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DETERMINANTS OF LEVERAGE: A STUDY ON S&P BSE TECK

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Abstract

Every company irrespective of the size strives hard to have optimal capital structure. Capital Structure is a mix of debt and equity capital of the firm. It is also called as financial structure of a firm. It is very important as it related to the ability of the firm cater to the needs of its stakeholders, besides expansion, diversification and modernization. The present study has the objective of identifying determinants of capital structure, to test for the applicability of trade-off theory, the sketch that a company make choice in percentage of debt finance and equity finance to use by balancing the costs and benefits, the trade-off between the tax shield of debt and cost financial distress. The study is based on the sample data drawn from the Indian Information Technology sector firms which are listed in BSE for the five year period 2010-11 to 2015-16. Top 10 companies are considered according to the market capitalization. The study examine the factors influencing capital structure of S&P BSE TECK, i.e., companies related to media, information Technology, and Telecommunication firms which are listed in BSE. For this study the various determinants that affect the capital structure of the above stated sector is considered. The various determinants are, leverage as a

Keywords:

Leverage,

Information technology,

Trade- off theory,

Hausman test,

Wald test,

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dependent variable and thirteen independent variables. These variables are separated into two group, they are, policy and decision variables, and firm characteristics variables. E-views software is used for the study.

1. Introduction:

Every company irrespective of the size strives hard to have optimal capital structure. Capital Structure is a mix of debt and equity capital of firm. It is also called as financial structure of a firm. It is very important as it related to the ability of the firm cater to the needs of its stakeholders, besides expansion, diversification and modernization. Capital structure, as already stated, is influenced by various factors. Factors are both internal and external. The Indian Accounting Standard fixes the ideal mix of debt equity for companies in its territories. Generally debt is not to exceed two times of equity, therefore the ideal debt equity ratio is fixed at 2:1. Capital structure in terms of optimal is normally varied from one country to another. For instance under Indian accounting standard the ideal capital structure in India is 2:1. Whereas in the China it is less than 1. Further in country where taxation policy does not exist, capital structure is apparently different. The earnings of the company is largely depends on the appropriate equity and debt mix. Firm's capital includes of the long term liability and the shareholders fund. Long term debt consistently comprises of long term loan, debenture, such other deposits provoked from the general public while Shareholders fund comprises of, share premium, equity share capital, reserves, profit and loss account, etc. The appropriate mix of capital structure is vital; as such it is considered as optimal capital structure.

Leverage is the use of a mixture of borrowed fund or financial instruments as margin, to boost the possible return of an investment. The sum of debt used to finance a company's assets. A firm with considerably added debt than equity is measured to be highly leveraged.

Trade-off theory of Capital structure:

The original version of the trade-off theory grew out of the debate on the **Modigliani-Miller(1958)** theorem. When corporate income tax was added to the original irrelevance, benefit

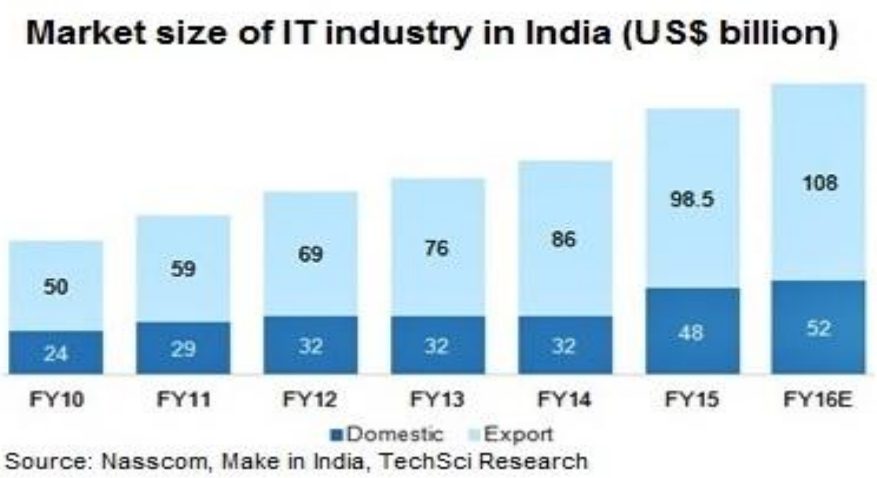
for debt shield earnings from taxes. This theory refers to the plan of how much of equity finance and how much debt finance should firm use to attain firm's wealth maximization. Trade-off theory of capital structure helps the firm in balancing the costs of debt next to the benefits of debt. Trade-off theory of capital structure primarily deals with cost of financial distress and agency costs of the firm. The main purpose of the trade-off theory of capital structure is to give description of the fact that the firms usually financed partly with debt and partly equity **(Jensen and Meckling ,1976),**

