were around 86 firms that were actively traded on National Stock Exchange (NSE) with market capitalization of Rs.11,479.45 Billions as on 31st March 2018. It ranks 10th in terms of total number of firms listed in stock exchanges under transport equipment industry with highest being Chemical and Chemical Products Industry with around 408 firms in BSE and 226 firms in NSE. The following Table 1 exhibits the Segment Name, Number of firms and composite market capitalization of each segment traded in BSE and NSE.

Table 1: Segmentation of firms in Transport Equipment Industry Traded on stock exchanges

Sl. No.	***Segment***	***BSE***		***NSE***	
		No. of firms	***Composite market capitalization (Rs. In Billion)***	***No. of firms***	***Composite market capitalization (Rs. In Billion)***
1	*Automobile ancillaries*	*79*	*2,711.62*	*56*	*2,683.51*
2	*Transport equipment & ancillaries*	*13*	*111.51*	*8*	*106.86*
3	*Tyres & tubes*	*9*	*823.72*	*7*	*795.83*
4	*Two & three wheelers*	*7*	*2,584.29*	*6*	*2,579.46*
5	*Storage batteries*	*4*	*338.07*	*4*	*337.83*
6	*Commercial vehicles*	*4*	*1,417.87*	*3*	*1,380.60*
7	*Passenger vehicles*	*1*	*2,677.38*	*1*	*2,676.76*
8	*Diversified automobile*	*1*	*920.21*	*1*	*918.59*

Source: Author's computation

From the Table1 above, it is evident that the highest numbers of firms are found in automobile ancillaries segment with 79 and 56 firms in BSE and NSE respectively followed by other transport equipment & ancillaries segment with. The least in passenger vehicles and diversified automobile segments with one firm each. The composite market capitalization is highest in automobile ancillaries segment with Rs. 2,711.62 Billions and Rs. 2,683.51 Billions in BSE and NSE respectively followed by passenger vehicles segment even though it consists of only one firm.

Table 2: Largest firms in each segment of transport equipment industry based on market capitalization

Sl. No.	***Segment***	***Name of the firm***	***Firm Market Capitalization (Rs. In Billion)***
1	*Automobile ancillaries*	*Motherson Sumi Systems Ltd.*	*654.64*
2	*Transport equipment & ancillaries*	*Cochin Shipyard Ltd.*	*68.29*
3	*Tyres & tubes*	*M R F Ltd.*	*307.54*
4	*Two & three wheelers*	*Bajaj Auto Ltd.*	*794.23*
5	*Storage batteries*	*Exide Industries Ltd.*	*189.42*
6	*Commercial vehicles*	*Tata Motors Ltd.*	*943.73*
7	*Passenger vehicles*	*Maruti Suzuki India Ltd.*	*2,676.76*
8	*Diversified automobile*	*Mahindra & Mahindra Ltd.*	*918.59*

Source: Author's computation

The Table 2 depicts the largest firms under each segment of Transport equipment Industry based on firm market capitalization. Maruti Suzuki India Ltd. which is the lone firm in passenger vehicles segment dominates with highest market capitalization of Rs. 2,676.76 Billions. It is followed by Tata Motors Ltd. with market capitalization of Rs. 943.73 Billions which also belongs to commercial vehicles segment. Further it is notes that the top 5 firms account for composite market capitalization of Rs. 6106.62 Billions which is around 53% of total Transport Equipment Industry capitalization.

This study is divided into five sections. Apart from the introduction presented in the above section, previous literature pertaining to leverage and profitability analysis are discussed in greater detail in designating variables for the study. The third deals with research design related to the data, research tools, and techniques used in the study. The fourth part systematically presents the results of data and related discussions. The final section presents the conclusion and policy implications of the study.

2 Theoretical Background and Review of Literature

The firms in Transport Equipment Industry is prime linkage between Industries and Indian economy, it becomes indispensible to examine the impact of Degree of leverage of firms on the returns generated to the concerned stakeholders.

2.1Theoretical Framework

The literatures reviewed for the purpose of the study unveils that the factors determining the leverage of firm are classified at three hierarchical levels: Industry-specific, Segment-specific and Firm-specific. Many studies include all three-levels while others include combination of them. On one side of the argument it is found that the firm affiliation to specific industry is considered to be vital. The Demand for the product in Industry compels firms to expand or shrink its size (Das et. al., 1993) however; spending equal amount of on Research and development firms within industry group might not ensure the same results. (Mauri and Michaels, 1998). The industry-specific factors impact capital structure of firm directly and indirectly (Li and Islam, 2019) and firm leverage is interconnected to changes in leverage of peer firms within industry (MacKay and Phillips, 2002).

