Determinants of Capital Structure : An Exclusive Study of Passenger Car Companies in India

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Abstract

Capital structure decision is one of the core financial decisions in a firm. Theoretically, composition of capital structure has a significant stake in determining the earnings available to equity holders and thereby, the market value of a firm. If it is so, a better understanding about the determinants of capital structure is inevitable to manage the decisions of a firm. This study attempted to identify the determinants of capital structure of passenger cars companies listed on the Bombay Stock Exchange (BSE) of India. The long-term debt to total capital ratio was considered as the dependent variable representing the capital structure. The determinants of capital structure which were considered as the independent variables are : (a) size of the firm, (b) profitability, (c) tangibility, (d) growth in assets, (e) non-debt tax shield, (f) debt service capacity, and (g) dividend payout ratio. A panel regression was run to identify the determinants by following a logical procedure for establishing the relationship. Though the independent variables were sensibly and carefully chosen from the existing literature, none of these determinants were found to have a statistically significant relationship with capital structure in the case of passenger car companies in India. However, the overall *F* - statistics confirmed that the specified model with the above explanatory variables had more predictability power and could explain more than what the intercept only model could explain.

Key words : **Capital structure, leverage, determinants of capital structure, debt-equity ratio**

JEL Classification : G3, G30, G32

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Capital structure of a company refers to the composition or make up of its capitalization and it includes all long - term capital resources, that is, loans, reserves, shares, and bonds (Brealey, Myers, & Marcus, 2012). Capital structure, which is made up of debt and equity security, deals with the permanent finance of a firm. The decision regarding capital structure is considered to have a significant bearing on earnings per share (EPS) and market price per share (MPS) of companies (Akhtar, Zahir, Tareq, & Rabbi, 2016 ; Fumani & Moghadam, 2015 ; Lawal, 2014). Myers (1984) rightly mentioned capital structure as "the capital structure puzzle". Thus, financing a firm's assets is a very crucial problem in every business, and as a general rule, there should be a proper mix of debt and equity capital in financing a firm's assets. Conceptually, the use of long term fixed interest bearing debt and preference share capital along with equity shares is called financial leverage (Pandey, 2002). Financial leverage is considered to be a tool in the hands of the financial managers to magnify the effect of change in sales on its EPS (Akhtar, Zahir, Ali, & Rabbi, 2016). It is true that capital structure cannot affect the operating earnings of a firm, but it can affect the share of earnings available for equity shareholders (Pandey, 2002).

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The importance of capital structure may be viewed from two angles. One is at the micro -level and the other is at the macro - level. At the micro level, when a firm takes advantage of sourcing funds from various channels, it seems to be one of the crucial financing decisions that influence a firm's survival, daily operations, and future growth potential (Akhtar, Zahir, Ali, & Rabbi, 2016). Moreover, a firm's capital structure reflects all of the firm's debt and equity obligations, which effectively presents an overview of risk and cost of financing decisions. Second, at the macro-level, a firm's capital structure decision may be affected by overall changes in the business and economic environment (Cheng, 2014). The macro - economic variables, on one hand, may influence the choice of source funds of a firm and on the other hand, the changes in these variables may directly or indirectly impact the operating earnings of the firm and thereby, the market price of its shares. Evidently, an ideal capital structure should minimize cost of financing and maximize earnings per share. It should accept an unduly high risk. It should keep controlling position of owners' intact, should be able to cater to additional requirements of funds in future, and it should also be able to seize market opportunities. Therefore, a pragmatic capital structure decision taking into account all these factors is somewhat subjective in nature. No capital structure theories that are based on certain unimaginable assumptions can fruitfully help in the decision.

Confirming this practical difficulty, Myers (2001) and Fama and French (2002) pointed out that there is no theory that explains general capital structure decision methods, which could be made in practice. Available theories and findings of different studies on capital structure lack a consensus with regard to the various determinants of capital structure and also about its optimal structure. This is exactly the research gap which led to the present study.

