

# Dynamics of Corporate Capital Structure Choices: Further Reconciliations and Tests

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## Abstract

In the Literature of Corporate Finance, an inclusive theory unifying the modern capital structure theories is pending as yet. A comprehensive theory considers “time-state-focus” choices over time. Firms’ comprehensive capital structure choices need some reconciliation of their different tracks of financing. On reconciliation of the choices in the static trade-off (STO) track, the pecking order (PO) track, and the dynamic trade-off (DTO) track at presence of upper and lower recapitalization boundaries, and the limits of adjustment costs, we theoretically extend the 2nd proposition of Sinha and Ghosh (2012) (read with Sinha and Ghosh, 2013a) with three innovative corollaries. The empirical observations with reference to a large sample of Indian non-banking firms’ financing data over 10 years’ study period of 1997-98 to 2006-07 show unique findings in support of the corollaries.

**Keywords:** Corporate Capital Structure Theories, Dynamic Choice References, Recapitalization Boundaries, Adjustment Costs, Reconciliatory Views.

## 1. Introduction

An inclusive theory that unifies the ‘modern’ capital structure theories viz., the static trade-off (STO) theory, the pecking order (PO) theory, the dynamic trade-off (DTO) theory, and the market timing (MT) theory is pending. Comprehensive theory considering firms’ *time-state-focus* choices over time is yet to be explored. These modern ‘point/s of view’ theories are conditional to a few firm-specific characteristics. The desired dynamics on

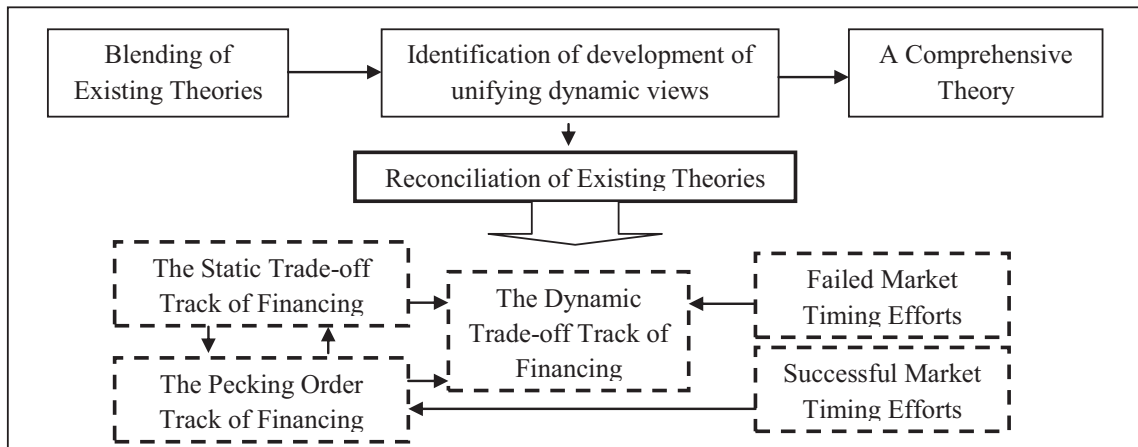
firms’ financing choices could be addressed in a unifying financing framework (Sinha and Ghosh, 2013a; published as a research letter). The framework in Figure 1 suggests that blending of the theories toward a comprehensive one sets forth development of a unifying dynamic view through reconciliations of the theories (Sinha and Ghosh, 2013a; p. 45; read with Myers, 2002; p. 3 - 4).

The framework offers for three propositions ( $P_s$ ) and six corollaries ( $C_s$ ).  $P-1$  reconciles between STO-track and PO-track (Ghosh and Sinha, 2009).  $P-2$  deals with reconciliations from STO or PO-tracks to DTO-track (Sinha and Ghosh, 2012), and  $P-3$  reconciles MT-track with DTO-track.  $C-1.1$  and  $C-1.2$  are derived from  $P-1$ . They explain dynamics of firms’ reserve debt capacity in their swings with STO and PO-tracks (Sinha and Ghosh, 2013b).  $C-2.1, 2.2$  and  $2.3$  are derived from  $P-2$ . The paper empirically explores these corollaries. These reconcile STO and PO-tracks with DTO-tracks at recapitalization boundaries and adjustment costs.  $C-3.1$  is derived from  $P-3$ .  $C-3.1$  reconciles MT-track with PO-track (Sinha and Ghosh, 2009).

$P-2$  (also  $P_2$ ) deals with firms’ dynamic reconciliation from STO or PO-track to DTO-track. It states that high (low)-value firms’ new equity issues in STO (PO) track over time approach to follow DTO-track in dynamic recapitalization (Sinha and Ghosh, 2013a; p. 45). Sinha and Ghosh (2012) have showed that in dynamic recapitalizations,  $P_2$  holds true for Indian sample firms. Firms’ objective is to maximize firm-values and minimize adjustment costs. In the STO theory, adjustment cost connotes for bankruptcy costs and tax-shield benefits and agency costs and control benefits as well (Modigliani and Miller, 1963; Kraus &

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**Figure 1: Framework for Development of Comprehensive Theory.**

Litzenberger, 1973; Myers, 1977; Miller, 1977; Altman, 1984; Andrade & Kaplan, 1998; Bradbury and Lloyd, 1994; Jensen and Meckling, 1976; Jensen, 1986). In the PO theory, it stands for the asymmetric information costs between insider managers and outsider investors (Myers and Majluf, 1984; Myers, 1984). Besides the corporate tax rate, personal tax rate, firms' assets' variances, risk-free interest rate, and bankruptcy costs, adjustment cost includes transaction costs (Fischer, et al., 1989a; 1989b). At adjustment costs, there is little study on reconciliations and unifying financing choices.

## 2. Literature Review

The STO theory is exposed to firms' immediate adjustments of capital structures. The 'pure' PO theory in Myers (1984) is subject to asymmetric information costs only while the STO line mostly explains the 'modified' PO theory in Myers and Majluf (1984). These versions set principles on model building and tests and not explicit models for empirical testing (Frank and Goyal, 2008). Empirical studies on the STO theory result in Type-II error even if a pseudo trade-off firm is following PO-track (Shyam-Sunder and Myers, 1999; Fama and French, 2002 and 2005). In PO-track, financing deficit over time irrespective of firms' size effects plays less (more) significant roles in net debt (equity) issues (Frank and Goyal, 2003). Despite favors for PO-track in Fama and French (2002), firms rarely issue equity at high asymmetric information costs (Fama and French, 2005). Equity issues are on an average material and so pervasive that the pecking order itself fails (Fama and French, 2005).

The PO and reverse PO (i.e., STO) choices in new external issues simultaneously could exist in an economy (Gomes and Phillips, 2005). The firms rarely maintain their types over time (Bontempi, 2002). The PO firms fund financing deficits with internal equity in short-run but the agency conflicts and signaling effects thrust them toward STO-track with issues of long term debts. Firms' dynamics in debt-capacity and their reliance on debt or equity issues depend on the restrictions imposed in debt-covenants (Lemmon and Zender, 2004). Firms' PO or reverse PO-track depends on information asymmetry whether it is about the expected value or risk of their new projects (Halov and Heider, 2005). Ghosh and Sinha (2009) show that firms' PO-track faces sub-optimality at higher long-term debt levels which drive them for STO-track toward optimality at lower long-term debt levels. Firms' profitability, costs of capital, and effects of financing on profitability, however, here put into their dynamics in financing choices.

However, 'adjustment cost' is an inclusive initiative in explaining firms' capital structure decisions (Myers, 1984). Besides the firm-specific and macro-economic effects (Sinha and Ghosh, 2010), the adjustment cost can incorporate intra-structure and inter-structure dynamics of firms' capital structure changes (Sinha and Ghosh, 2014; *forthcoming*).

The STO and PO theories do not show persistency empirically. In the DTO theory, firms' jump-diffusion process in leverage ratios depends on exogenous tax rate (Kane, et al., 1984) while in equilibrium, optimally levered firms earn return premium which sub-optimal firms lack

(Kane, et al., 1985). Firms' sub-optimal revisions over time come about for changes in bankruptcy costs, debt maturity, debt issuance costs, and taxes. Leverage ratios show time-varying swings on changes in recapitalization costs (Fischer, et al., 1989a; 1989b). Debt-maturity structure causes STO benefits for tax-benefits over bankruptcy and agency costs (Leland and Toft, 1996). Mauer and Triantis (1994) show possible substitution between production-flexibility and financing-flexibility where operating adjustment costs positively influence firms' adjustments in fixing the ranges of debt boundaries.

Further, firms' dynamic choices comprise of choices on target leverages and adjustment-speeds (DeMiguel and Pindado, 2001; Heshmati, 2002; DeHaas and Peeters, 2006; and Banerjee, et al., 2000; 2004). Goldstien, et al., (2001) have showed that equity-holders', debt-holders' and government's claims to contingent EBIT-flows are conditional to firms' choice of state variables. Ju, et al., (2002; 2005) have showed that firms lower their initial debt ratios to avoid "perceived" or "actual" bankruptcy but optimally levers up firms' asset-base if existing debts mature.