Further, the composite debt of industry (Maksimovic and Zechner (1991) and the firm's position within industry are crucial when synergies of financial structure, technology and risk choice are considered (MacKay and Phillips 2005; Maksimovic and Phillips 2008). Also, firm leverage is interconnected to changes in leverage of peer firms within industry (MacKay and Phillips (2002). The successful breakthrough at firm level positively affects the aggregate productivity of industry (Dai and Sun, 2021)

On the other hand the conclusion such as Capital structure and financial strategy of firm is determined at firm level are more important driving (Kochhar and Hitt, 1998; Clausen, 2013; Pervan, Curak and Kramaric, 2017) indicating focus on individual firm and not their affiliation towards Industries. Further, the market share and diversification of firms found to have positive influence on its profitability ignoring their industry affiliation (Schmalensee 1989). The strategy related to innovation performance at firm level impacts firm performance and is found to be significant vary based on the industry type (Gomes, Seman and Carmona, 2022).

Firm Size

The effects of firms and industry on firm's strategic decisions from two different viewpoints: Industry view and resource based views. There are mixed range of relationships found in the past indicating the positive, negative and no relationships between firm size and profitability. The firm size and industry effects together explain significantly high variance in strategic leverage condition which in turn affects R&D intensity and return on assets (Mauri and Michaels, 1998). The relatively high turnover rates in large firms are more profitable and are credible to access capital markets (Titman & Wessels, 1988). Some studies also claim the relationship between firm size and profitability is negative which is found to be statistically significant (Goddard et al., 2005). While some studies opine that firm size does not have any impact on profitability at all (Abeyrathna and Priyadarshana, 2019).

Tangibility

The fixed assets constituents of the firm matters more in the capital structure decision of firm within industry with due considerations to its value, technological update and flexibility. Some studies identifies that type of assets used in firm matters while taking financial decisions is of paramount importance than industry category to which firm belongs to (Balakrishnan and Fox,1993). The firm's ability to reduce variable cost of production by procuring capital-intensive technology depends on competence of realising sufficient cash which in turn depends on the aggregate demand of the industry (Williams, 1995). Further, increase in profitability is associated with a decrease in leverage indicating a negative relationship (Chong-Chuo Chang et al, 2019).

Non-Debt Tax Shields

The amount of depreciation and amortization accompanies the operating activities which over period fail to adhere to the standards. Timely renewal of fixed assets have led to inclusion of Non-debt Tax shield as an important factor affecting leverage both at firm and industry level.

Firm decision is confined to firm resources and the capacity factors; instead, it follows the aggregated decisions of all firms within industry, specifically in the presence of corporate tax, firms in the same industry behave differently between alternative financial structures Maksimovic and Zechner (1991). Often firms have impetus to avoid or defer taxes by favouring alternative tax shields for reason that it does not require additional expenses and helps reduces taxes without affecting income statement (Kolay, Schallheim and Wells, 2013). However, the tax benefits provided non-debt tax shield are offset by debt financing at firm-level (Almendros and Mira, 2018).

Profitability

The previous studies indicate that the firm has both positive relationship between profitability and leverage while some claim negative i.e, higher the rate of returns, firm retains for future investments opting for less debt. Profitability is increased with increase in operating leverage increases thus, initiating a negative relation between profitability and financial leverage (Chen, Harford and Kamara, 2019). But on the other hand researches do suggest that increased profitability of firm establishes credibility which is enchased in form of debt with lesser interest rates. Further, strategic use of debt in capital structure affects industry profitability as whole (Baker, 1973). Industry level profitability has

*positive relation with economies of scale leading to higher profitability (Schmalensee (1989); Mackay and Philips, 2005). The source of push in profits is due to leverage aggressiveness directly associated with market share. As a consequence, firms which opt for higher leverage retain market power subsequently high profits (McAndrews and Nakamura, 1992). Economic situation or industry-specific situations reflects on the profitability of firm (Fairfield, Ramnath and Yohn, 2009 **;** Fairfield et. al, 2009)*

Growth

The increase in capital goods, investments, technology and human capital in firm directly contributes to the industry growth. The industry growth is found to have greater persistence than the firm-specific earnings. Thus, in forecasting accuracy of models predicting firm growth, the profitability of firm are modelled efficiently by including industry and economy specific parameters. Also, the performance of firm revolves directly on the learning experience from industry peers (Balasubramanian and Lieberman 2010 ; Vorst and Yohn, 2018). The industry learning varies across firm and industries depicting strategic relation between firm and industry environment. The advantages due to characteristics possessed by different organizational forms vary based on industry life cycle (Maksimovic and Phillips, 2008). More often in low growth industry, less debt levels are preferred while considering new projects. On the other hand, all equity firms tend to collect relatively less information compared to levered firms in high growth industry. Consequently, few firms that are levered continue to compete with each other indicating the strong linkage between firm and industry during expansionary period. (Maksimovic, Stomper and Zechner, 1999; Bamiatzi et. al. 2016).

