

# Debt Overhang: Indian Real Estate Companies' Dilemma

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## ABSTRACT

Debt overhang is a position of capital structure where excessive debt are reducing investments since the earnings from future prospective investment in firms goes to present debt holders and not the shareholders . Indian real estate companies have accumulated huge debt since the middle of the last decade and even before worldwide recession from 2008. The main focus of our study is to expose the evidence of debt overhang empirically of select real estate companies in India during 2004-2005 to 2016-2017. For this empirical study, we have taken a random sample of 20 Indian real estate companies and applied the technique of panel regression to evaluate the impact of debt linked variables on investment and thereafter conducted granger causality test to find out the causal relationship. The results show significant negative impact of debt maturity, financial leverage and coverage on investment of the selected companies as well as unidirectional causal relationships of debt maturity, leverage and default with investment. The study explores the existence of debt overhang both in long and short term.

**Key Words:** Capital structure. Debt overhang, Investment. Panel regression  
JEL Classification Codes: G32, G31, C23, E32

## 1. INTRODUCTION

Myers had introduced the basic reason of debt overhang in corporate literature in 1977 and it is based on corporate borrowing. Debt overhang is an position of capital structure where excessive debt are reducing investments since the earnings

from future prospective investment in firms goes to present debt holders and not the shareholders. Krugman (1988) <sup>(10)</sup> and Sachs (1984, 1986) <sup>(18,19)</sup> relates it to the debt situation of a country and its ability to meet its outstanding debt timely and hence the theory has also been applied in macroeconomics to discuss country level debt management. Even before 2008 worldwide recession Indian corporate sector has experienced the problem of accumulated debt in sectors like real estate, telecom, power, steel manufacturing etc. Recently infrastructure Leasing & Financial Services (IL&FS) companies default their payment due to debt overhang in 2018. Unsustainable debt of Indian companies has created major constraint in flow of new investment in the country. But there is no comprehensive study to explore whether this huge debt really creates debt overhang.

## 2. LITERATURE REVIEW

In the process of reviewing literatures of debt overhang paradox systematically some broad groups of literatures have been reviewed. Modigliani and Miller (1958) <sup>(13)</sup> opined financing sources never affect the investment decision of a firm. But latter their propositions were challenged by two significant theories viz. pecking order and trade-off theories. Murray and Goyal (2005), <sup>(14)</sup> have suggested that the firm's operations is significantly influenced by corporate debt taken from different sources. So the long run investment decisions are affected by the

sources of debt, which in turn significantly affect overall economic developments. It is a paradox because capital generally boosts up investment but debt capital after crossing a limit, reduces investment.

The literatures build up theoretical justification of debt overhang hypothesis include the paper, "Determinants of Corporate Borrowing," of Myers (1977).<sup>(15)</sup> He has demonstrated the reason behind a company with a possibility of failure to pay on its debt has to curtail prospective investments that need new capital although have positive net present value and that may boost the firm's earnings power and benefit existing shareholders. Sudipto Bhattacharya *et al.* (2008)<sup>(1)</sup> in a paper, "The contribution of Stewart Myers to the Theory and Practice of corporate Finance", have opined that the problem of underinvestment could not be abolished but could be decreased, by giving assurance to investors that they would have prior claim on the cash flows generated from investment funded by them.

There are some literatures which investigate the macroeconomic implications of debt overhang. One of them is IMF working paper by Goretti and Souto (2013).<sup>(7)</sup> They have given empirical evidence of the relation between investment options and firm's balance sheet position when the debt of the firm crossed a threshold level. Bernanke and Gertler (1989)<sup>(2)</sup> have shown theoretically that financial frictions, for instance those take place due to borrowing restrictions, have an impact on investment of a firm. Lamont (1995)<sup>(11)</sup> has tested in macroeconomic model the validity of debt overhang in corporate sector. According to the author, different economic conditions affect debt overhang differently. Filippo Occhino and Andrea Pescatori (2010)<sup>(16)</sup> have found that non-contractible nature of investment creates the trap of debt overhang due to changes in business cycle.. Debt overhang may reduce investment in short term or in long term. Myers (1977)<sup>(15)</sup> has suggested that the problem of debt overhang may be solved by using short term debt. Diamond and He (2014)<sup>(4)</sup> have studied the

effect of maturity period of debt on firm's investment. They have shown proposals of Myers are valuable but they also proved that in different situations such proposals can be reversed because in downturn economy short term debt impose strong debt overhang. It is similar with the findings of Gertner and Scharfstein (1991)<sup>(6)</sup> and Titman and Tsyplakov (2007).<sup>(20)</sup>