The DTO theory has both the STO and the PO impetuses even if reconciliations amongst them are almost addressed in Sinha and Ghosh (2012) and Sinha and Ghosh (2013a) (see also, Sinha and Ghosh (2013c)). The former study focuses on high-value and low-value firms' reconciliations from STO and PO-tracks towards DTO-track. It has abstracted exploring dynamic reconciliations at different limits of adjustment costs. Sinha and Ghosh (2013a) reveal ingenious results towards development of unifying dynamic view, its framework, the related theoretical propositions and corollaries. The study "...limits itself within briefing the empirical observations" and reports "an overview of ... methodological approaches" (Sinha and Ghosh, 2013a; pp. 52-53). This paper seeks to address the unpublished research work in relation to C - 2.1; 2.2; and 2.3.

### 3. Theoretical Development

In the dynamic recapitalization of Fischer, et al. (1989a), firms revise capital structures with debt (equity) issues at higher (lower) "firm-value to debt" ratio. It is reciprocal (proportional) to firm-value to debt (equity) ratio. In a continuous time framework of geometric wiener process, they follow Intertemporal Capital Asset Pricing Model of

Merton (1973). Continuous debt or equity adjustments are not incorporated here. Firms recapitalize only at upper or lower recapitalization boundaries of firm-value to debt ratios. Their recapitalization scheme does not slot in firms' transitions from one track to the other.

Let us assume that  $P_2$  holds in dynamic recapitalization policy of Fischer, et al., (1989a). Firm's general objective is to maximize firm-value and minimize adjustment cost. For dynamic monitoring of the elements of adjustment costs, firms should follow different tracks at different limits of upper and lower debt levels (see, Figure 2, Sinha and Ghosh, 2013a; p. 49; and Sinha and Ghosh, 2013b; p. 55). At any debt ratio bellow  $D_0D_1$ , asymmetric information cost for new debt (equity) issue is lower (higher) than that at  $D_0D_1$  (or just set off) while debts' trade-off benefits are higher than its related costs. If adjustment costs include asymmetric information costs, and trade-off costs and benefits in Figure 2, then C-2.1 is derived from  $P_2$ . Further, in STO-track, firms revise debt ratios at changes in trade-off benefits and costs. This adjustment is immediate at less adjustment cost. In PO-track, low-value firms face high adjustment cost for information asymmetry. C-2.2 is derived from C-2.1. C-2.3 however is synthesized from C-2.1 and 2.2 jointly. In dynamic recapitalization, adjustment costs thus determine recapitalization boundaries.

**C-2.1:** *Firms in their approach to follow the DTO theory are exposed to follow the STO (PO) track at lower (upper) recapitalization boundaries of the debts or at upper (lower) recapitalization boundaries of the equity.*

**C-2.2:** *Firms in their approach to follow the DTO theory are exposed to face smaller (higher) adjustment costs when they are supposed to finance through external capitals under the STO (PO) track of financing.*

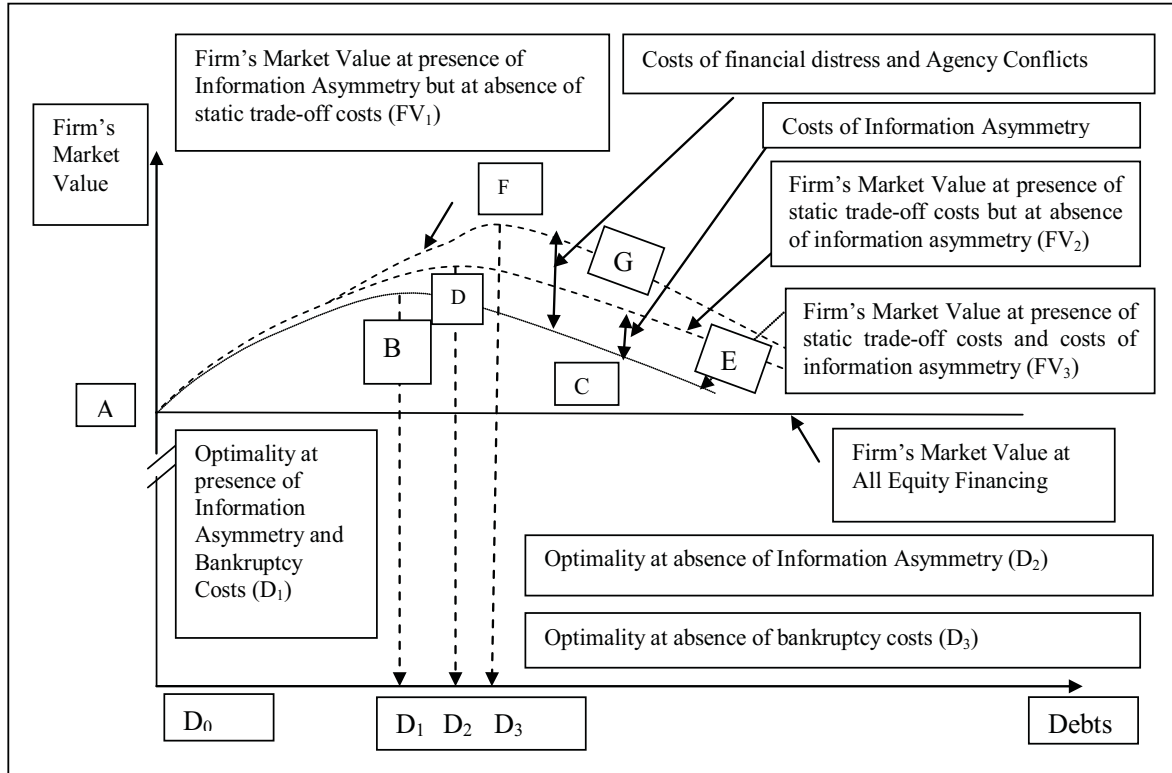
**C-2.3:** *Firms in their approach to follow the DTO theory are exposed to face smaller (higher) adjustment costs at lower (upper) recapitalization boundaries of the debts or at upper (lower) recapitalization boundaries of the equity.*

## 4. Data and Methodology

### 4.1 Data and Study Period

The data utilized are collected from the "Capitaline" database. It includes six capital intensive industries: the automobile industry, the auto-ancillary industry, the

**Figure 2: Firms' Dynamic Optimality at Different Imperfections of the Market**



petrochemical and chemical industry, the cement industry, the consumer durables industry, and the construction and real estate industry. The study empirically covers the period of 10 financial years from 1997-98 to 2006-07. Firms' list is available on request to the authors.

**4.2 Sample Selection Criteria**

From a large data set of the Indian listed firms, a primary set of 273 firms are selected. These firms are belonging to the industries which are automobile, auto-ancillary, petrochemical and chemical, cement, consumer durables, and construction and real estate, and sub-sample sizes for these industries are 28, 67, 75, 32, 43, and 28 respectively. These firms are listed Indian firms. On empirical explorations only the firms, whose profitabilities are found to be positive at least for six years within the study period, are selected here. Keeping parity with Ghosh and Sinha (2009), a few observations where the overall cost of capital  $\leq 3\%$ , the operating rate of return  $\leq 5\%$ , and the equity rate of return  $\leq 4\%$  are excluded since these values are too small and these may distort the average

relationships. Based on these criteria, the final firms' data-sizes vary over the changes in the long-term debt to equity levels.

**4.3 Definition of the Variables**

We assume that in optimal dynamic recapitalization policy, a representative sample firm ( $F_i$ )'s current (at time  $t$ ) total debt-to-equity ratio is  $L_{it}$ . Its lower ( $\underline{d}_{it}$ ) and upper ( $\bar{d}_{it}$ ) debt limits respectively are the minimum and maximum debt ratios over the time periods,  $t$ .  $L_{oi}^*$  is the mean of long-term debt-equity ratios over  $t$ . Adjustment cost ( $\pi_{it}$ ) includes elements of risk-less interest rate ( $R_{f, it}$ ), tax-shield benefits ( $\tau_{it}$ ), bankruptcy risks ( $\phi_{it}$ ), underlying assets' variance ( $\sigma_{it}^2$ ), size of the recapitalization cost ( $\rho_{it}$ ). The magnitudes of  $\pi_{it}$  may reflect net effect of  $R_f$ ,  $\Delta\tau$ ,  $\phi$ ,  $\sigma^2$ , and  $\rho$ . The proxy for  $R_f$  is the yield rate of long term (5 years') govt. bonds. The proxy for  $\tau$  is defined as the change in interest tax-shield benefits. Atman's modified Z-score is used to provide inverse proxy for  $\phi$ . The Z-score refers to firms' solvency limits. It is defined as  $Z_{it} = (3.3 * PBIT_{it} + SALE_{it} + RE_{it} + WC_{it}) / TA_{it}$  where