Distance from Bankruptcy

The ability of the firm to pay obligations encountered due to borrowing capital in form of debt is measured by Altman Z-score model. With the view point that cost of debt is lower than cost of equity due to tax benefits, firms intended to borrow debt. But after the threshold level, it is dangerous to borrow debt which leads firm to financial distress. The financial distresses are low in conglomerates compared to individual segment firms (Maksimovic and Phillips, 2008) confining it to firm-level. In Industry context, the firms are inspired to enter particular industry with an advantage of low output price due to tax shield provided by debt. Nonetheless, the obligation of interest payment restrains firm to go for higher output prices and consequently exit (Fries, Miller and Perraudin 1997).

Liquidity

In times of financial distress, the time period involved in conversion of assets into cash to meet the obligations is the liquidity aspect. The situation is presumably occurs when entire industry is indented either due to declining stage of industry life-cycle or economy-wide recession. In such circumstances of financial distress and its industry peers are also encountering complications. The liquidity management decision of firm impacts the profitability (Mohanty and Mehrotra, 2018).Nonetheless; the firm's inclination to be highly liquid in industry attracts the investors' by accomplishing their liquidity needs (Erkan, Fainshmidt and Judge, 2016). At the industry level, however, the working capital management is to be stressed more as a measure of liquidity than current ratio that affects profitability (Eljelly, 2004).

3. Research Methodology

3.1 Objectives

The present study aims to analyze the Degree of Leverage of Publicly Traded firms of Transport Equipment Industry in National Stock Exchange (NSE) and classify those under three categories such as overleveraged, optimal leveraged and underleveraged firms. After grouping, the profitability ratios such as Return on Equity (ROE) and Return on Capital Employed (ROCE) will be analyzed at 25^{th}, 50^{th} and 75^{th} percentile under each group recognize the group beneficial for investors.

3.2 Data

The study is conducted on the firms that are publicly traded in Indian stock exchanges to analyze the relationship between Degree of Leverage and profitability of firms in Transport Equipment Industry. Descriptive research design is used to describe the characteristics of the firms belonging to industry. The study envisages an extensive use of data extracted from professional database CMIE prowess and from reports Ministry of Statistics and Programme Implementation, Annual Survey of Industries and Satista.

The sample for the study consists of all listed firms National Stock Exchange (NSE) affiliated under Transport equipment Industry (CMIE classification). There were totally 86 firms as on 31st March 2018. The relevant data sets are retrieved for a period of 10 years (2008-2018). Thus, a panel data of 860 different observations were considered for study. To analyze the data collected, Econometric model for longitudinal data with repeated measures known as Hierarchical linear regression model is adopted. This helps in estimation of industry grand mean, segment mean and firm mean for multilevel nested data. The tests are conducted using software STATA.

3.3 Model Estimation

A multilevel framework of regression model is considered since the longitudinal data consists of repeated measures of cross-sectional data. Various modifications to hierarchical linear model (HLM) are made to construct 4 different models. The best fit model based on information criteria is accepted and results of only that particular model will be interpreted.

Model 1(Empty model)

$$Lev_{ijk} = \beta_{0jk} + \varepsilon_{ijk} \quad \textbf{(1)}$$

Where,

Lev_{ijk} *is dependent variable which represents leverage (debt-to-total assets) for year i for firm j belonging to segment k.*

β_{0jk} *is mean leverage of firm j over considered time period.*

ε_{ijk} *is random error term representing variance of leverage across time which is assumed to be normally distributed.*

Model 2 (Random intercept model with firm level variables)

Adding firm-level variable while controlling time by incorporating time dummies to equation (1), ***Model 2*** *is expressed as follows:*

$$Lev_{ijk} = \delta_{ooo} + \sum_{i=1}^{10}(\sigma_{i00} * year_{i00}) + \beta_{0jk} + \beta_{1jk} * SIZE_{ijk} + \beta_{2jk} * TANG_{ijk} + \beta_{3jk} * NDTS_{ijk} + \beta_{4jk} * PROF_{ijk} + \beta_{5jk} * GROW_{ijk} + \beta_{6jk} * DFB_{ijk} + \beta_{7jk} * LIQ_{ijk} + \varepsilon_{ijk} \quad \textbf{(2)}$$

Model 3 (Random intercept model with firm and segment level variables)

Expressing industry level variable in equation (2),

$$\beta_{0jk} = \gamma_{00k} + \gamma_{01k} * SUS_{00k} + \gamma_{02k} * DYN_{00k} + \gamma_{03k} * CONC_{00k} + r_{ojk} \quad \textbf{(3)}$$