2. An overview of the Indian IT Sector:

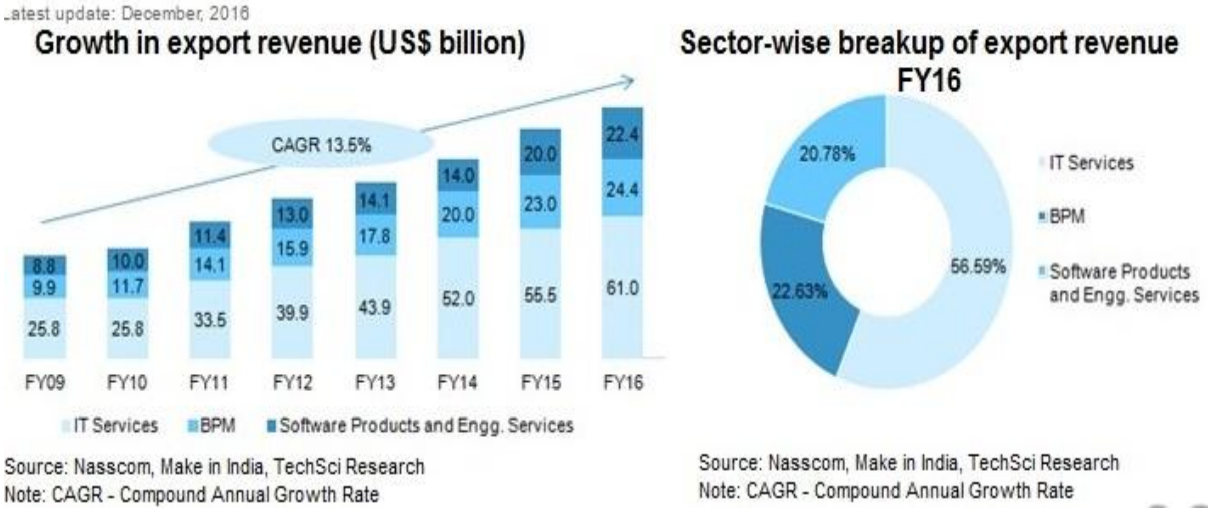
India is the world's biggest sourcing target for the information technology sector, accounting around 67 % of the US$134 billion market share. The industry has led the Indian economy to transfer and alter the perception of our country in the global economy. India's cost competitiveness provided IT services, which is around 4 times lesser than the US country, continues to be the foundation of its Unique Selling Proposition in the worldwide source market. However, India is in gain significance in terms of intellectual capital with several world IT companies establishing their modernization centres.

Market Size

The Indian Information Technology sector is expected to grow at the rate of 13% the year March 2018. The sector is also likely triple its existing yearly revenue to reach US$ 350 billion by the year 2025. Total spending on Information Technology by security firms and banks in India is likely to grow 8.6%.



As per Accenture's Platform Readiness Index India stands first among the top five countries in terms of digitalisation maturity and by 2020 is expected to be the first with the prospects to grow and scale up digital platforms.



Total exports from all the three subsector has raised eventually. In the financial year 2016 revenues increased to US$108 billion exports % rose at 61.68 from 2009 to 2016. Export of IT services is the major provider of revenues, around for 56.59 per cent%.

Leading IT players by revenue (FY16)

Company name	Revenue (USD billion)
TCS	16.6
Infosys	9.5
Wipro	7.8
HCL Tech	4.7
Tech Mahindra	4.04

Source: ibef.com

The top 5 IT companies contributed over 25 per cent to the total IT industry revenue.