$PBIT_{it}$  is the profit before interest and taxes,  $SALE_{it}$  is net sales,  $RE_{it}$  - retained earning,  $WC_{it}$  - working capital, and  $TA_{it}$  - total assets less fictitious assets. The low (high) is Z-score the high (low) is  $\varphi$ . Underlying assets' variance ( $\sigma^2$ ) represents firm's total assets' variance over  $t$ . The ratio of variance of sales turnover divided by absolute value of its mean difference is used to proxy for size of recapitalization costs ( $\rho$ ). Sales turnover is assumed to be inversely related to size of cost of recapitalization. The higher is sales turnover the higher is product market power of  $F_i$  and the lower is size of recapitalization cost. In order to incorporate the time-varying effects in  $\rho$ , the magnitude of sales turnover is divided by absolute value of its mean deviations of sales turnovers. Debt-revisions in STO-track ( $d_{it}^{STO}$ ), PO-track ( $d_{it}^{PO}$ ) and, DTO-track ( $d_{it}^{DTO}$ ) are defined in the followings.

$$d_{it}^{STO} = (L_{it} - L_{it-1}) / (L_{it} - L_{i0}^*) \dots \dots \dots (i)$$

$$d_{it}^{PO} = (L_{it} - L_{it-1}) / (\bar{d}_{it} - L_{it}) \dots \dots \dots (ii)$$

$$d_{it}^{DTO} = (L_{it} - L_{it-1}) / (\bar{d}_{it} - \underline{d}_{it}) \dots \dots \dots (iii)$$

#### 4.4 Empirical Propositions and Specific Objectives

On the dynamic recapitalization policy, C-2.1, 2.2 and 2.3 suggest that firms which follow STO (PO)-track are biased towards (i) lower (upper) recapitalization boundaries of debts, (ii) upper (lower) recapitalization boundaries of equity, and (iii) smaller (higher) adjustment costs. But, according to  $P_2$ , high (low)-value firms are those which follow STO (PO)-track. The empirical proposition follows that at different limits of upper or lower boundaries of debt (or equity) and at different limits of the adjustment cost elements, STO (PO) debt-revisions by high (low)-value firms would show different swings in DTO debt-revisions. Based on this empirical proposition and objective on dynamic behaviours of the firms, the regression models are formulated.

### 5. Regression Models

In the DTO-track, firms show swings in dynamic recapitalization at the different levels of the recapitalization boundary of debt. Debts are recapitalized once the current debt ratio reaches upper / lower debt boundary. The high-

value and low-value firms' dynamic swings are specified in the following models (1) and (2) respectively. In model (1), the high-value firms' DTO debt-revision ( $d_{it}^{DTO}$ ) is explained with the independent variables of STO debt-revisions ( $d_{it}^{STO}$ ) in a cubic specification along with the firm-value proxy ( $X_{it}^{MB \geq 1}$ ). Here,  $h_{1t}$  is the random error term. In model (2), the low-value firms' DTO debt-revision ( $d_{it}^{DTO}$ ) is tried to explain with the independent variables PO debt-revisions ( $d_{it}^{PO}$ ) in the cubic specification along with the firm-value proxy ( $X_{it}^{MB < 1}$ ). Here,  $h_{2t}$  is the random error term. In both the models,  $\alpha_0$  is the intercept component. The lower / upper recapitalization boundaries (i.e.,  $\underline{d}_{it}$  or  $\bar{d}_{it}$ ) or the elements of adjustment cost,  $\pi_{it}$  (viz.,  $\Delta R_{f, it}$ ,  $\Delta \tau_{it}$ ,  $\varphi_{it}$ ,  $\sigma_{it}^2$  and  $\rho_{it}$ ) serve as the third dimension of limit ( $l$ ). In the models,  $\alpha_{s, k, l}$  and  $\alpha_{p, k, l}$  are the respective coefficients of  $d_{it}^{STO}$  and  $d_{it}^{PO}$  at  $l$  limits long the third dimension while  $\alpha_{mb, l}$  represents the coefficient of the firm-value proxy.

$$d_{it, l}^{DTO} = \alpha_0 + \alpha_{s, k, l} \sum_{k=1}^3 (d_{it}^{STO})^k + \alpha_{mb, l} X_{it}^{MB \geq 1} + h_{1t} \quad (1)$$

$$d_{it, l}^{DTO} = \alpha_0 + \alpha_{p, k, l} \sum_{k=1}^3 (d_{it}^{PO})^k + \alpha_{mb, l} X_{it}^{MB < 1} + h_{2t} \quad (2)$$

In order to address C-2.3, the following models (3) and (4) are introduced. These explain upper and lower recapitalization boundaries of the debts respectively. Both models are used for sub-samples of high-value and low-value firms in together. The elements of adjustment cost are specified in a linear regression form. The intercept term is excluded to skip fixed effect, if any. The random error terms are  $h_{3t}$  and  $h_{4t}$ . The effects of the  $k^{th}$  element of adjustment cost on lower and upper recapitalization boundaries of debts are  $\alpha_{k, \underline{d}}$  and  $\alpha_{k, \bar{d}}$  respectively.

$$\underline{d}_{it} = \alpha_{k, \underline{d}} \sum_{k=1}^5 \pi_{it, k} + h_{3t} \quad (3)$$

$$\bar{d}_{it} = \alpha_{k, \bar{d}} \sum_{k=1}^5 \pi_{it, k} + h_{4t} \quad (4)$$

## 6. Hypotheses

Based on the above models, (1), (2), (3), and (4), the null hypotheses and the relevant alternative hypothesis respectively are formulated in the followings.

### 6.1 Null Hypotheses

Over the different limits of lower recapitalization

boundary ( $\underline{d}_{it}$ ) and over the different limits of elements in adjustment cost ( $\pi_{it}$ ) viz.,  $R_{f, it}$ ,  $\Delta\tau_{it}$ ,  $\varphi_{it}$ ,  $\sigma^2_{it}$ , and  $\rho_{it}$  as well, the high-value ( $F_{Hi}$ ) firms' STO debt-revisions and the firm-value proxy  $X_{it}^{MB \geq 1}$  have no effect on their DTO debt-revisions. In model (1),  $\alpha_0$  and  $\alpha_{s, k, l}$  ( $k = 1, 2$  and  $3$ ) are insignificant. The firms attain the semi-separating equilibrium<sup>1</sup> and  $a_{mb}$  is insignificant. Again, over the different limits of upper recapitalization boundary ( $\bar{d}_{it}$ ) and over the different limits of  $R_{f, it}$ ,  $\Delta\tau_{it}$ ,  $\varphi_{it}$ ,  $\sigma^2_{it}$ , and  $\rho_{it}$  as well, the low-value ( $F_{Li}$ ) firms' PO debt-revisions and the firm-value proxy  $X_{it}^{MB < 1}$  have no effect on their DTO debt-revisions. In model (2),  $\alpha_0$  and  $\alpha_{p, k, l}$  ( $k = 1, 2$  and  $3$ ) are insignificant. At the semi-separating equilibrium,  $a_{mb}$  is also insignificant.

The different elements of adjustment cost (viz.,  $R_{f, it}$ ,  $\Delta\tau_{it}$ ,  $\varphi_{it}$ ,  $\sigma^2_{it}$ , and  $\rho_{it}$ ) do not explain  $\underline{d}_{it}$  and in the model (3),  $\alpha_{k, \underline{d}}$  at  $k = 1, 2, \dots, 5$  are insignificant. These elements of adjustment cost also do not explain  $\bar{d}_{it}$  and hence, in model (4),  $\alpha_{k, \bar{d}}$  at  $k = 1, 2, \dots, 5$  are insignificant.

## 6.2 Alternative Hypotheses

In dynamic recapitalization, none of the trade-off elements puts too extreme presence to refer STO framework. The effects of STO costs or benefits are expected to be disappeared at their higher limits. With the model (1), on DTO debt-revisions, the effects of  $F_{Hi}$  firms' STO debt-revisions are expected to be significant at the lower limits of  $\underline{d}_{it}$ ,  $R_{f, it}$ ,  $\Delta\tau_{it}$ ,  $\varphi_{it}$ ,  $\sigma^2_{it}$  and  $\rho_{it}$ . The signs of the coefficients in cubic specification are immaterial in a dynamic framework. The proxy variable  $X_{it}^{MB \geq 1}$  would have significantly positive effect in order to show the said separating equilibrium where larger is firm's firm-value larger is its extent of DTO-revisions. In model (1), intercept is expected to be positive to show fixed effect.

Again, in dynamic recapitalization, effects of  $F_{Li}$  firms' PO debt-revisions are expected to be significant over different limits of  $\bar{d}_{it}$ ,  $R_{f, it}$ ,  $\Delta\tau_{it}$ ,  $\varphi_{it}$ ,  $\sigma^2_{it}$  and  $\rho_{it}$  with model (2). The effects of PO debt-revisions are not expected to wane at higher limits rather these would show persistency since at these limits, these firms approach from STO-

1 In the separating equilibrium, high (low)-value firms behave unlikely of those of low (high)-value ones. In a semi-separating equilibrium, the firms within a group remain indifferent. For details on *separating* and *semi-separating* equilibrium please review Sinha and Ghosh (2013b).

track to PO-track (proposition-1) and not vice-versa. The proxy variable  $X_{it}^{MB < 1}$  may have negative effect to show separating equilibrium. The lower is firms' firm-value larger is its expected swings to attain the said equilibrium. The intercept in model (2) would show positive fixed effect, if any.