Substituting equation (2) and (3), ***Model 3*** *is expressed as follows:*

$$Lev_{ijk} = \delta_{ooo} + \sum_{i=1}^{10}(\sigma_{i00} * year_{i00}) + \beta_{1jk} * SIZE_{ijk} + \beta_{2jk} * TANG_{ijk} + \beta_{3jk} * NDTS_{ijk} + \beta_{4jk} * PROF_{ijk} + \beta_{5jk} * GROW_{ijk} + \beta_{6jk} * DFB_{ijk} + \beta_{7jk} * LIQ_{ijk} + \gamma_{01k} * SUS_{00k} + \gamma_{02k} * DYN_{00k} + \gamma_{03k} * CONC_{00k} + u_{00k} + r_{ojk} + \varepsilon_{ijk} \quad \textbf{(4)}$$

Model 4 (Random intercept and random-coefficients)

In addition to random intercepts, random-coefficients are allowed for each segment by incorporating interaction variables.

$$Lev_{ijk} = \delta_{ooo} + \sum_{i=1}^{10}(\sigma_{i00} * year_{i00}) + \beta_{1jk} * SIZE_{ijk} + \beta_{2jk} * TANG_{ijk} + \beta_{3jk} * NDTS_{ijk} + \gamma_{40k} * PROF_{ijk} + \gamma_{50k} * GROW_{ijk} + \gamma_{60k} * DFB_{ijk} + \beta_{7jk} * LIQ_{ijk} + \gamma_{01k} * SUS_{00k} + \gamma_{02k} * DYN_{00k} + \gamma_{03k} * CONC_{00k} + \gamma_{41k} * SUS_{00k} * PROF_{ijk} + \gamma_{43k} * CONC_{00k} * PROF_{ijk} + \gamma_{51k} * SUS_{00k} * GROW_{ijk} + \gamma_{62k} * DYN_{00k} * DFB_{ijk} + + \gamma_{63k} * CONC_{00k} * DFB_{ijk} + u_{00k} + r_{ojk} + r_{4jk} * PROF_{ijk} + r_{5jk} * GROW_{ijk} + r_{6jk} * DFB_{ijk} + \varepsilon_{ijk} \quad (5)$$

4. Results and Discussion

4.1 Variance Decomposition of Leverage

The Interclass correlation is computed for each model which is reliability measure of data categorized into groups which explains variability across the groups. If the value of coefficient approaches 0 indicates that grouping by segments are ineffective while on the other hand if value approaches to 1 indicates that there is no variance to explain at firm level.

Table 3: Variance decomposition of leverage in Transport equipment industry

Degree of Leverage	Model 1			Model 2			Model 3		
	Var	S.E.	ICC (%)	Var	S.E.	ICC (%)	Var	S.E.	ICC (%)
Segment-level	0.0000	0.0000	0.00	0.0000	0.0000	0.00	0.0000	0.0000	0.00
Firm-level	0.0381	0.0152	66.19	0.0552	0.0183	77.15	0.0554	0.0192	77.28
Time-level	0.0195	0.0036	33.81	0.0163	0.0032	22.85	0.0163	0.0033	22.72
Total	0.0576		100	0.0715		100	0.0716		100

Source: Author's computation

The Table 3 specifies the variance, standard error and interclass correlation across three models at various levels. It is observed that with the incorporation of year, firm and segment level variables, the interclass percentage do not alter. Controlling for repeated measures of time, and classifying firms into segment, no improvement in similarity of firms between segments can be observed. Paradoxically, the variance of firm level variables increases. Thus, it can be deduced that in transport equipment industry, all segments contains firms with both low as well as high leverage.

4.2 Model Estimation results

The Table 4 below exhibits the co-efficient estimated by random intercept model with incorporation of fixed effects of year, firm and segment. The model 1 estimates coefficient 0.2898 representing the grand mean of Transport equipment industry. In model 2 and 3, all the traditional determinants of leverage are statistically significant at 5 percent at firm level except tangibility and growth. The variables size, distance from bankruptcy and liquidity indicate negative relation with leverage.

Table 4: Random intercept Model for leverage in Transport equipment industry

Variables	Model 1			Model 2			Model 3		
	Coef.	S.E.	p-value	Coef.	S.E.	p-value	Coef.	S.E.	p-value
Intercept	0.2898	0.0349	0.0000*	1.1564	0.1027	0.0000*	1.1258	0.1063	0.0000*
SIZE				-0.0754	0.0113	0.0000*	-0.0752	0.0115	0.0000*