3. Review of Literature

In order to find out the gaps in these studies it is pertinent to review the available literature on the related aspects of the present study.

Modigliani and Miller(1958), created a theory that answers to issues of cost of capital, examined and found that an investment financed by equity shares benefits to the current shareholders only when it yields the market capitalization rate. **Myers (1984),** in disparity to static-trade-off theory, the pecking-order theory points that when debt finance is needed,. Consequently, static-trade-off theory works to an extent. **Chandra Sekhar Mishra (2011),** the results suggest that the capital structure of the profit making PSUs is affected by Profitability and Tax. **Aulova and Hlavsa (2013)** in their regression analysis considered the collateral value of assets, size of the firm, liquidity and retained profit as statistically the most important determinants affecting total indebtedness of agricultural business. **Lalit asija (2014),** analysis showed that assets composition and firm age has positive significant impact on leverage. **Mirie Mwangi and Edwin Maranga Birundu(2015),** examined effect of Capital Structure of SME. The marks were that there was insignificant effect of capital structure, asset tangibility the financial performance of Small-Medium Enterprises. **Yongjia (2016),** analysed in the Chinese A-share market. In the course of the empirical analysis, the study has found the peer effect's capability to elucidate the capital structure of the company and Peer firms play a significant role for the firm's own capital structure.

Research Gap:

On the basis of reviewed literature, we found that, there is no inclusive study on determinants of leverage on IT sectors, yet in the reviews market to book equity is not considered for the study of leverage in IT industry and also we found that, not all policy & decision variables for capital structure decision of firms listed in BSE IT sector are not considered.

4. Determinants of capital structure:

According to the reviews made there are many determinants of leverage, which influence the decisions of capital structure. In this study we have taken thirteen independent variables are

considered, leverage is taken as dependent variable. All these variables are measured in the trade off theory of capital structure. A short description of each variable is as under:

Firm Characteristics Variable:

a. **Total assets:** Total assets are taken as the natural log of the firm's total asset denoted as Total Assets. It is expected that large firms generally have higher debt ratios. In addition larger firms generally are exposed to higher debt tax rate which further motivates them to increase leverage.

b. **Capital intensity:** The second firm characteristic variable is capital intensity measured by tangible and fixed assets as a percentage of Total Assets, and represented as Tangible assets/TA. If a firm can readily finance tangible assets with debt, debt ratios should be positively related to Tangible assets/TA.

c. **Research and development expenditures :** Firm's characteristic variable is firm Research and development expenditures over the period as a percentage of TA denoted as R&D/ Total Assets.

d. **Tax loss carry-forward:** Firm's tax-loss carry forward at the year-end as a percentage of TA denoted as Tax-Loss Carry Forward/TA. A firm with the large amount of tax-loss carry forward has less intensive to have debt in its capital structure.

e. **Net Income:** firm's net income over the period as a percentage of TA, denoted as NI/TA. Most of the firms retains theirs bulk of earnings, so a firm's equity base tends to increase with the earnings..

f. **Market-to-book equity:** The firm's market-to-book equity ratio at the year-end, denoted as MEQ/BEQ. It is expected that across firms market to book equity ratios should be positively related to leverage due to the benefit on a smaller equity base as leverage increase.

Policy and Decision Variables: These determinants in the regression as policy and decision variables, because to some level, these determinants are under the control of management of the firm.

g. **Change in firm's debt:** Net change in firm's debt denoted as Change in Debt/TA. It may appear to be obvious that a firm's debt ratio will be higher leverage.

h. **Dividends:** The debt contracts often restrict dividends, particularly for the firm with the high leverage. Normally the coefficient will be negative.

i. **Firm's sales:** Represented as Sales of common stock/ TA. Stock sales increases firm's equity base' and thus decreases the firm's debt ratio, so it is estimated the coefficient of this variable is negative.

j. **Firm's stock repurchases:** The fourth variable is denoted Repurchases/TA. Stock sales decrease the firm's equity base, and thus increase the firm's debt ratio, so it is estimated the coefficient of this variable is positive.

k. **Non-Debt Current Liabilities:** The fifth variable is denoted as Change in NDCL/TA. For several reason firm may increase or decrease its reliance on the current liabilities relative to debt financing. So it is normally that the coefficient of this variable to be negative.

l. Dummy Variable 1: The variable is denoted as D1, D1 = 1 if D/TA of the year end = 0 and D1 = 0. It is normally the coefficient of this variable is negative.

m. **Dummy Variable 2:** The variable is denoted as D2, D2 =1 if D/TA>50 Percent and D2 = 0 otherwise. Thus it is normally coefficient of this variable to be positive.