In DTO-track,  $F_{Hi}$  firms may show larger (smaller) swings with smaller changes in the benefits (costs). In model (3), the elements of benefits (costs) may have "moving-back" (forth) effect on the lower recapitalization boundary.  $F_{Hi}$  firms'  $R_f$ ,  $inv-\varphi$  (solvency limit),  $\sigma^2$  and  $\rho$  are likely to have negative effects on  $\underline{d}_{it}$  while the effects of  $\Delta\tau_{it}$  is expected to be positive. In DTO-track,  $F_{Li}$  firms would also show larger (smaller) swings with smaller changes in the benefits (costs). Hence,  $F_{Hi}$  firms'  $R_f$ ,  $inv-\varphi$ ,  $\sigma^2$  and  $\rho$  are likely to have negative effects on  $\bar{d}_{it}$  while the effects of  $\Delta\tau_{it}$  is expected to be positive with model (4).

## 7. Results and Findings

On the different limits of lower and upper recapitalization boundaries of debts that is,  $\underline{d}_{it}$  and  $\bar{d}_{it}$ , respective results with regard to the models (1) and (2) are showed in Table 1 and Table 2. These are related to C - 2.1 empirically. The results on C - 2.2 with the models at the different limits of  $R_f$ ,  $\Delta\tau$ ,  $\varphi$ ,  $\sigma^2$ , and  $\rho$  are also shown and analyzed. On the different limits of  $R_f$ , the results are showed in Table 3 and Table 4. The same on  $\Delta\tau$  are depicted in Table 5 and Table 6 while those on  $\varphi$  are in Table: 7 and Table 8, and those on  $\sigma^2$  in the Table 9 and Table 10, and those on  $\rho$  are in Table 11 and Table 12. C - 2.3 is examined with the models (3) and (4). The results on both the models are shown in Table 13.

### 7.1 Results with limits of Recapitalization Boundary

Table 1 shows that intercept is only significant for 'high' limits at 1% level while for the other limits it is insignificant at 15% level. STO debt-revisions of high-value ( $F_{Hi}$ ) firms at different orders in cubic specification are significant (at 10% or lower levels) for 'low' limits (viz., "0.00 - 0.15") of lower recapitalization boundaries of debts (i.e., debt-equity ratios) while for 'moderate' and 'high' limits (viz., at "0.16 - 0.60" and "0.61-above" respectively) those are insignificant at 15% level. These

reveal that once  $F_{Hi}$  firms follow STO-track, the dynamic behaviours are inconsistent over different higher limits of lower recapitalization boundary and these are biased to 'low' limits only while firms show significant fixed effect at 'high' limits. The firm-value has positively significant (at 5% level) coefficient at 'low' limits while at the other limits coefficients are positively insignificant at 15% level. These confirm that at 'low' limits of lower recapitalization debt-boundary,  $F_{Hi}$  firms reach at *separating* equilibrium. It suggests that  $F_{Hi}$  firms with high (low) extents of firm-value ratios are more (less) exposed to dynamics at low limits of lower debt boundary.

Table 2 show that PO-revisions of low-value ( $F_{Li}$ ) firms at the different orders in cubic specification are significant (at 10% or lower levels) at 'low', 'moderate', and 'high' limits ("0.07-1.76", "1.76-2.98", and "2.98-above" respectively) of upper recapitalization boundaries of debts. Intercept is significant only at 'high' limits at 10% level while for the other limits the same are insignificant at 15% level. These confirm that once  $F_{Li}$  firms follow PO-track in debt-revisions, then dynamic behaviours are consistent over different limits of upper recapitalization boundary and the same are not biased at any limits even if at 'high' limits, the same also show significant fixed effects. Furthermore, firm-value proxy of  $F_{Li}$  firms has negatively significant (at 10% level) coefficient at 'high' limits while at the other limits coefficients are insignificantly negative at 15% level. This reveals that  $F_{Li}$  firms attain at *separating* equilibrium at 'high' limits of upper debts recapitalization boundary where those  $F_{Li}$  firms with lower firm-value ratios are exposed to higher limits of the upper levels of the boundary.

The results validate C-2.1 that firms' STO (PO) debt-revisions are exposed to the lower (upper) recapitalization boundary of debts in dynamic recapitalization under DTO debt-revisions.  $F_{Hi}$  firms' STO debt-revisions are biased to 'low' limits of lower debt recapitalization boundary while  $F_{Li}$  firms' PO debt-revisions are consistent over their different limits of upper debt recapitalization boundary. The models explain firms' DTO behaviours about 0.9 % to 15.585% with STO debt-revisions and 43.53% to 88.46% with PO debt-revisions.

## 7.2 Results with Limits of Risk-Free Rate of Return

The results in Table 3 show that over the different limits of the risk free rate of return ( $R_f$ ),  $F_{Hi}$  firms' STO debt-revisions at the different orders in cubic specification involve significant (at levels lower than 5 % level of significance) values of the coefficient at 'low' limits (i.e., "0.06 - 0.085") of  $R_f$  while at 'moderate' limits (i.e., "0.085 - 0.095"), the first order of STO debt-revisions only is significant at 15% level and at 'high' limits ("0.095 - above"), those are insignificant at 15% level. The intercept is significant (at 1% level) only at 'high' limits of  $R_f$ . These reveal that  $F_{Hi}$  firms' STO debt-revisions are exposed to DTO-revisions inconsistently and at low adjustment costs the same are biased while at 'high' limits firms show fixed effects only. The coefficient of firm-value proxy is positively significant at 12 % level at 'low' and 'moderate' limits while at 'high' limits the same is positively insignificant even at 15% level of significance. These confirm that  $F_{Hi}$  firms reach at *separating* equilibrium at any limits of  $R_f$  bellow 'high' limits of  $R_f$  where firms with higher firm-value ratios are exposed to higher extents of DTO debt-revisions.

The results in Table 4, however, show that  $F_{Li}$  firms' PO debt-revisions at the different orders in the cubic specification are significant at 7% or lower levels at 'low' (0.06 - 0.007), 'moderate' (0.07- 0.095) and 'high' (0.095 - above) limits of  $R_f$ . The intercept is negatively insignificant over these limits. These validate that  $F_{Li}$  firms' PO-revisions consistently approach to dynamic behaviours at the different limits of adjustment costs in terms of  $R_f$ . Firm-value proxy that has negatively insignificant (at 10% level) coefficients over the limits further reveals that  $F_{Li}$  firms' dynamic revisions as explained by MB ratio attain at *semi-separating* equilibrium rather than *separating* equilibrium. These firms can not be discriminated among them within the sub-sample firms.

These confirm that C-2.2 is reasonable in explaining firms' dynamic behaviours as proposed in DTO-track given that their PO debt-revisions show regularity across the limits of adjustment cost,  $R_f$ . The results show a good fit of the regression models and explain almost 5.07 % to 15.072% of firms' STO debt-revisions and 60.996% to 85.4% of PO debt-revisions. The puzzle is that  $F_{Hi}$  ( $F_{Li}$ ) firms' STO (PO) debt-revisions show dynamic revisions at 'low' and 'moderate' limits of  $R_f$  while at 'high' limits, only PO-revisions of  $F_{Li}$  firms sustain dynamic behaviours. This result also supports proposition -1, where firms' STO

debt-revisions approach to PO-track over time. Another revelation is that at higher limits of  $R_f$ ,  $F_{Li}$  firms' PO debt-revisions involve lesser determining power on the dynamic behaviours. One explanation is that  $F_{Hi}$  ( $F_{Li}$ ) firms in STO (PO)-track lead to sub-optimality at 'high' limits of  $R_f$ .

### 7.3 Results with Limits of Changes in Interest Tax-Shield Benefit

The results in Table 5 depict that over different limits of changes in interest tax-shield benefit ( $\Delta\tau$ ),  $F_{Hi}$  firms' STO debt-revision in cubic specification has significant (at 1% level) coefficient at 'low' limits (-0.20 – 0) for its second order only while at higher limits of  $\Delta\tau$ , (0 – 0.003) and (0.003 – 0.086), the same is insignificant at 15% level. The intercept is insignificant at 'low' limits of  $\Delta\tau$  while the same is significant at 'moderate' and 'high' limits of  $\Delta\tau$  at 1% and 17% levels respectively. A limit of  $\Delta\tau$  surrogate for an inverse change in adjustment cost. The findings hint for that in dynamic recapitalization,  $F_{Hi}$  firms' STO-revisions are inconsistent over different limits of  $\Delta\tau$  that is, adjustment costs while the same are biased at 'low' limits. Firms show fixed effects at higher limits of  $\Delta\tau$ .  $F_{Hi}$  firms' dynamic revisions can not be explained by STO-revisions at lower adjustment costs and their dynamic exposures show inertia. Firm-value proxy that is significant at 15% level suggests that at 'high' limits of  $\Delta\tau$ ,  $F_{Hi}$  firms show *separating* equilibrium while at higher adjustment costs they attain at *semi-separating* equilibrium.