TANG				*-0.1104*	*0.0723*	*0.1270*	*-0.1096*	*0.0728*	*0.1320*
NDTS				*2.7134*	*0.3344*	*0.0000**	*2.7264*	*0.3364*	*0.0000**
PROF				*0.3903*	*0.0854*	*0.0000**	*0.3931*	*0.0855*	*0.0000**
GROW				*-0.0044*	*0.0031*	*0.1570*	*-0.0041*	*0.0031*	*0.1850*
DFB				*-0.1507*	*0.0158*	*0.0000**	*-0.1504*	*0.0158*	*0.0000**
LIQ				*-0.0615*	*0.0108*	*0.0000**	*-0.0604*	*0.0108*	*0.0000**
SUS							*0.0753*	*0.0718*	*0.2940*
DYN							*0.1471*	*0.0903*	*0.1030*
CONC							*0.0137*	*0.0865*	*0.8740*
Year fixed effects	*No*			*Yes*			*Yes*		
Joint signify-cance of year fixed effects				*$chi^2(2)$ = 659.93 Prob > chi^2 = 0.0000*			*$chi^2(2)$ = 654.07 Prob > chi^2 = 0.0000*		
Overall Wald test				*$chi^2(17)$ = 690.43 Prob > chi^2 = 0.0000*			*$chi^2(20)$ = 695.18 Prob > chi^2 = 0.0000*		
Model-fit statistics	*AIC*	*BIC*		*AIC*		*BIC*	*AIC*		*BIC*
	-316.35	*-297.07*		*-795.19*		*-693.95*	*-792.03*		*-676.32*
Observations	*917*			*917*			*917*		

*Source: Author's computation, * Significant at 5 percent*

A positive relationship is derived from variables such as non-debt tax shield and profitability. Model 3 which include segment level variables depict that none of the variables are statistically significant. In addition to computation of parameters, the model-fit statistics are generated. It is observed that the AIC and BIC are increasing suggesting that inclusion of segment variables are not relevant in explaining firm leverage.

Table 5: Random intercept and Random Coefficient model for leverage for Transport equipment industry

Variables	***Model 4***		
	Coef.	***S.E.***	***p-value***
Intercept	*0.8281*	*0.1003*	*0.0000**
SIZE	*-0.0342*	*0.0110*	*0.0020**

TANG	*0.1039*	*0.0640*	*0.1040*
NDTS	*2.0798*	*0.2887*	*0.0000**
PROF	*0.4954*	*0.1614*	*0.0020**
GROW	*0.0019*	*0.0031*	*0.5240*
DFB	*-0.2101*	*0.0220*	*0.0000**
LIQ	*-0.0390*	*0.0093*	*0.0000**
SUS	*-0.1532*	*0.0812*	*0.0590*
DYN	*-0.0540*	*0.0999*	*0.5890*
CONC	*-0.2990*	*0.1026*	*0.0040**
*PROF*SUS*	*2.6670*	*0.2818*	*0.0000**
*PROF*CONC*	*-1.0133*	*0.4543*	*0.0260*
*GROW*SUS*	*-0.0747*	*0.0181*	*0.0000**
*DFB*DYN*	*-0.0983*	*0.0422*	*0.0200**
*DFB*CONC*	*0.1932*	*0.0624*	*0.0020**
Year fixed effects	*Yes*		
Joint significance of year fixed effects	*$chi^2(2)$ = 436.28* *Prob > chi^2 = 0.0000*		
Overall Wald test	*$chi^2(25)$ = 1120.47* *Prob > chi2 = 0.0000*		
Model fit statistics	*AIC*		*BIC*
	-1073.77		*-933.96*
Observations	*917*		

Likelihood-ratio test
LR $chi^2(5)$ = 84.44
(Assumption: m3 nested in m4)
Prob > chi^2 = 0.0000

*Source: Author's computation, * Significant at 5 percent*

The extension of model 3 with interaction variables into model 4 do not alter the covariates at firm and segment level. However, the indirect influences of segment-level due to certain firm-level variables are estimated. Likelihood Ratio test was conducted between model 2 and model 4 for leverage. The LR $chi^2(5)$ value was found to be 84.44 with p value 0.0000. Hence the null hypothesis that there is no significant difference between model 2 and model 4 is rejected. In other words, including variables by allowing random co-efficient along with random slope in model 4 improves model fit which is statistically significant. Further, the lower values of AIC and BIC reaffirms that model 4 is better fit.

From the Table 5 above, all the traditional determinants of leverage are statistically significant at 5 percent at firm level except tangibility and growth. The grand mean of transport equipment industry is

identified to be 0.8281. Excluding non-debt tax shield and profitability, all firm-level variables have an inverse relationship with the firm leverage. The positive relation of non-debt tax shield with leverage according to traditional trade-off theory is that that cost of future financial distress increases with leverage after the threshold point. Profitability shows positive relation with leverage is in accordance with trade-off theory which explains that higher profitable firm have less probability to miss out on debt repayment and employ more debt.