Capital Structure Determinants and Its Expected Signs

VARIABLES	MEASURES	EXPECTED SIGN
TA	Natural log of the firm's total asset	+
Capital intensity	PP&E/TA	+
R&D	R&D/TA	-
Tax loss carry forward	Tax loss carry forward/TA	-
Net income	NI/TA	-
MBQ	Market to book equity ratio	+
Change in debt	Change in debt/ TA	+
Dividends	Dividends/TA	-
Sales of common stock	Sale of a common stock/TA	-
Stock repurchases	Stock repurchases/TA	+
Non debt current liabilities	Change in NDCL/TA	-
D1	D1/TA	-
D2	D2/TA	+

5. Research Methodology:

5.1 Objectives:

- To understand the capital structure adopted by the selected Information Technology firms listed in the Bombay Stock Exchange.
- To examine the relationship of leverage and firm's characteristics variables of S&P BSE TECK firms
- To examine the association of leverage and policy decision variables of firms listed in S&P BSE TECK.
- To examine the applicability Traditional Trade-off theory in IT sector.

5.2 Sampling of the study

The systematic sampling techniques as employed in the present study. It is large sample study. 10 firms of 5 years data are collected. In total fifty observations are considered for the analysis.

5.3 Data Collection Techniques

The data for this study is collected from secondary sources.

5.4 Sample Size

This research was conducted to identify the various factors of leverage affecting IT industry. Multiple regressions model have been applied on data for 5 years i.e, from 2010-11 to 2015-16. The data collected from top 10 firms in IT sector which is listed in Bombay Stock Exchange, collected on the basis of market capitalization. Out of top 10 firms, all firms are selected as there was no deletion of the firm throughout 5 years.

5.5 Analytical Software: E-View

Statistical Tools: we have analyzed the data using e-views software. Both time-series and cross-sectional series are conducted in the study. The study has used of multiple regression as statistical tools. The panel data consist of fixed effect, random effect and pooled regression model. To conduct the above models, Hausman test and Wald test is used.

5.6 Hypothesis of the study:

The main hypothesis is as below:

Ho: There is no relationship between the Firm characteristics variables determinants and capital structure decision of selected Indian IT firms listed in BSE.

H1: There is relationship between the Firm characteristics variables determinants and capital structure decision of selected Indian IT firms listed in BSE.

Ho: There is no relationship between the Policy decisions variables determinants and capital structure decision of selected Indian IT firms listed in BSE.

H2: There is relationship between the Policy decisions variables determinants and capital structure decision of selected Indian IT firm listed in BSE.

5.7 Regression Model used:

Leverage =β_0 + β_{1to6}(Firm characteristics variables) + β_{7to10}(Policy decision variables)+e_{it}

6. Data Analysis and Intrpretation:

The first step is to find out the best model among random effect model and Fixed effect model. To identify the best model we ran our multiple regression in Hausman test and Wald test. First we conducted Hausman test.

Hypothesis:

To identify the best model, the following hypothesis is drawn

H0: Random effect model is appropriate model to test the leverage of selected IT firms.

H3: Fixed effect model is appropriate model to test the leverage of selected IT firms.