Review of Literature

The existing literature on internal factors determining the capital structure of a firm is so extensive. Size of the firm determines the choice of different financing has been found in several studies (Amsaveni & Gomathi, 2012 ; Demirguc-Kunt & Maksimovic, 1999 ; Hackbarth, Hennessy, & Leland, 2007 ; Jagannathan & Suresh, 2017 ; Jalilvand & Harris,1984 ; Titman & Wessels, 1988). Profitability was confirmed by different studies as one of the determinants (Ai-Ajmi, Hussain, & Al-Saheh, 2009 ; Amsaveni & Gomathi, 2012 ; Huang & Song, 2006 ; Jagannathan & Suresh, 2017 ; Khanna, Srivastava, & Medury, 2015 ; Myers & Majluf, 1984).

A number of researchers observed the importance of tangible assets in the composition of total assets of a firm as it gives higher capacity to raise debt on the collateral securities (Bhaduri, 2002 ; Drobetz & Fix, 2003 ; Pandey, 2002). Growth of the firm in terms of change in total assets between two consecutive years was considered in many studies (Bevan & Danbolt, 2002 ; Mohanraj, 2011 ; Titman & Wessels, 1988). Non-debt tax shield was an important variable used to determine the effect of capital structure decision (Buferna, Bangassa, & Hodkinson, 2005 ; Chaplinsky & Niehaus, 1993 ; De Angelo & Masulis, 1980 ; Wald, 1999). Studies also found both positive and negative relation between capital structure and debt service capacity of firms (Hiran & Sojatia, 2015 ; Myers, 1977). However, most of the empirical studies found a negative relation between debt service capacity and capital structure. The dividend payout ratio was also found in many studies to be a determinant of capital structure (Akhtar et al., 2016 ; Jagannathan & Suresh, 2017).

Objective, Methodology, and Model Specification

The study is descriptive in nature to identify the firm specific factors determining the capital structure of passenger car companies listed on the Bombay Stock Exchange (BSE) of India. All the four automobile companies listed on the BSE under the segment : Cars and Utility Vehicles were taken for the study (Maruti Suzuki India Ltd.,

Table 1. Dependent Variable and Independent Variables Used in the Study

Dependent Variable	Independent Variables
Long-term Debt	1. Size of firm (log of Sales)
To	2. Profitability (EBIT/Total Assets)
Total Capital Ratio	3. Tangibility (Tangible Assets/Total Assets)
(LTD/TC)	4. Growth in Assets (% Change in Total Assets)
	5. Non-Debt Tax shield (Depreciation/Total Assets)
	6. Interest Coverage Ratio (EBIT/Interest)
	7. Dividend Payout Ratio

Hindustan Motors Ltd., Mahindra & Mahindra Ltd., and Force Motors Ltd.). One of the variants of leverage or capital structure ratio, that is, long-term debt to total capital is regressed against the seven independent variables chosen from the existing literature to identify the determinants.

Annual reports of the automobile companies formed the source of the data. These data were collected from the research databases such as Money Control and PROWESS. A total of 10 years' data from 2008 to 2017 were considered for analysis.

The study employs panel data regression. In order to estimate the effects of explanatory variables on the capital structure ratio, two estimation models were used namely, pooled ordinary least squares (OLS) and random effects model (REM). Jarque Berra test was carried out to check the normality of data. To test the stationarity of the data series, Philips-Perron Fisher chi-square unit root test was applied. Linear relationship between the variables was tested by correlation. The analysis was carried out using E - Views software.

(1) Study Hypothesis

↳ **H1:** The size of the firm, profitability, tangibility, growth in assets, non-debt tax shield, interest coverage, and dividend payout significantly affect the capital structure.

(2) Model Specification : The following multivariate OLS regression model (general form) is used to test the relationship between capital structure and its determinants.