Table 6 reveals that the coefficients of  $F_{Li}$  firms' PO debt-revision for different orders are significant (at 5% level) at 'high' limits of  $\Delta\tau$  (i.e., 0.004 – 0.06). These coefficients at 'low' and 'moderate' limits, which are -0.10 – 0 and 0 – 0.004 respectively, are significant at 1% level for the 1<sup>st</sup> and 3<sup>rd</sup> orders. At different limits of  $\Delta\tau$ , intercept is insignificant at 15% level. These show that  $F_{Li}$  firms' PO-revisions consistently follow dynamic behaviour as proposed in the DTO theory over different levels of adjustment costs (i.e., at different limits of  $\Delta\tau$ ). The coefficients of firm-value proxy show that  $F_{Li}$  firms' DTO debt-revisions as explained by the MB ratio attain at *semi-separating* equilibrium and could not be discriminated among themselves.

The above findings confirm that C-2.2 is tenable with an exception that  $F_{Li}$  firms' PO-revisions show regularity

in dynamic revisions over the levels of adjustment costs in terms of  $\Delta\tau$ . The models with explanatory STO-revisions explain 1.84 % to 8.29 % about firms' DTO-revisions while with PO-revisions these explain about 73.76 % to 86.30%. At 'low' or 'moderate' limits of  $\Delta\tau$ , debt-revisions neither by  $F_{Hi}$  firms in STO-track nor by  $F_{Li}$  firms in PO-track result in *separating* equilibrium in DTO-revisions while that happens only at 'high' limit of  $\Delta\tau$  with STO-revisions along with presence of fixed effect. Besides confirming C-2.2, these support P-1 and C-2.1. At lower changes in  $\Delta\tau$  (at lower levels of leverage ratio with presence of higher adjustment costs)  $F_{Hi}$  firms are biased to STO-track in their approach to DTO-revisions (at lower recapitalization boundaries of debts).

### 7.4 Results with Limits of Bankruptcy Risks

The results in Table 7 show that the coefficients of  $F_{Hi}$  firms' STO-revision in cubic specification in explaining DTO-revisions are significant (at 15% or lower level) at 'low' (2.98 - above) and 'moderate' (1.87 – 2.97) limits of bankruptcy risks ( $\phi$ ) while at 'high' limits (-1.41 – 1.85) those are insignificant at 15% level. The intercept is insignificant over limits at 15% level. These infer that  $F_{Hi}$  firms' STO-revisions are consistent in dynamic recapitalization even if the bankruptcy risks are not high enough. The coefficients of firm-value proxy suggest that *separating* equilibrium is significantly present at 10 % level at 'high' and 'low' limits of  $\phi$  (modified Atman's Z-score serves inverse proxy of  $\phi$ ) while at 'moderate' limits, firms attain *semi-separating* equilibrium. At the extreme ends of bankruptcy risks,  $F_{Hi}$  firms behave discriminately among them.

In Table 8, the results show that coefficients of  $F_{Li}$  firms' PO-revision at the different orders in cubic specification in explaining DTO-revisions are significant at 1% level at 'high' and 'moderate' limits of bankruptcy risk ( $\phi$ ) (-0.22 – 1.41 and 1.43 – 2.17 respectively). At 'low' limits (2.18 - above), the same are significant at 5% level at the 1st and 2nd orders of PO debt-revisions only. At the different limits, the intercepts are negatively insignificant at 15% level. These refer that  $F_{Li}$  firms' PO-revisions follow DTO behaviour consistently over different limits of  $\phi$ . The negatively insignificant coefficients of firm-value proxy confirm that the said dynamic revision does not discriminate them to attain *separating* equilibrium, if any.

Atman's Z-score is utilized to serve as an inverse proxy

for the limits of bankruptcy risks. It provides a third dimension for the relationship as stated in C-2.2. The above evidences confirm empirical reliability of C-2.2 given that  $F_{Li}$  firms' PO-revisions show consistency in DTO-revisions over adjustment costs caused by bankruptcy risk ( $\phi$ ). The results demonstrate the robustness of good fit of the models with the degree of determination 1.67 % to 18.86 % for the STO debt-revisions and 69.13% to 89.80% for the PO debt-revisions.

### 7.5 Results with Limits of Assets' Variability

With regard to different limits of  $F_{Hi}$  firms' assets' variability ( $\sigma^2$ ), for their STO debt-revision in cubic specification in explaining DTO debt-revisions with model (1), the results in Table 9 show that in dynamic recapitalization framework,  $F_{Hi}$  firms are biased at both 'low' and 'high' limits of  $\sigma^2$ . At 'low' limits, the coefficients of STO debt-revision for the 1st and 3rd orders and at the 'high' limits, those for the 2nd and 3rd orders are significant at 11% or at lower levels. The coefficients are insignificant at 'moderate' limits at 15% level. The significant value of the intercept term shows presence of fixed effect in dynamic behaviours at 'low' limits only. Further, the coefficients of firm-value proxy infer that these firms' dynamic behaviours involve separating equilibrium only at 'high' limits of  $\sigma^2$  while semi-separating equilibrium persists at the other limits of  $\sigma^2$ . The DTO debt-revisions by  $F_{Hi}$  firms are biased to STO debt-revisions at the both ends' limits of adjustment costs in terms of the assets' variability even if these firms reach at *separating* equilibrium only at 'high' limit of  $\sigma^2$  and show fixed effects at its 'low' limit.

On the other hand, in explaining DTO debt-revisions with PO debt-revisions of  $F_{Li}$  firms, the results for in Table 10 confirm consistent dynamic revisions at the different limits of  $\sigma^2$ . The results show significant fixed effect only at 'high' limits, where  $F_{Li}$  firms demonstrate separating equilibrium as well. At the other limits of  $\sigma^2$ , these  $F_{Li}$  firms neither show significant fixed-effects nor reveal separating equilibrium, if any. These further endorse validity of C-2.2 even if low-value firms' PO-revisions are again consistent in dynamic recapitalization over the different limits of  $\sigma^2$ . The results also show robustness with respect to the values of Adjusted R-square (Adj. R<sup>2</sup>-square). The models explain DTO debt-revisions to an extent of 2.82 % to 11.76 % for STO debt-revisions and

38.78% to 88.60 % for PO debt-revisions.

### 7.6 Results with Limits of Size of Recapitalization Cost

On size of recapitalization cost ( $\rho$ ), in Table 11 results show  $F_{Hi}$  firms' dynamic revisions as explained by STO-revisions. Firms' variability of sales' turnover to mean deviation of sales turnover ratio is used to serve a direct proxy for  $\rho$ . The coefficients of STO-revisions at its different orders are found to be significant at 8% or at lower level at 'low' limits of  $\rho$  while the coefficients for the 2<sup>nd</sup> and 3<sup>rd</sup> orders (and for the 3<sup>rd</sup> order only) are significant at 10% or lower level at 'moderate' ('high') limits of  $\rho$ . The intercept is significant at 14% level at 'low' limits only. Further, the coefficient of firm-value proxy is positively insignificant at 'low' limits of  $\rho$  while the same is significant at its upper limits, which are 'moderate' and 'high' limits, at 13% or at any lower levels. These findings confirm that dynamic behaviours as explained by STO debt-revisions of  $F_{Hi}$  firms are found to be consistent over limits of  $\rho$  while their separating equilibriums are reached at upper limits of  $\rho$  (viz., at 'moderate' and 'high' limits).

The results for PO-revisions with  $F_{Li}$  firms' in Table 12 also confirm consistent dynamic revisions at the different limits of  $\rho$ , size of recapitalization costs. These happen along with insignificant fixed effects and semi-separating equilibrium. These confirm validity of C-2.2 with the exception that  $F_{Hi}$  or  $F_{Li}$  firms' DTO debt-revisions are not biased to limits of  $\rho$ . The observations are strong and explain firms' dynamic behaviours to the extent of 2.70 % to 13.41 % for STO-revisions and 65.70% to 81.10 % for PO-revisions.

### 7.7 Results on Corollary-2.3 with Elements of Adjustment Costs

The results in Table 13 are related to empirical examination of C-2.3. Here, the debts' upper and lower recapitalization boundaries are explained by the different elements of adjustment costs. The table depicts two central observations with regard to  $F_{Hi}$  and  $F_{Li}$  firms.

In case of  $F_{Hi}$  firms, lower recapitalization boundary of debts is (i) positively influenced by changes in interest tax shield benefits ( $\Delta\tau$ ), (ii) negatively influenced by changes in solvency limit measured in the terms of modified Atman

Z-score ( $inv-\varphi$ ), an inverse of bankruptcy risks ( $\varphi$ ), and (iii) insignificantly influenced by risk free rate of return ( $R_f$ ), assets' variance ( $\sigma^2$ ), and size of recapitalization costs ( $\rho$ ). That is, higher (lower) extents of debts' lower recapitalization boundary are exposed to higher (lower) extents of debts' static trade-off benefit and bankruptcy risk. These infer that in dynamic recapitalization at debts' lower recapitalization boundary,  $F_{Hi}$  firms' dynamic behaviours are biased to bankruptcy cost and related benefit of the debts while influences of the other firm-specific characteristics are not tenable. The swings in response to the costs are larger than those to the benefits.