The size of firm is significant and negatively related to leverage insisting that information asymmetry in large firms pave the way to issue new equity without affecting the value of firm. Financially strong firms are far away from bankruptcy thus greater the Altman Z score; firm embraces lesser degree of leverage. Hence the significant negative relation between distance from bankruptcy and firm leverage is justified. The liquidity of firms' assets indicates a significant negative relationship with leverage because funds are internally generated utilizing liquid assets to finance new profitable investments.

Segment-level determinant segment concentration shows significant positive relationship with leverage. Oligopolistic industries are exposed to relatively lower risk due to less competitiveness, thus prefer low leverage. Segment dynamism and concentration are insignificant. Further, all interaction variables are significant at 5 percent level. The influence of sustainability on profitability is positive and significant indicating ample sustained growth opportunity increases concomitant effect on profitability thus compelling to low leverage.

The influence of segment concentration on profitability is negative. Influence of segment sustainability on growth is positive. The segment dynamism has significant negative influence on distance from bankruptcy indicating that firms with low volatility are also pushed towards bankruptcy. The segment concentration and distance from bankruptcy is positive.

4.3 Degree of leverage and Profitability

After identifying best-fit model, the previous part, this section deals with the determination of firms encompassing average firm leverage above and below the segment mean leverage. To compute the distance of firm mean, average leverage of each firm over past eleven years is computed which represents actual firm leverage. This is compared with predicted segment leverage estimated from best fit model. The deviation (distance of firm mean from segment mean) is computed by deducting firm average leverage from predicted segment leverage. Based on deviation, firms are grouped into three categories: Top 25 percent firms with substantial negative deviations into ***underleveraged*** *category, top 25 percent firms with substantial positive deviations into* ***overleveraged*** *category and firms close to predicted segment leverage into* ***optimal range****.*

The profitability ratios such as average return on equity (ROE) and average return on capital employed (ROCE) of each category of underlevered, optimal ranged and overleveraged firms are grouped for further analysis. Return on equity measures a firm's profitability by analyzing how much profit a firm generates with the money shareholders have invested. Return on capital employed (ROCE) measures the return that a business achieves with the total invested capital, showing the firm's profitability and efficiency. A higher ROCE indicates a more efficient use of capital.

Table 6: Profitability ratios based on degree of leverage in transport equipment industry

Degree of leverage	***Number of firms***	***ROE***			***ROCE***		
		P25	***P50***	***P75***	***P25***	***P50***	***P75***
Overleveraged	*26*	*-20.93*	*0.00*	*9.41*	*-6.02*	*-3.21*	*3.87*

Optimal range	*44*	*6.65*	*15.02*	*17.66*	*3.70*	*8.43*	*11.61*
Underleveraged	*29*	*10.64*	*15.62*	*19.55*	*8.19*	*13.73*	*16.90*

Source: Author's computation

Note: P25, P50 and P75 represent the 25th, 50th and 75th percentile under each category respectively.

The Table 6 indicates the number of firms in each category and their respective ROE and ROCE. Firms with optimal range of leverage have higher average ROE and ROCE, compared to overleveraged firms. Coherently, underleveraged firms exhibit relatively higher average ROE and ROCE, compared to optimal leveraged firms. This is justified by the pecking order theory that higher profitable firms incorporate internally generated funds available at lower cost compared to external financing.

Further, out of 26 overleveraged firms, 12 firms have negative ROE while 14 firms have negative ROCE most of which belongs to automobile ancillary segment. Out of 44 optimal range firms, four have reported negative ROE. Cimmco Ltd., Denso India Pvt. Ltd. and Hindustan Composites Ltd. have reported the highest negative ROE among the overleveraged, optimal range and underleveraged category during the period of our analysis. In optimal range, two are listed in Nifty fifty firms; Mahindra & Mahindra Ltd. and Tata Motors Ltd. Out of 29 underleveraged firms, four are listed in Nifty fifty firms; Bajaj Auto Ltd., Eicher Motors Ltd. and Hero MotoCorp Ltd.

5. Conclusion

Industries in mixed economy of India consist of policies implemented by both public and private sector. These integral economic conditions compel intricate relations between industries at various levels such as firm-level, segment-level and industry-level over years. The above mentioned dynamic structural forces determine the extent of leverage, profitability and eventually competition in industry which are not well known in Indian context.

Industries in India has experienced paradigm shift in its operational framework post liberalization. The industry concentration has increased dramatically since then providing level playing field for firms. Additionally, phenomenal growth was acknowledged in capital markets participation of foreign and domestic institutional investors along with retail investors. Integrated growth in the number of listed firms in the stock exchanges along with composite stock market capitalization is validated.