Capital structure = Function of (Size of firm, Profitability, Tangibility, Growth in Assets, Non-Debt Tax Shield, Interest Coverage, and Dividend Payout)

The specified model is:

$$LTD/Total\ Capital = \beta 0 + \beta 1\ (LOGSALES) + \beta 2\ (PROFIT) + \beta 3\ (TANG) + \beta 4\ (GR\text{-}ASSET) + \beta 5\ (NDTS) + \beta 6\ (INT\text{-}COV) + \beta 7\ (DP) + €$$

where,
β0 = Coefficient of intercept (constant),
β1 = Coefficient of log sales,
β2 = Coefficient of profitability,
β3 = Coefficient of tangibility,
β4 = Coefficient of growth in assets,
β5 = Coefficient of non debt tax shield,

β6 = Coefficient of interest coverage,
β7 = Coefficient of dividend payout,
€ = The error term.

Results and Discussion

The descriptive statistics of all the variables are depicted in Table 2.

(1) Descriptive Statistics : In order to test the normality of the data, Jarque-Bera test was carried out. The following hypothesis is tested using Jarque-Bera statistics.

↳ **H2:** The distribution is normal.

The *p* - values of Jarque Bera statistics are < 0.05, which rejects the hypothesis H2 that the distribution is normal at the 5% significance level in all the cases except *LTD/Total Capital, NDTS,* and dividend payout (Table 2).

(2) Unit Root Test : The results of PP-Fisher chi-square unit root test applied to test the stationarity nature of the data series at level are given in Table 3.

↳ **H3:** Unit root is present.

At level (without differencing), the probability of PP-Fisher chi-square-statistics being less than 0.05 rejects the hypothesis H3 of presence of unit root at the 5% significance level, except in the case of *LTD/Total Capital*, log of sales, tangibility, non-debt tax shield, and dividend payout. This indicates that except those, the data series of profitability, growth in assets, and interest coverage are stationary. Since the dependent variable and the four independent variables are not stationary at level, they are subjected to first differencing and the unit root test is once again applied on the differenced variable to test whether it is stationary or not. The results are shown in the Table 4.

After first differencing, probability of PP-Fisher chi-square statistics being less than 0.05 rejects the hypothesis H3 of presence of unit root at the 5% significance level in all the cases except that of log of sales. This indicates that

Table 2. Descriptive Statistics (Individual Samples)

	D_TC	*LOGSALES*	*PROFIT*	*TANG*	*GR_ASSET*	*NDTS*	*INT_COV*	*DP*
Mean	0.121298	8.207094	0.04792	0.295027	1.038584	0.044098	25.47148	11.05975
Median	0.115733	8.68129	0.051352	0.300831	9.828139	0.043045	18.2717	8.315
Maximum	0.321271	11.12777	0.62873	0.639407	37.05306	0.08234	125.352	33.16
Minimum	0.022923	-0.210721	-0.48333	0.139152	-168.185	0.020683	-4.355499	0
Std. Dev.	0.079456	2.782777	0.183182	0.10265	32.64328	0.015258	32.36656	10.60814
Skewness	0.477068	-1.386247	-0.20716	0.787527	-3.682952	0.516231	1.69961	0.448806
Kurtosis	2.299775	4.882349	6.077591	4.627757	19.25224	2.853852	5.356597	1.773466
Jarque-Bera	2.334487	18.7166	16.07204	8.550648	530.6529	1.81223	28.51374	3.850158
Probability	0.3112	0.0001	0.0003	0.0139	0.0000	0.4041	0.0000	0.1459
Observations	40	40	40	40	40	40	40	40

Table 3. PP- Fisher Chi - Square Unit Root Test (Level – No Differencing)

Null Hypothesis: Unit root (individual unit root process)			Sample: 2008 2017	
Exogenous variables: Individual effects			User-specified lags: 1	
Method: PP - Fisher Chi-square	**Total (balanced) observations**	**Cross Sections**	**Statistic**	**Prob.****
Series: LTD/Tot Cap	36	4	9.44041	0.3065
Series: Log_Sales	36	4	6.68321	0.5712
Series: Profitability	36	4	41.4272	**0.0000**
Series: Tangibility	36	4	11.4511	0.1774
Series: Growth_in_Assets	36	4	34.4316	**0.0018**
Series: Non Debt Tax Shield	36	4	5.40004	0.7141
Series: Interest_Coverage	36	4	16.445	**0.0364**
Series: Dividend_Payout	27	3	10.6256	0.1007