The relationship between investment and indebtedness in corporate sector was found in many empirical studies. Vermeulen (2000)<sup>(21)</sup> has found in his studies on Germany, Spain, Italy and France during the year 1983 to 1987 that investment in small firms during recession was negatively affected by balance sheet position due to the effect of financial accelerator. Ana Martinis and Igor Ljubaj (2016)<sup>(12)</sup> have investigated the corporate debt of Croatia. They have applied dynamic panel regression technique and found that heavily indebted non-financial firms hinder investment in Croatia. Moreover, if a firm is in debt overhang this negative effect is more severe. Kalemli-Ozcan *et al.* (2015)<sup>(9)</sup> have found that investment-to-capital ratio decreased almost by 50% in European firms during the financial crisis due to debt overhang, and after the sovereign debt crisis this problem becomes more complicated. They have noticed sluggish investment due to high rollover risk and presence of debt overhang in Europe.

Indian companies have also experienced heavy debt problem in recent years. Some of the studies focus on this issue. Panigrahi (2012)<sup>(17)</sup> has analysed three hundred private companies of India belongs to twenty different sectors, during the year 1999-2000 to 2007-08. The study has revealed that the reliance of debt capital is more in manufacturing companies than Service sector companies. The correlation between size of the company and dependence of debt has been negative. Larger the Debt capital lower was the dependence of Debt capital and Vice-versa. S.chanda and Anil k. Sharma (2016)<sup>(3)</sup> has conducted a study from 2003-04 to 2012-

13 on manufacturing sector in India and the study was on the composition of capital structure. In this empirical study they have used ratio analysis and the technique of panel regression. They have noticed that the capital structure of these companies were loaded with high level of debt and the relationship between leverage and the value of a firm was not at all significant.

John and Muthusami (2011) <sup>(5)</sup> have examined the investment and leverage relationship of pharmaceutical companies of India from 1998-2009. They have shown the results of fixed effect, random effect and pooling regression methods. They have found significant negative effect of leverage on investment for firms of medium size and significant positive effect of leverage on investment in large size firms.

### **3. MOTIVATION**

In this context the Indian companies burdened with debt should be analyzed comprehensively to detect whether their unsustainable debt put them in the dead trap of debt overhang or not. The real estate industry is the best for the study as it is a capital intensive sector and use huge debt to finance its projects.

### **4. RESEARCH GAP**

High level of debt not always mean debt overhang. It only occurs when heavily indebted companies have very poor cash flows over years. So it is very important to find out whether debt burdened Indian Real estate companies have lost investors faith for financing their upcoming projects due to debt overhang or not. To fulfill this gap we have selected Real Estate Industry, to explore empirically whether debt overhang have trapped this industry or not.

### **5. OBJECTIVES**

The following objectives are set for the study:

1) To test the impact of debt maturity, financial leverage, leverage and coverage have any significant impact on investment in order to find the presence of debt overhang in selected real estate companies in Indian during the selected study period.

2) To find out the causal relationship between debt maturity, financial leverage, leverage and coverage with investment for the selected real estate companies in Indian during the selected study period.

### **6. HYPOTHESES**

The literature review indicates several studies that proved the ill effects of unsustainable debt on investment. Investment may decline due to various factors influencing investors to become very conservative. But whether the volume of debt, repayment capacity, position of capital structure significantly influencing towards underinvestment or not help us to make the following hypotheses in this study.

1) Debt maturity, financial leverage, leverage and coverage have significant impact on investment in selected real estate companies in Indian during the selected study period.

2) There is causal relationship between debt maturity, default chance, leverage and coverage with investment in the selected real estate companies in Indian during the selected study period.

### **7. DATABASE AND METHODOLOGY**

This study has been conducted on 20 real estate construction companies (Table:-1B) of India selected randomly. There are 141 real estate construction companies listed in Bombay Stock Exchange. Due to non availability of data required for calculation of the variables of the study during most of the study period for 80 companies we have to limit the sample size within 20. The data has been collected from Annual reports of the companies. The description of variables is given in table:-1A

**Table 1A: DESCRIPTION OF VARIABLES**

S.N	NAME OF VARIABLES	DATA SOURCE	DEFINITION
1	Investment(INV) (Explained variable)	Annual reports	(Change in Fixed tangible assets add depreciation) / Shareholders fund(previous year)
2	Debt maturity(M) (Explanatory variable)	Annual reports	Debt of long term/Total Debt
3	Financial leverage(FL) (Explanatory variable)	Annual reports	Net debt/EBITDA Net debt=total debt-cash& cash equivalent EBITDA=earnings before interest tax depreciation and amortization
4	Leverage(L) (Explanatory variable)	Annual reports	Debt/equity
5	Coverage (C) (Explanatory variable)	Annual reports	Interest/ EBITDA

Notes: All variables are taken in natural logarithm.