It is coherent from the analysis that transport equipment industry has interclass correlation percentage of zero. This implies that leverage ratio of firms within the segment is highly varying and suggests that segment means are approximately equal to industry mean of 0.2898 Further, the segment-level mean is found to be Zero expressing that all firms categorized under eight segments follows normal distribution with firms having high and low leverage firms. Finally, the firm-level variance is comparably high indicating that firms' influence on capital structure decisions is predominant of all in this industry which has been found to be consistent over years.

The study also indicates that apart from tangibility and growth, all other variables do have significant impact on leverage. Factors such as firm size distance from bankruptcy and liquidity exhibits significantly negative relation with leverage while Non-debt tax shield and profitability are significantly positive. Eventually, the profitability in terms of ROE and ROCE for each group categorized into overleveraged, optimal leveraged and underleveraged with sub-classification into 25th, 50th and 75th percentile are computed. The composite ROE and ROCE for is high for underleveraged and optimal leveraged firms which are more compelling for investors.

6. Policy Implication

Transport equipment industry is one of the prime linkages between industry and economic growth. In recent times this industry's supply chain has been severely hit by global bottlenecks. Big technology disruption due to emission control standard of Bharat stage VI norms and safety norms is costing dearly. Consequentially, industry is suffering undivided due to decline in retail sales leading to high volatility in firms' profitability. This impact has been transferred to small firms at higher degree due to

bargaining power of large firms. Hence, benefits for small firms by providing tax advantages would be of great relief to both internal and external stakeholders. Ensuring adequate financing though government policies provides firm to arrive at optimal capital structure for small firms.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

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Appendix

List of Firms in Transport equipment Industry traded on NSE as on 31st March 2018 as retrieved from CMIE database

Sl. No.	***Name of the Firm***	***Segment Group***
1	*A B G Shipyard Ltd.*	*Transport equipment & ancillaries*
2	*A N G Industries Ltd.*	*Automobile ancillaries*
3	*Amara Raja Batteries Ltd.*	*Storage batteries*
4	*Amtek Auto Ltd.*	*Automobile ancillaries*
5	*Apollo Tyres Ltd.*	*Tyres & tubes*
6	*Ashok Leyland Ltd.*	*Commercial vehicles*
7	*Atlas Cycles (Haryana) Ltd.*	*Transport equipment & ancillaries*
8	*Atul Auto Ltd.*	*Two & three wheelers*
9	*Autoline Industries Ltd.*	*Automobile ancillaries*
10	*Autolite (India) Ltd.*	*Automobile ancillaries*
11	*Automotive Axles Ltd.*	*Automobile ancillaries*
12	*Automotive Stampings & Assemblies Ltd.*	*Automobile ancillaries*
13	*Bajaj Auto Ltd.*	*Two & three wheelers*
14	*Balkrishna Industries Ltd.*	*Tyres & tubes*
15	*Banco Products (India) Ltd.*	*Automobile ancillaries*
16	*Bharat Forge Ltd.*	*Automobile ancillaries*
17	*Bharat Gears Ltd.*	*Automobile ancillaries*
18	*Bharati Defence & Infrastructure Ltd.*	*Transport equipment & ancillaries*

19	*Bosch Ltd.*	*Automobile ancillaries*
20	*Ceat Ltd.*	*Tyres & tubes*
21	*Cimmco Ltd.*	*Transport equipment & ancillaries*
22	*Cochin Shipyard Ltd.*	*Transport equipment & ancillaries*
23	*Commercial Engineers & Body Builders Co. Ltd.*	*Automobile ancillaries*
24	*Dynamatic Technologies Ltd.*	*Automobile ancillaries*
25	*Eicher Motors Ltd.*	*Two & three wheelers*
26	*Endurance Technologies Ltd.*	*Automobile ancillaries*
27	*Exide Industries Ltd.*	*Storage batteries*
28	*Federal-Mogul Goetze (India) Ltd.*	*Automobile ancillaries*
29	*Fiem Industries Ltd.*	*Automobile ancillaries*
30	*G N A Axles Ltd.*	*Automobile ancillaries*
31	*Gabriel India Ltd.*	*Automobile ancillaries*
32	*Goldstar Power Ltd.*	*Storage batteries*
33	*H B L Power Systems Ltd.*	*Storage batteries*
34	*Harita Seating Systems Ltd.*	*Automobile ancillaries*
35	*Hero Motocorp Ltd.*	*Two & three wheelers*
36	*Hindustan Composites Ltd.*	*Automobile ancillaries*
37	*Hindustan Motors Ltd.*	*Transport equipment & ancillaries*
38	*Hi-Tech Gears Ltd.*	*Automobile ancillaries*
39	*India Nippon Electricals Ltd.*	*Automobile ancillaries*
40	*Innovative Tyres & Tubes Ltd.*	*Tyres & tubes*
41	*J B M Auto Ltd.*	*Automobile ancillaries*
42	*J K Tyre & Inds. Ltd.*	*Tyres & tubes*
43	*J M T Auto Ltd.*	*Automobile ancillaries*
44	*J T E K T India Ltd.*	*Automobile ancillaries*
45	*Jamna Auto Inds. Ltd.*	*Automobile ancillaries*
46	*Jay Bharat Maruti Ltd.*	*Automobile ancillaries*
47	*Kalyani Forge Ltd.*	*Automobile ancillaries*