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution.
Figures in bold indicates significant at 5% level

Table 4. PP - Fisher Chi - Square Unit Root Test (After First Differencing)

Null Hypothesis: Unit root (individual unit root process)			Sample: 2008 2017	
Exogenous variables: Individual effects			User-specified lags: 1	
Method: PP - Fisher Chi-square	**Total (balanced) observations**	**Cross Sections**	**Statistic**	**Prob.****
Series: LTD/Tot Cap-1st diff	32	4	31.7712	**0.0001**
Series: Log_Sales-1st diff	32	4	11.8692	0.1571
Series: Tangibility-1st diff	32	4	31.4826	**0.0001**
Series: Non Debt Tax Shield-1st diff	32	4	24.665	**0.0018**
Series: Dividend_Payout- 1st diff	24	3	46.4761	**0.0000**

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution.
Figures in bold indicates significant at 5% level

Table 5. PP - Fisher Chi -Square Unit Root Test (After Second Differencing)

Null Hypothesis: Unit root (individual unit root process)			Sample: 2008 2017	
Exogenous variables: Individual effects			User-specified lags: 1	
Method: PP - Fisher Chi-square	**Total (balanced) observations**	**Cross Sections**	**Statistic**	**Prob.****
Series: Log_Sales-2nd diff	28	4	22.7377	0.0037

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution.
Figures in bold indicates significant at 5% level

the data series is stationary after first differencing, except for log of sales, which is subjected to second differencing. The predictor, that is, namely log of sales representing the size of the business is also found to be stationary after second differencing, since less than 0.05 probability of PP-Fisher chi-square statistic rejects the hypothesis H3 of presence of unit root at the 5% significance level (Table 5).

(3) Correlation : Coefficients of inter correlation between dependent and independent variables were checked

Table 6. Correlation Coefficients

	LTD/Tot Cap-1st Diff	Log_Sales-2nd Diff	Profitability	Tangibility-1st Diff	Growth_in_Assets	Non Debt Tax Shield-1st Diff	Interest_Coverage	Dividend_Payout-1st Diff
LTD/Tot Cap- 1st Diff	1.0000							
Log_Sales- 2nd Diff	-0.2372	1.0000						
Profitability	-0.3030	-0.1550	1.0000					
Tangibility- 1st Diff	0.3366	0.3336	-0.7492	1.0000				
Growth_in_Assets	-0.5677	0.2032	0.6808	-0.5075	1.0000			
Non Debt Tax Shield- 1st Diff	-0.2624	0.3896	-0.2648	0.4508	0.1698	1.0000		
Interest_Coverage	-0.0252	-0.0255	0.4368	-0.2460	0.3858	-0.1231	1.0000	
Dividend_Payout- 1st Diff	-0.1585	0.0412	0.2650	-0.2645	0.0658	-0.0622	-0.0741	1.0000

before regressing the variables (Table 6). Between dependent and independent variables, a high negative correlation was found to exist between *LTD* to capital and growth in assets (-0.567%).

(4) OLS (Pooled Regression - 4 Car Companies - Period (Adjusted) 8 years – 132010-2017) : A panel regression was done with the following hypothesis :

↳ **H4:** The coefficient is equal to zero.