**Table 1B: List of selected Real estate companies in India**

Serial no	Name of companies
1.	Hudco
2	DLF
3	Godrej Properties LTD
4	Prestige Estate projects LTD
5	Shobha LTD
6	HDIL
7	Parasvath Developers LTD
8	Omaxe LTD
9	Vipul LTD
10	Vascon engineers LTD
11	Puravankara LTD
12	Anant Raj LTD
13	Brigade Enterprises LTD
14	Phoenix Mills LTD
15	Sunteck reality LTD
16	Kolte-Patil Developers LTD
17	Ajmira Reality and Infra India LTD
18	Indiabulls Real Estate LTD
19	Delta Corp LTD
20	Nitesh Estates LTD

We have selected the study period from 2004-2005 to 2016-2017 because from the middle of last decade real estate companies have piled up huge debt to finance its profitable projects but even before 2008 worldwide recession its demand falls drastically, not being recovered fully till now. We have not considered the period after 2017 because the effect of demonetization and G.S.T has created slowdown in Indian economy. We have got an unbalanced panel data and used STATA 12 for all calculations. Accordingly, the following panel regression model has been applied to examine the impact of Maturity, Financial leverage, Leverage and coverage on **Investment**:  
 $INV_{it} = \alpha_i + \beta_1 M_{it} + \beta_2 FL_{it} + \beta_3 L_{it} + \beta_4 C_{it} + \mu_{it} \dots \dots (1)$

The above equation is presented on the basis of one way fixed effect panel data

model. However, it remains the same in case of pooled OLS models except the constant term ( $\alpha_i$ ) in equation (1) will be substituted by  $\alpha$ . In case of random effect models the error term  $\mu_{it}$  will be substituted by  $\omega_{it}$  and the other components of the models will remain the same, where  $\omega_{it}$  is the composite error term. To test the appropriate method for conducting panel regression, three tests namely F- test, Breusch Pagan Lagrange multiplier (herein after referred as BP LM test) test and Hausman specification test have been performed. We have also tested Autocorrelation, Heteroscedasticity, Multicollinearity and Stationerity as panel data have some time series related problems.

The panel causality test for heterogeneous panel has been applied by following the Dumitrescu & Hurlin method (2012).<sup>(8)</sup> The model of panel causality test is based on the following linear equation:

$$y_{i,t} = \alpha_i + \sum_{k=1}^K \gamma_i^{(k)} \cdot y_{i,t-k} + \sum_{k=1}^K \beta_i^{(k)} \cdot x_{i,t-k} + \epsilon_{i,t} \dots \dots (2)$$

y=Explained variable  
 x=Explanatory variables  
 i=cross sectional units  
 t= Year  
 k= lag numbers (in this study it is 1 selected on the basis of Akaike information criteria)  
 $\alpha$ =individual effects of selected companies  
 $\gamma$ =Auto regressive coefficient  
 $\beta_i$ =Regression coefficient of individual Indian real estate company

**8. RESULTS**

As per the methodology for panel regression, random effect model is appropriate to fit as null hypotheses of fixed effect model and BPLM test are rejected but the null hypothesis of Hausman specification test is accepted (Table:-2). Our model shows moderate goodness of fit as  $R^2$  is 0.2689. So we have preferred to carry out

our analysis on the basis of this model. Some problems are detected in panel data like 1<sup>ST</sup> order serial Autocorrelation and panel level Heteroscedasticity although Multicollinearity problem is not present as  $VIF < 10$  (Table 3). So I we have used robust measure in random effect model. However, stationarity test (Table 4) shows there is no problem of unit roots.

**Table2: Selection of appropriate model**

Equation	Fixed effect F value	Random effect Wald chi <sup>2</sup> value	BPLM test Chibar <sup>2</sup> value	Hausman test Chi <sup>2</sup> value	Model applied
1	15.92***	64.63***	149.39***	2.32	Random effect

Notes-\*\*\* indicates significant at1% level,\*\* indicates significant at5% level,\* indicates significant at10% level

**Table 3: Autocorrelation, Heteroscedasticity, Multicollinearity Tests**

Name of test	Test Statistics/Measure	Value	Result
Autocorrelation	F	4.609**	First order Autocorrelation
Heteroscedasticity	Likelihood-ratio test (Assumption: nested in hetero)	52.61**	Heteroscedasticity
Multicollinearity	VIF(variance inflation factor)	2.41	No Multicollinearity

Notes-\*\*\* indicates significant at1% level,\*\* indicates significant at5% level,\* indicates significant at10% level

**Table 4: Stationarity Test (Fisher-type, test statistic=inverse chi-square)**

Name of Variables	Value	Result
INV	98.5411***	stationery.
M	146.6739***	stationery.
FL	109.4356***	stationery.
L	112.5435***	stationery.
C	113.9261***	stationery.