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. hausman fixed .
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	Coefficients			
	(b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
cdebt	.4215028	.3141208	.1073819	.
c_i	-.0457981	.2014053	-.2472034	.0568383
d1	-.0417275	-.0667539	.0250264	.0122707
div	.242849	-.8423315	1.085181	.3836945
fscs	-4.727098	2.536056	-7.263154	.
net	-.3592934	-.6243098	.2650164	.064159
l_ta	-.2530013	.0592373	-.3122387	.099884
ndcl	.0092364	-.0082728	.0175092	.
ndts	.2945988	.9199998	-.625401	.
mbq_	-.0000503	.0001652	-.0002154	.

```
                b = consistent under Ho and Ha; obtained from xtreg
     B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test:  Ho:  difference in coefficients not systematic

            chi2(10) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                     =       24.42
           Prob>chi2 =      0.0066
           (V_b-V_B is not positive definite)
```

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The results of above Hausman test, Random effect model is inappropriate to test the leverage of Indian IT firms. And it is very clear from the above test that 'b' is consistent under H_0 and Ha.

Henceforth, alternative hypothesis is accepted, which indicates the fixed effect model is more appropriate model for testing the leverage of Indian IT sector firms.

Our next step was to identify the best model among fixed effect model and pooled regression model. For this purpose we conducted Wald test, and the following hypothesis is drawn.

H_0: Pooled regression model is appropriate model to examine the relationship between the determinants of capital structure and leverage of selected IT firms.

H_4: Fixed effect model is appropriate model to examine the relationship between the determinants of capital structure and leverage of selected IT firms.

Wald test

Stating d1=0

```
. test d1=0

 ( 1)  d1 = 0

           chi2(  1) =    3.82
         Prob > chi2 =    0.0506
```

The results from the Wald test show that value of chi square is insignificant. As a result Pooled regression model is not an appropriate model to examine the relationship between the determinants of capital structure and leverage of selected IT firms. .Therefore, the fixed effect model is appropriate model to examine the relationship between the determinants of capital structure and leverage of selected IT firms.

Now we have analysed our regression equation by applying in fixed effect model

Leverage =β_0 + β_{1to6}(Firm characteristics variables) + β_{7to10}(Policy decision variables)+e_{it}

FIXED EFFECT MODEL

```
. xtreg debt_ta cdebt c_i d1 div fscs net l_ta ndcl ndts r_d mbq_, fe
note: r_d omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =        50
Group variable: id                              Number of groups   =        10

R-sq:  within  = 0.8894                         Obs per group: min =         5
       between = 0.0054                                        avg =       5.0
       overall = 0.0943                                        max =         5

                                                F(10,30)           =     24.12
corr(u_i, Xb)  = -0.8333                        Prob > F           =    0.0000
```