48	*L M L Ltd.*	*Two & three wheelers*
49	*Lumax Auto Technologies Ltd.*	*Automobile ancillaries*
50	*Lumax Industries Ltd.*	*Automobile ancillaries*
51	*M R F Ltd.*	*Tyres & tubes*
52	*Mahindra & Mahindra Ltd.*	*Diversified automobile*
53	*Mahindra C I E Automotive Ltd.*	*Automobile ancillaries*
54	*Maruti Suzuki India Ltd.*	*Passenger vehicles*
55	*Minda Corporation Ltd.*	*Automobile ancillaries*
56	*Minda Industries Ltd.*	*Automobile ancillaries*
57	*Motherson Sumi Systems Ltd.*	*Automobile ancillaries*
58	*Munjal Auto Inds. Ltd.*	*Automobile ancillaries*
59	*Munjal Showa Ltd.*	*Automobile ancillaries*
60	*Omax Autos Ltd.*	*Automobile ancillaries*
61	*P P A P Automotive Ltd.*	*Automobile ancillaries*
62	*Pricol Ltd.*	*Automobile ancillaries*
63	*Rane (Madras) Ltd.*	*Automobile ancillaries*
64	*Rane Brake Lining Ltd.*	*Automobile ancillaries*
65	*Rane Engine Valve Ltd.*	*Automobile ancillaries*
66	*Reliance Naval & Engg. Ltd.*	*Transport equipment & ancillaries*
67	*Remsons Industries Ltd.*	*Automobile ancillaries*
68	*Rico Auto Inds. Ltd.*	*Automobile ancillaries*
69	*S M L Isuzu Ltd.*	*Commercial vehicles*
70	*Setco Automotive Ltd.*	*Automobile ancillaries*
71	*Sharda Motor Inds. Ltd.*	*Automobile ancillaries*
72	*Shivam Autotech Ltd.*	*Automobile ancillaries*
73	*Shriram Pistons & Rings Ltd.*	*Automobile ancillaries*
74	*Steel Strips Wheels Ltd.*	*Automobile ancillaries*
75	*Subros Ltd.*	*Automobile ancillaries*
76	*Sundaram Brake Linings Ltd.*	*Automobile ancillaries*

77	*Sundram Fasteners Ltd.*	*Automobile ancillaries*
78	*Suprajit Engineering Ltd.*	*Automobile ancillaries*
79	*T V S Motor Co. Ltd.*	*Two & three wheelers*
80	*T V S Srichakra Ltd.*	*Tyres & tubes*
81	*Talbros Automotive Components Ltd.*	*Automobile ancillaries*
82	*Tata Motors Ltd.*	*Commercial vehicles*
83	*Titagarh Wagons Ltd.*	*Transport equipment & ancillaries*
84	*Ucal Fuel Systems Ltd.*	*Automobile ancillaries*
85	*Wabco India Ltd.*	*Automobile ancillaries*
86	*Wheels India Ltd.*	*Automobile ancillaries*

Note: The classification of segment group is as specified in CMIE.

Variables incorporated in the model

Dependent Variable

LEV	*Leverage*	*Debt/Total assets*

Independent Variables

Firm-Level Variables

SIZE	*Firm Size*	*Natural logarithm of Net Sales*
TANG	*Tangibility*	*Net Fixed Assets/ Total Assets*
NDTS	*Non-Debt Tax Shields*	*Depreciation & Amortizations/ Total Assets*
PROF	*Profitability*	*Earnings Before Depreciation, Amortisation, Interest and Tax*
GROW	*Growth*	*Price to Book ratio*
DFB	*Distance from Bankruptcy*	*Altman Z = 3.3 (EBIT / TA) + 1.0 (Sales / TA) + 1.4 (Retained earnings / TA) + 1.2 (Working capital / TA)*
LIQ	*Liquidity*	*Current Assets / Current Liabilities*

Segment-level Variables

SUS	*Sustainability*	*Regressing time against segment sales over the previous 5 years of the period under analysis and taking the ratio of the regression slope coefficient to the mean segment sales.*

DYN	*Dynamism*	*Standard error of the sustainability computed by regression slope coefficient divided by the mean value of sales over this period*
CONC	*Concentration*	*Sum of the squares of market shares of firms within a given segment*