Notes-\*\*\* indicates significant at1% level,\*\* indicates significant at5% level,\* indicates significant at10% level

**Table 5: Existence of debt overhang [Random effects model (Robust)]**

Independent variables	coefficient	z values
M	-1.169541	-4.31***
FL	-0.4675127	-1.91*
L	1.110317	5.93***
C	-3.366312	-2.23**

Notes-\*\*\* indicates significant at1% level,\*\* indicates significant at5% level,\* indicates significant at10% level.

**Table 6: Dumitrescu & Hurlin (2012) Granger non-causality test**

Null hypothesis	Test statistics	Null Hypothesis Accept/reject
M does not Granger-cause INV	Z-bar tilde = 3.2748**	Reject
FL does not Granger-cause INV	Z-bar tilde = 2.4475**	Reject
L does not Granger-cause INV	Z-bar tilde = 4.7901***	Reject
C does not Granger-cause INV	Z-bar tilde = 1.4592	Accept

Notes: \*\*\* indicates significant at1% level,\*\* indicates significant at5% level,\* indicates significant at10% level.

**9. DISCUSSION**

Panel regression result (Table 5) shows that one rupee increase in debt of long term as a portion of total debt reduce investment significantly byRs.1.169541. It confirms the existence of long term debt overhang. As like Diamond and He, we have analysed the impact of debt maturity on investment and find the existence of long term debt overhang in the study of real estate companies.

The variable Financial leverage is the most vital indicator of debt overhang and also used by different credit rating agencies to measure debt overhang. This study shows the existence of debt overhang

in long term because on rupee increase in net debt as a portion of EBITDA leads to Rs. 0.4675127 decrease in investment significantly. The result confirms the very existence of debt overhang and consistent with the findings of Kalemlı-Ozcan *et al.* (2015).<sup>(9)</sup>

Myers has suggested short term debt as a possible remedy for long term debt overhang because it imposes lower overhang. But this study revealed the symptom of short term debt overhang too. One rupee increase in interest as portion to EBITDA has reduced investment significantly by Rs.0.3366312. The result of this study reveals that the selected real



estate companies during the study period have possibilities of interest default in near future which provide a negative signal to the investors, as consistent with the findings of Diamond and He.

Most of the real estate companies invest debt capital in their projects to take the advantage of trading on equity. So it generally boosts up investment. This study also shows the positive impact of leverage on investment because one rupee increase in long term debt as compared to equity has significantly increase investment by Rs.1.1103187. But this ratio does not capture the repayment capacity of debt like financial leverage ratio used in this study. The result (Table:-6) shows that null hypothesis is rejected in each case except coverage. So Debt maturity, financial leverage, and Leverage have significant unidirectional causal relationships with investment but coverage has no significant causal relationship with investment, for the above mentioned period. As debt maturity and financial leverage have significant causal relationships with investment so it proves the presence of debt overhang in long term. Although the short term debt overhang imposed by coverage as shown in regression is not strong as it fails to qualify in causality test.

## **10. CONCLUSION**

Indian real estate companies have given a high growth in Indian economy in the beginning of this century but failed drastically as soon as its demand falls and after worldwide recession the performance of these companies become worse due to their past accumulated debt. In this study we have found the presence of both long term as well as short term debt overhang for the selected real estate companies during the study period. Leverage still has a good chance to recover investment growth but the presence of debt overhang prevented to boost up investors confidence. Therefore Debt restructuring as well Debt rescheduling is the way out to overcome this problem. Our present study will draw the

attention of real estate companies' policy makers to think that any of their measures to finance profitable projects will not be fruitful until they specifically take some steps to get their companies out of debt overhang. Real estate companies should frame debt sustainability report and cash management policy should be reviewed continuously to ensure steady cash flow. They have to design suitable debt restructuring policy to get back the faith of investors. Old debts should be rescheduled so that new investors should get the maximum benefits from new projects. The demand of real estate at present has much improved than earlier so by taking proper Debt restructuring policy these companies can attract new investors in real estate and regain its past glory.

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