The central observation with  $F_{Li}$  firms is also remarkable. The upper debt-recapitalization boundary is (i) negatively influenced by both changes in solvency limit ( $inv-\varphi$ ) and assets' variance ( $\sigma^2$ ) and (ii) insignificantly influenced by risk free rate of return ( $R_f$ ), changes in interest tax-shield benefits ( $\Delta\tau$ ) and size of recapitalization cost ( $\rho$ ). The firms, which have higher (lower) solvency limits in the terms of modified Atman Z-score (that is, lower (higher)

bankruptcy risks) and higher (lower) limits of underlying assets' risks, are exposed to recapitalize debts at lower (higher) limits of upper levels of debt-recapitalization boundary. These findings conjecture that at higher limits of upper debt-recapitalization boundary,  $F_{Li}$  firms are exposed to low adjustment-cost caused by bankruptcy risks but to higher asymmetric information problem caused by underlying assets' variability. Their swings in response to bankruptcy risks are however lower than those to underlying assets' variability.

In brief,  $F_{Hi}$  firms' lower recapitalization boundary of debts shows swings to  $\Delta\tau$  and  $inv-\varphi$  while  $F_{Li}$  firms' upper debt-recapitalization boundary is sensitive to their magnitudes of  $\varphi$  and  $\sigma^2$ . However, if a cross-sectional comparison between the sub-samples of high-value and low-value firms, the negative effect of solvency limit (inverse- $\varphi$ ) is comparatively higher at the lower debt-recapitalization boundary than that at the upper debt-recapitalization boundary. On interest tax-shield benefits, high-value firms enjoy comparative benefits of utilization of debts

**Table 1: The  $F_{Hi}$  Firms' Lower Recapitalization Boundaries of Debts,  $d_{it}$  and STO and DTO Debt-Revisions**

Regression Model		$d_{it}^{DTO} = \alpha_0 + \alpha_{s,k,l} \sum_{k=1}^3 (d_{it}^{STO})^k + \alpha_{mb,l} X_{it}^{MB \geq 1} + h_{1t}$						
Limits, $d_{it}$	Coefficients	Un-standardized Coefficients	Std. Error	Standardized Coefficients	t value	Stg. Lev.	Adj. R <sup>2</sup> (Std.-Error)	F - Value
Low	Intercept ( $\alpha_0$ )	0.068277	0.075923		0.8993	0.40	0.15585 (0.47023)	6.2617
	STO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.050914	0.016307	0.60429	3.122	0.01		
	STO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	-0.00249	0.001479	-0.82252	-1.684	0.10		
	STO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	-0.00011	0.000046	-1.21619	-2.501	0.015		
	MB Ratio ( $\alpha_{mb}$ )	0.039196	0.019452	0.18052	2.0150	0.05		
Moderate	Intercept ( $\alpha_0$ )	0.015903	0.096129		0.1654	0.90	0.009 (0.6378)	1.2615
	STO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.009401	0.014884	0.3471	0.6316	0.60		
	STO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	0.000914	0.000739	8.2313	1.2375	0.25		
	STO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	-0.0000039	0.0000031	-8.7183	-1.2559	0.25		
	MB Ratio ( $\alpha_{mb}$ )	0.033197	0.031891	0.0974	1.041	0.30		
High	Intercept ( $\alpha_0$ )	<b>0.215712</b>	0.081426		<b>2.6492</b>	<b>0.01</b>	<b>0.0658</b> (0.7276)	<b>2.9906</b>
	STO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.004227	0.003997	0.20104	1.0576	0.30		
	STO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	-0.000014	0.0000386	-0.1814	-0.3682	0.75		
	STO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	0.000000073	0.00000014	0.2921	0.522	0.60		
	MB Ratio ( $\alpha_{mb}$ )	0.007674	0.017662	0.0404	0.4345	0.70		

Note: The limits of the lower debt recapitalization boundaries of Debt to Equity ratios are 'low' at (0.00 – 0.15), 'moderate' at (0.16 – 0.60), and 'high' at (0.61 – 1.71).

**Table 2: The  $F_{Li}$  Firms' Upper Recapitalization Boundaries of Debts,  $\bar{d}_{it}$  and PO and DTO Debt Revisions**

Regression Model		$d_{it,l}^{DTO} = \alpha_0 + \alpha_{p,k,l} \sum_{k=1}^3 (d_{it}^{PO})^k + \alpha_{mb,l} X_{it}^{MB < 1} + h_{2t}$						
Limits, $\bar{d}_{it}$	Coefficients	Un-standardized Coefficients	Std. Error	Standardized Coefficients	t value	Sig. Lev.	Adj. R <sup>2</sup> (Std.-Error)	F-Value
Low	Intercept ( $\alpha_0$ )	0.029631	0.038815		0.7633	0.45	0.8846 (0.1150)	121.78
	PO-1 <sup>st</sup> Order ( $\alpha_{s, k=1}$ )	0.458712	0.026832	2.00066	17.09	0.01		
	PO-2 <sup>nd</sup> Order ( $\alpha_{s, k=2}$ )	-0.08144	0.014489	-2.94669	-5.62	0.01		
	PO-3 <sup>rd</sup> Order ( $\alpha_{s, k=3}$ )	0.004673	0.001289	1.6522	3.626	0.01		
	MB Ratio ( $\alpha_{mb}$ )	-0.02642	0.058163	-0.01945	-0.454	0.65		
Moderate	Intercept ( $\alpha_0$ )	-0.00565	0.074432		-0.076	0.95	0.8288 (0.1513)	74.84
	PO-1 <sup>st</sup> Order ( $\alpha_{s, k=1}$ )	0.239518	0.032463	0.70676	7.378	0.01		
	PO-2 <sup>nd</sup> Order ( $\alpha_{s, k=2}$ )	-0.05834	0.030574	-0.53561	-1.908	0.07		
	PO-3 <sup>rd</sup> Order ( $\alpha_{s, k=3}$ )	0.020647	0.007344	0.7701	2.811	0.01		
	MB Ratio ( $\alpha_{mb}$ )	-0.034999	0.100179	-0.01887	-0.349	0.75		
High	Intercept ( $\alpha_0$ )	0.179122	0.105314		1.7008	0.10	0.4353 (0.1913)	18.735
	PO-1 <sup>st</sup> Order ( $\alpha_{s, k=1}$ )	0.078292	0.018407	15.0273	4.253	0.01		
	PO-2 <sup>nd</sup> Order ( $\alpha_{s, k=2}$ )	Variable Excluded						
	PO-3 <sup>rd</sup> Order ( $\alpha_{s, k=3}$ )	-0.0000005	0.00000011	-14.4607	-4.094	0.01		
	MB Ratio ( $\alpha_{mb}$ )	-0.24561	0.140761	-0.16122	-1.744	0.10		

Note: The limits of the upper debt recapitalization boundaries of Debt to Equity ratios are Low (0.07 – 1.76), Moderate (1.76 – 2.98), and High (2.98 – Above).

**Table 3: The  $F_{Hi}$  Firms' Limits of Risk-Less Rate of Return ( $R_f$ ) and STO and DTO Debt Revisions**

Regression Model		$d_{it,l}^{DTO} = \alpha_0 + \alpha_{s,k,l} \sum_{k=1}^3 (d_{it}^{STO})^k + \alpha_{mb,l} X_{it}^{MB \geq 1} + h_{1t}$						
Limits, $R_f$	Coefficients	Un-standardized Coefficients	Std. Error	Standardized Coefficients	t -value	Sig. Lev.	Adj. R <sup>2</sup> (Std.-Error)	F - Value
Low	Intercept ( $\alpha_0$ )	<b>-0.0698</b>	0.050044		-1.395	0.17	0.15072 (0.28617)	6.014
	STO-1 <sup>st</sup> Order ( $\alpha_{s, k=1}$ )	-0.0047	0.009856	-0.0863	-0.476	0.65		
	STO-2 <sup>nd</sup> Order ( $\alpha_{s, k=2}$ )	-0.00307	0.000955	-1.37857	-3.21	0.01		
	STO-3 <sup>rd</sup> Order ( $\alpha_{s, k=3}$ )	-0.000075	0.0000352	-0.97095	-2.136	0.04		
	MB Ratio ( $\alpha_{mb}$ )	0.030958	0.01972	0.1382	1.569	0.12		

Regression Model		$d_{it,l}^{DTO} = \alpha_0 + \alpha_{s,k,l} \sum_{k=1}^3 (d_{it}^{STO})^k + \alpha_{mb,l} X_{it}^{MB \geq 1} + h_{1t}$						
Limits ( $R_f$ )	Coefficients	Un-standardized Coefficients	Std. Error	Standardized Coefficients	t -value	Sig. Lev.	Adj. $R^2$ (Std.-Error)	F - Value
Moderate	Intercept ( $\alpha_0$ )	-0.02438	0.099007		-0.24627	0.85	0.0507 (0.6524)	2.523
	STO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.023773	0.015697	0.8521	1.514512	0.15		
	STO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	0.00054	0.000463	4.6565	1.168081	0.25		
	STO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	-0.0000026	0.00000206	-5.6208	-1.27437	0.20		
	MB Ratio ( $\alpha_{mb}$ )	0.056268	0.023095	0.2266	2.436327	0.02		
High	Intercept ( $\alpha_0$ )	0.377597	0.084682		4.45899	0.01	0.0511 (0.7576)	2.535
	STO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.003826	0.004222	0.174578	0.906166	0.40		
	STO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	-0.000027	0.0000402	-0.32876	-0.66526	0.55		
	STO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	0.000000113	0.000000145	0.434682	0.774029	0.45		
	MB Ratio ( $\alpha_{mb}$ )	0.001625	0.018622	0.008153	0.087264	0.95		

Note: The limits of the Risk Free Rate of Return are Low (0.06 – 0.085), Moderate (0.085 – 0.095), and High (0.095 – Above).