debt_ta	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
cdebt	.4215028	.0962306	4.38	0.000	.2249736	.6180319
c_i	-.0457981	.0703545	-0.65	0.520	-.1894812	.0978849
d1	-.0417275	.0313943	-1.33	0.194	-.1058431	.0223882
div	.242849	.5198885	0.47	0.644	-.818905	1.304603
fscs	-4.727098	3.190928	-1.48	0.149	-11.24384	1.789646
net	-.3592934	.1065504	-3.37	0.002	-.5768983	-.1416885
l_ta	-.2530013	.1009639	-2.51	0.018	-.4591972	-.0468055
ndcl	.0092364	.0367738	0.25	0.803	-.0658657	.0843385
ndts	.2945988	.6081704	0.48	0.632	-.9474508	1.536648
r_d	0	(omitted)				
mbq_	-.0000503	.0011456	-0.04	0.965	-.0023899	.0022894
_cons	.9903628	.3344149	2.96	0.006	.3073965	1.673329
sigma_u	.3044145					
sigma_e	.05225395					
rho	.97137827	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(9, 30) =     5.13                 Prob > F = 0.0003
```

In the above Fixed Effect Model analysis, R^2 of estimation of leverage in IT sector firms firms 9.43%, it means 88.948% of variation in leverage within the Indian Information sector firms is explained by the above estimators.

For the 10 firms selected, 5 years data,

It is noted that Market to Book Equity ratio, Capital intensity, Sale of Common Stock, dividend, Net Income and Total Assets of selected S&P BSE TECK firms has a negative association with debt ratios.

While Non-Debt Tax Shield as the proxy of Tax-Loss Carry Forward, Change in Debt, Research & Development, and Non-Debt Current Liabilities, has positive relationship with leverage and it is significant.

7. SUMMARY OF FINDINGS:

VARIABLES	EXPECTED SIGN	ACTUAL RESULTS
Total assets	+	-
Capital intensity	+	-
Research and Development expenditures	-	+
Tax loss carry forward	-	+
Net income	-	-
Market to Book equity	+	-
Change in debt	+	+
Dividends	-	+
Sales	-	–
Stock repurchases	+	-
Non debt current liabilities	-	+
DUMMY 1	-	-
DUMMY 2	+	+

From the above data analysis, we have identified the cause of the various determinants of leverage Information Technology firms which has the negative impact.

Capital Intensity of IT firms which is the proxy of fixed, tangible assets. This factor has negative association with capital structure. The coefficient of this determinant is -0.0457981. The reason for the negative relationship is because; the selected IT firms are not using tangible as collateral assets to increase its debt. Therefore debt ratios are negatively related to Capital Intensity.

Natural log of total assets of IT sector firms over the period has negative relationship with leverage. Generally larger firm will have higher debt ratios as their earnings are less volatile. In addition larger firms generally are exposed to higher debt tax rate which further motivates them to increase leverage. Whereas this case total assets are negatively related to debt ratios. The coefficient is -0.2530013. It is because IT firm's earnings are fluctuating. Hence they are insignificant. In addition larger firms generally are exposed to higher debt tax rate which further motivates them to increase leverage.

High leverage dummy variable has positive relationship with leverage and this relationship is highly significant, which signifies firms of IT sectors have more debt ratio in the base year of the analysis we have made analysis.

Dividends of IT firms over the period as per cent of Total Assets, represented as DIV/TA, which is under policy decision variable. It is noted that more debt in the firm contracts often restricts dividends, particularly for the firm with the high leverage. The coefficient of this determinant is 0.242849, and it is positively correlated.

The sum of firm's sale of equity stock is the issue of common shares over the period as the per cent of TA, denoted as Sales of common stock/ Total Assets. Firm's common stock increases firm's equity base and thus reduce the firm's debt ratio.

The stock repurchase of firms in BSE IT sectors found to be zero throughout 5 years. Therefore the coefficient of this determinant is zero correlation with leverage.

Market-to-book equity ratio, represented as MEQ/BEQ. Selected IT firms market to book equity ratios is negatively related to capital structure due to the smaller equity base to leverage decrease. Its coefficient value is -0.000503.

Net change in firm's debt over the period as a per cent of Total Assets represented as Change in Debt/Total Assets. IT Firm's debt ratio are higher to the degree of increases in its debt over the

previous years. Its coefficient is 0.0092364. Net-change in debt of selected firms is positively significant with leverage.

Zero debt Dummy (d1) variables have a negative relationship with consumer durable sector firms. It indicates that IT firms as these characteristics are adequately controlled by other variables in the regression we tested.

The Net income, over the period taken as a per cent of Total Assets, denoted as NI/TA. Most of the firms maintain their volume of earnings, so a firm's equity base tends to increase with their profits. Thus to the extent of a firm has generated income, the firm's debt ratio will be lower.

Research & Development expenditure over the period as a per cent of Total Assets symbolized as R&D/ TA. Capitalized Research & Development expenditures are considered as intangible asset, using this R&D firms cannot be financed with debt. In the analysis research and Development to Total assets has zero correlation with leverage.

Non-Debt Tax Shield which is considered as proxy of tax-loss carry forward, over the period per cent of Total Assets represented as Tax-Loss Carry Forward/Total Assets. Its coefficient is 0.2945988 and it is positively correlated with leverage.

The firm's Non-Debt Current Liabilities over the period as the per cent of Total Assets, represented as Change in NDCL/Total Assets. IT firm's current liabilities are positively related as the firms have more debt.

8. Conclusion:

From the above analysis on top 10 firms of S&P BSE TECK, we found the significant variations from the hypothesis made. Among firm characteristics variables net income, is the only variable found to be significant. Among policy and decision variables change in debt, sale of common stock, dummy variable 1 and dummy variable 2 are found to be significant.

IT firms are different from manufacturing concerns. IT firms do not invest on tangible assets,

Manufacturing firms generally are exposed to higher debt tax rate which further motivates them to increase leverage. Hence most of our determinants are insignificant to leverage.

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