The results are given in the Table 7. The coefficients of all the predictors and constant are not significant, since *p* - values of *t*- statistics exceed 0.05, which fails to reject the hypothesis H4 at the 5% significance level. However, a

Table 7. Summary of Regression Results (Car Companies) – Seven Predictors

Dependent Variable: LTD/Total Cap				Method: Panel Least Squares
Sample (adjusted): 2009 2017				Periods included: 8
Cross-sections included: 4				Total panel (unbalanced) observations: 32
Variable	**Coefficient**	**Std. Error**	***t* - Statistic**	**Prob.**
Log_Sales - 2nd Diff	-0.01349	0.016273	-0.8290	0.4153
Profitability	0.06661	0.094190	0.7072	0.4862
Tangibility - 1st Diff	0.38624	0.243704	1.5849	0.1261
Growth_in_Assets	-0.00080	0.000490	-1.6247	0.1173
NDTS - 1st Diff	-1.460666	1.164714	-1.254098	0.2219
Interest_Coverage	0.00023	0.000316	0.7260	0.4748
Dividend_Payout - 1st Diff	-0.00059	0.001483	-0.3964	0.6953
C	-0.02293	0.012796	-1.7922	0.0857
R-squared	0.455783	*F*-statistic		2.871432
Adjusted *R*-squared	0.297053	Prob(*F* - statistic)		**0.02509**
S.E. of regression	0.052467	Durbin-Watson stat		2.501758

Note : Bold indicates significant figure at 5% level.

sufficiently high *R* squared value indicates better explaining power of the model. The *SE* of regression is very low in this case. The Durbin - Watson statistic of 2.50 indicates negative auto correlation in residuals, though not a serious concern, since it is not nearer to four. The following hypothesis is set for validation in this context.

↳ **H5:** The fit of the intercept only model is as good as the specified model.

Since the *p* - value of *F* statistics is lesser than 0.05, the hypothesis H5 gets rejected at the 5% significance level (Table 7). This implies that the explanatory variables have more predictability power and can explain more than what the intercept only model could explain.

Then, the regression can be represented as :

$$LTD/Total\ Capital\ (1st\ Diff) = -0.02293 - 0.013490*DIFF2LOG + 0.06661*PROFIT + 0.38623*DIFF1TAN - 0.00079621*GR\_ASSET - 1.46066*DIFF1NDTS + 0.000229 * INT\_COV - 0.000587744*DIFF1DP$$

(5) Multicollinearity Test – Coefficient Diagnosis (Variance Inflation Factors) : In order to assess multicollinearity among the independent variables, variance inflation factor (VIF) is calculated. Theoretically, for VIF greater than 5 or 10, the concerned variable is multicollinear with others in the model. Here, all the values are less than 4 which indicates that the variables are not multicollinear with each other (Table 8).

Table 8. Multicollinearity Test (VIF)

Sample: 2008 2017		Included observations: 68	
Variable	Coefficient Variance	Uncentered VIF	Centered VIF
Log_Sales- 2nd Diff	0.0002650	1.53	1.53
Profitability	0.0088720	3.98	3.81
Tangibility- 1st Diff	0.0593920	3.50	3.47
Growth_in_Assets	0.0000002	3.43	3.43
NDTS- 1st Diff	1.3565590	1.88	1.88
Interest_Coverage	0.0000001	2.30	1.36
Dividend_Payout- 1st Diff	0.0000022	1.25	1.24
C	0.0001640	1.90	NA

(6) Random Effects

(i) Cross Section Random Effects : Two way random effects estimation is not possible since a number of cross sections is less than the number of coefficients in the estimator. The specification of random cross sections effect and no period effects combination also needs number of cross sections to be more than the number of coefficients in the estimator.

(ii) Period Random Effects : Here, since the number of cross sections is only four, which is lesser than the number of coefficients, that is, 7 in estimator, the period random effects, with no cross section effects is determined. The results shown in Table 9 confirm that all the coefficients are not significant since the *p* - values of statistics exceed 0.05, which fails to reject the hypothesis H4 at the 5% level of significance.

Finally, Hausman test is conducted for differentiating between fixed effects model and random effects model. It is carried out to see whether there is a correlation between the unique errors and regressors in the model (Table 10).