**Table 4: The  $F_{Li}$  Firms' Limits of Risk-Less Rate of Return ( $R_f$ ) and PO and DTO Debt Revisions**

Regression Model		$d_{it,l}^{DTO} = \alpha_0 + \alpha_{p,k,l} \sum_{k=1}^3 (d_{it}^{PO})^k + \alpha_{mb,l} X_{it}^{MB < 1} + h_{2t}$						
Limits ( $R_f$ )	Coefficients	Un-standardized Coefficients	Std. Error	Standardized Coefficients	t -value	Sig. Lev.	Adj. $R^2$ (Std.-Error)	F - Value
Low	Intercept ( $\alpha_0$ )	0.029387	0.040865		0.719134	0.50	0.854 (0.0875)	97.80
	PO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.383543	0.026621	2.223	14.40775	0.01		
	PO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	-0.06264	0.012817	-2.57504	-4.88778	0.01		
	PO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	0.002303	0.001212	0.8011	1.899619	0.07		
	MB Ratio ( $\alpha_{mb}$ )	-0.00825	0.057509	-0.00702	-0.14351	0.90		
Moderate	Intercept ( $\alpha_0$ )	0.034568	0.049777		0.694448	0.50	0.7639 (0.1357)	53.58
	PO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.514647	0.057717	1.1315	8.916675	0.01		
	PO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	0.034025	0.040502	0.09157	0.840083	0.45		
	PO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	-0.06933	0.033302	-0.3581	-2.08181	0.05		
	MB Ratio ( $\alpha_{mb}$ )	-0.07966	0.070407	-0.07009	-1.13146	0.30		
High	Intercept ( $\alpha_0$ )	0.012437	0.121588		0.1023	0.95	0.60996 (0.2526)	33.32
	PO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.175639	0.019369	22.3608	9.0683	0.01		
	PO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	Variable Excluded						
	PO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	-0.000001	0.000000116	-22.0166	-8.929	0.01		
	MB Ratio ( $\alpha_{mb}$ )	-0.036631	0.163377	-0.017821	-0.2242	0.85		

Note: The limits of the Risk Free Rate of Return are Low (0.06 – 0.07), Moderate (0.07 – 0.095), and High (0.095 – Above).

**Table 5: The  $F_{Hi}$  Firms' Limits of  $\Delta$  Interest Tax-Shield Benefits ( $\Delta\tau$ ) and STO and DTO Debt-Revisions**

Regression Model		$d_{it,l}^{DTO} = \alpha_0 + \alpha_{s,k,l} \sum_{k=1}^3 (d_{it}^{STO})^k + \alpha_{mb,l} X_{it}^{MB \geq 1} + h_{it}$						
Limits ( $\Delta\tau$ )	Coefficients	Unstandardized Coefficients	Std. Error	Standardized Coefficients	t value	Sig. Lev.	Adj. R <sup>2</sup> (Std.-Error)	F - Value
Low	Intercept ( $\alpha_0$ )	0.006326	0.056113		0.1127	0.95	0.077 (0.301)	3.389
	STO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.010652	0.010508	0.176643	1.014	0.35		
	STO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	- 0.0008	0.000245	- 0.3026	-36.26	0.01		
	STO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	- 0.000012	0.0000165	- 0.12775	-0.732	0.50		
	MB Ratio ( $\alpha_{mb}$ )	0.02351	0.022187	0.09621	1.059	0.30		
Moderate	Intercept ( $\alpha_0$ )	0.266406	0.079975		3.331	0.01	0.0184 (0.697)	1.529
	STO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.005179	0.005235	0.215042	0.989	0.35		
	STO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	- 0.000036	0.0000419	- 0.30873	-0.865	0.40		
	STO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	- 0.000000017	0.00000023	- 0.03451	-0.073	0.95		
	MB Ratio ( $\alpha_{mb}$ )	0.0095	0.0157	0.057476	0.607	0.55		
High	Intercept ( $\alpha_0$ )	0.150015	0.107933		1.389	0.17	0.0829 (0.723)	3.577
	STO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.004007	0.007428	0.167666	0.539	0.60		
	STO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	0.000142	0.000128	1.779078	1.108	0.30		
	STO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	- 0.000000042	0.000000377	-1.68266	-1.124	0.30		
	MB Ratio ( $\alpha_{mb}$ )	0.046037	0.029962	0.141119	1.537	0.15		

Note: The limits of  $\Delta$  Interest Tax Shield Benefits are Low ( - 0.20 – 0.00), Moderate (0.000 – 0.003), and High (0.003 – 0.086).

**Table 6: The  $F_{Li}$  Firms' Limits of  $\Delta$  Interest Tax-Shield Benefits ( $\Delta\tau$ ) and PO and DTO Debt-Revisions**

Regression Model		$d_{it,l}^{DTO} = \alpha_0 + \alpha_{p,k,l} \sum_{k=1}^3 (d_{it}^{PO})^k + \alpha_{mb,l} X_{it}^{MB < 1} + h_{2t}$						
Limits ( $\Delta\tau$ )	Coefficients	Un-standardized Coefficients	Std. Error	Standardized Coefficients	t -value	Sig. Lev.	Adj. R <sup>2</sup> (Std.-Error)	F - Value
Low	Intercept ( $\alpha_0$ )	-0.02693	0.04809		-0.559	0.60	0.863 (0.0819)	109.88
	PO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.451607	0.022859	1.265	19.75	0.01		
	PO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	0.026857	0.026193	0.15822	1.025	0.35		
	PO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	-0.04145	0.00877	-0.7565	-4.727	0.01		
	MB Ratio ( $\alpha_{mb}$ )	- 0.027616	0.06201	- 0.0199	-0.445	0.70		
Moderate	Intercept ( $\alpha_0$ )	0.024711	0.055512		0.445	0.70	0.802 (0.1084)	90.35
	PO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.303717	0.024117	62.243	12.59	0.01		
	PO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	Variable Excluded						
	PO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	- 0.0000018	0.000000144	- 61.659	-12.47	0.01		
	MB Ratio ( $\alpha_{mb}$ )	- 0.0051	0.077617	- 0.0036	-0.066	0.95		

Regression Model		$d_{it,l}^{DTO} = \alpha_0 + \alpha_{p,k,l} \sum_{k=1}^3 (d_{it}^{PO})^k + \alpha_{mb,l} X_{it}^{MB < 1} + h_{2t}$						
Limits ( $\Delta\tau$ )	Coefficients	Un-standardized Coefficients	Std. Error	Standardized Coefficients	t -value	Sig. Lev.	Adj. R <sup>2</sup> (Std.-Error)	F - Value
High	Intercept ( $\alpha_0$ )	0.071489	0.075444		0.9475	0.35	0.73764 (0.237)	41.77
	PO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.474539	0.052618	2.1637	9.018	0.01		
	PO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	-0.07637	0.021404	-2.696	-3.568	0.01		
	PO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	0.003623	0.001799	1.1756	2.014	0.05		
	MB Ratio ( $\alpha_{mb}$ )	-0.10749	0.119101	-0.0637	-0.902	0.40		

Note: The limits of  $\Delta$  Interest Tax Shield Benefits are Low (- 0.10 – 0.00), Moderate (0.000 – 0.004), and High (0.004 – 0.06).