Table 9. Regression Results with Effect Specification

Dependent Variable: LTD/ Total Capital		Method: Panel EGLS (Period random effects)		
Sample (adjusted): 2010 2017			Periods included: 8	
Cross-sections included: 4		Total panel (unbalanced) observations: 32		
Swamy and Arora estimator of component variances				
Variable	**Coefficient**	**Std. Error**	***t*-Statistic**	**Prob.**
Log_Sales - 2nd Diff	-0.01349	0.017798	-0.7580	0.4559
Profitability	0.06661	0.103017	0.6466	0.5240
Tangibility - 1stDiff	0.38624	0.266543	1.4491	0.1603
Growth_in_Assets - 1stDiff	-0.00080	0.000536	-1.4855	0.1504
NDTS - 1st Diff	-1.46067	1.273864	-1.1466	0.2628
Interest_Coverage	0.00023	0.000346	0.6638	0.5131
Dividend_Payout - 1stDiff	-0.00059	0.001622	-0.3624	0.7202
C	-0.02293	0.013995	-1.6386	0.1143
Effects Specification				
			S.D.	***Rho***
Period random			0	0.0000
Idiosyncratic random			0.057384	1.0000
Weighted Statistics				
R-squared	0.455783	*F*-statistic		2.871432
Adjusted *R*-squared	0.297053	Prob(*F*-statistic)		**0.0251**
S.E. of regression	0.052467	Durbin-Watson stat		2.501758
Unweighted Statistics				
R-squared	0.455783	Mean dependent var		-0.010466
Sum squared resid	0.066068	Durbin-Watson stat		2.501758

Table 10. Correlated Random Effects – Hausman Test

Correlated Random Effects - Hausman Test			
Test period random effects			
Test Summary	**Chi-Sq. Statistic**	**Chi-Sq. *df.***	**Prob.**
Period random	3.063362	7	0.8791

A probability of chi-sq. statistic above 0.05 fails to reject the hypothesis H6 that the preferred model is random effects. Hence, the preferred model will be random effects.

↳**H6:** The preferred model is random effects.

In short, all the explanatory variables considered are found to have no statistically significant predictive power on the dependent variable. Therefore, the study hypothesis (H1) that the size of the firm, profitability, tangibility, growth in assets, non-debt tax shield, interest coverage, and dividend payout significantly affect the capital structure stands rejected. This finding is far deviating from the findings made by earlier studies on determinants of capital structure as the independent variables considered in previous studies confirmed the statistically significant explanatory power on the dependent variable (capital structure ratio) (Ai-Ajmi et al., 2009 ; Chaplinsky & Niehaus, 1993 ; Jagannathan & Suresh, 2017 ; Khanna et al., 2015 ; Myers, 1977). However, the overall effect of the model revealed by the *F* statistics confirms some explanatory power of the independent variables on the dependent variable (*R* squared value 0.46 - Table 9). Moreover, the Hausman test further iterates that the model is REM or ECM.

Though the independent variables considered for the analysis are found to be statistically insignificant determinants of capital structure in the case of passenger car companies in India, the confirmation that the specified model with explanatory variables has more predictability power than intercept only model is worth substantiating the existing literature. The proxy of capital structure considered as a dependent variable for the present analysis can also be disputed in this context. Then, some other relevant proxies of capital structure ratio may bring sufficient evidence to confirm more determinants of capital structure in the case of these companies.

Research Implications, Limitations of the Study, and Scope for Further Research

Determinants of capital structure of corporate undertakings may vary from country to country and also from sector to sector.Quantification of the magnitude of influence of these determinants will serve as input variables in financial decisions by companies. The relevance of these factors is crucial when managers have to perform options on financing activity or new projects. The overall effect of all the explanatory variables found in this study in explaining the capital structure as determinants is the crux of the study. This is exactly the implication of this research. Out of the seven independent variables in the study, only three of them are found to be stationary in nature at level. The rest are found stationary either by first differencing or second differencing.This disputes the predictive accuracy of the model specified in the study. Only one of the variants of capital structure ratios is considered here as a dependent variable. Other variants of capital structure ratio as proxy may bring more improved results.

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