**Table 7: The  $F_{Hi}$  Firms' Limits of Bankruptcy Risks ( $\phi$ ) and STO and DTO Debt Revisions**

Regression Model		$d_{it,l}^{DTO} = \alpha_0 + \alpha_{s,k,l} \sum_{k=1}^3 (d_{it}^{STO})^k + \alpha_{mb,l} X_{it}^{MB \geq 1} + h_{1t}$						
Limits ( $\phi_{it}$ )	Coefficients	Unstandardized Coefficients	Std. Error	Standardized Coefficients	T -value	Sig. Lev.	Adj. R <sup>2</sup> (Std.-Error)	F - Value
High	Intercept ( $\alpha_0$ )	0.069699	0.055262		1.261	0.21	0.0167 (0.500)	1.480
	STO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.011434	0.010937	0.38054	1.046	0.30		
	STO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	- 0.000025	0.0000303	- 0.0788	-0.811	0.42		
	STO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	- 0.00000072	0.00000108	-0.23967	-0.670	0.55		
	MB Ratio ( $\alpha_{mb}$ )	0.019517	0.011513	0.1644	1.695	0.10		
Moderate	Intercept ( $\alpha_0$ )	0.232254	0.164065		1.416	0.16	0.1332 (0.697)	5.379
	STO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.027621	0.018678	0.254	1.4788	0.15		
	STO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	0.004716	0.001318	1.3293	3.578	0.01		
	STO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	0.0000886	0.0000408	0.935	2.172	0.04		
	MB Ratio ( $\alpha_{mb}$ )	0.03916	0.075996	0.04518	0.515	0.62		
Low	Intercept ( $\alpha_0$ )	-0.07178	0.095582		-0.751	0.46	0.1886 (0.583)	7.624
	STO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.017576	0.006203	1.06134	2.834	0.01		
	STO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	-0.00024	0.0000639	-4.09553	-3.757	0.01		
	STO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	0.000000642	0.000000168	3.2885	3.813	0.01		
	MB Ratio ( $\alpha_{mb}$ )	0.068517	0.023827	0.24876	2.876	0.01		

Note: The limits of the Bankruptcy Risks are High (- 1.41 – 1.85), Moderate (1.87 – 2.97), and Low (2.98 – above). The Atman's Z-score ( $\phi$ ) serves as an inverse proxy for the limit of bankruptcy risks.

**Table 8: The  $F_{Li}$  Firms' Limits of Bankruptcy Risks ( $\varphi$ ) and PO and DTO Debt Revisions**

Regression Model		$d_{it,l}^{DTO} = \alpha_0 + \alpha_{s,k,l} \sum_{k=1}^3 (d_{it}^{PO})^k + \alpha_{mb,l} X_{it}^{MB < 1} + h_{it}$						
Limits ( $\varphi$ )	Coefficients	Unstandardized Coefficients	Std. Error	Standardized Coefficients	T -value	Sig. Lev.	Adj. R <sup>2</sup> (Std.-Error)	F - Value
High	Intercept ( $\alpha_0$ )	0.011694	0.057813		0.202273	0.85	0.6913 (0.136)	34.024
	PO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.373671	0.034706	2.183	10.76678	0.01		
	PO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	-0.08358	0.017019	-3.52	-4.911	0.01		
	PO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	0.004852	0.001708	1.707	2.841459	0.01		
	MB Ratio ( $\alpha_{mb}$ )	-0.014715	0.083838	-0.0133	-0.17552	0.87		
Moderate	Intercept ( $\alpha_0$ )	-0.06655	0.089492		-0.74368	0.46	0.812 (0.163)	88.56
	PO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.294358	0.020154	40.69	14.60553	0.01		
	PO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	Variable Excluded						
	PO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	-0.0000017	0.00000012	-40.30	-14.4612	0.01		
	MB Ratio ( $\alpha_{mb}$ )	-0.089408	0.119404	-0.0425	-0.74879	0.46		
Low	Intercept ( $\alpha_0$ )	0.04893	0.037358		1.30977	0.20	0.898 (0.103)	162.79
	PO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.452722	0.023363	1.869	19.37734	0.01		
	PO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	-0.02613	0.012776	-0.917	-2.04535	0.05		
	PO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	-0.00088	0.001174	-0.3006	-0.74622	0.50		
	MB Ratio ( $\alpha_{mb}$ )	-0.06093	0.052617	-0.0438	-1.1579	0.25		

Note: The limits of the Bankruptcy Risks are High (-0.22 – 1.41), Moderate (1.43 – 2.17), and Low (2.18 – above). The Atman's Z-score ( $\varphi$ ) serves as an inverse proxy for the limit of bankruptcy risks.

**Table 9: The  $F_{Hi}$  Firms' Limits of Assets' Variability ( $\sigma^2$ ) and STO and DTO Debt Revisions**

Regression Model		$d_{it,l}^{DTO} = \alpha_0 + \alpha_{s,k,l} \sum_{k=1}^3 (d_{it}^{STO})^k + \alpha_{mb,l} X_{it}^{MB \geq 1} + h_{it}$						
Limits ( $\sigma^2$ )	Coefficients	Unstandardized Coefficients	Std. Error	Standardized Coefficients	T -value	Sig. Lev.	Adj. R <sup>2</sup> (Std.-Error)	F - Value
Low	Intercept ( $\alpha_0$ )	0.194416	0.077965		2.494	0.02	0.0821 (0.659)	3.548
	STO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.019483	0.005904	0.752254	3.299	0.01		
	STO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	0.0000161	0.0000585	0.136936	0.275	0.80		
	STO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	-0.00000046	0.00000028	-0.95525	-1.614	0.11		
	MB Ratio ( $\alpha_{mb}$ )	0.018741	0.015849	0.111674	1.182	0.25		
Moderate	Intercept ( $\alpha_0$ )	0.027121	0.092859		0.292	0.80	0.1176 (0.589)	4.764
	STO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	-0.00625	0.005147	-0.32447	-1.214	0.25		
	STO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	0.0000806	0.0000852	1.222628	0.946	0.35		
	STO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	-0.00000012	0.00000025	-0.58375	-0.488	0.65		
	MB Ratio ( $\alpha_{mb}$ )	0.032627	0.033547	0.08967	0.973	0.35		

Regression Model		$d_{it,l}^{DTO} = \alpha_0 + \alpha_{s,k,l} \sum_{k=1}^3 (d_{it}^{STO})^k + \alpha_{mb,l} X_{it}^{MB \geq 1} + h_{it}$						
Limits ( $\sigma^2$ )	Coefficients	Unstandardized Coefficients	Std. Error	Standardized Coefficients	T - value	Sig. Lev.	Adj. R <sup>2</sup> (Std.-Error)	F - Value
High	Intercept ( $\alpha_0$ )	0.050213	0.089704		0.5598	0.60	0.0282 (0.603)	1.828
	STO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.007361	0.015138	0.126361	0.4863	0.65		
	STO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	-0.00204	0.00124	-3.35797	-1.641	0.11		
	STO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	-0.00002	0.0000116	-3.40318	-1.72	0.10		
	MB Ratio ( $\alpha_{mb}$ )	0.046043	0.025494	0.167652	1.81	0.10		

Note: The limits of the Assets' Variability are Low (5.155 – 59.74), Moderate (60.05 – 202.46), and High (209.25 – Above). The Assets' Variability ( $\sigma^2$ ) serves as a direct proxy for the underlying assets' risks.

**Table 10: The  $F_{Li}$  Firms' Limits of Assets' Variability ( $\sigma^2$ ) and PO and DTO Debt Revisions**

Regression Model		$d_{it,l}^{DTO} = \alpha_0 + \alpha_{s,k,l} \sum_{k=1}^3 (d_{it}^{PO})^k + \alpha_{mb,l} X_{it}^{MB < 1} + h_{it}$						
Limits ( $\sigma^2$ )	Coefficients	Unstandardized Coefficients	Std. Error	Standardized Coefficients	t - value	Sig. Lev.	Adj. R <sup>2</sup> (Std.-Error)	F - Value
Low	Intercept ( $\alpha_0$ )	-0.00363	0.067334		-0.054	0.96	0.765 (0.160)	62.186
	PO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.322406	0.038368	1.517501	8.4030	0.01		
	PO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	-0.02291	0.015105	-0.82196	-1.52	0.15		
	PO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	0.0001	0.001243	0.033841	0.081	0.95		
	MB Ratio ( $\alpha_{mb}$ )	-0.018426	0.094167	-0.011019	-0.196	0.85		
Moderate	Intercept ( $\alpha_0$ )	0.068378	0.09331		0.733	0.50	0.3878 (0.235)	16.413
	PO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.113054	0.022354	17.90405	5.06	0.01		
	PO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	Variable Excluded						
	PO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	-0.00000066	0.000000134	-17.4493	-4.93	0.01		
	MB Ratio ( $\alpha_{mb}$ )	-0.07507	0.126831	-0.05463	-0.592	0.60		
High	Intercept ( $\alpha_0$ )	0.089573	0.051778		1.73	0.10	0.886 (0.113)	89.254
	PO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.5086	0.036381	1.176688	13.98	0.01		
	PO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	-0.14399	0.042381	-1.01081	-3.398	0.01		
	PO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	0.024812	0.010544	0.687064	2.35	0.03		
	MB Ratio ( $\alpha_{mb}$ )	-0.11655	0.075507	-0.08089	-1.54	0.15		

Note: The limits of the Assets' Variability are Low (0.23 – 57.49), Moderate (57.49 – 224.35), and High (225 – Above). The Assets' Variability ( $\sigma^2$ ) serves as a direct proxy for the underlying assets' risks.

**Table 11: The  $F_{Hi}$  Firms' Limits of Size of Recapitalization Costs ( $\rho_{it}$ ) and STO and DTO Debt Revisions**

Regression Model		$d_{it,l}^{DTO} = \alpha_0 + \alpha_{s,k,l} \sum_{k=1}^3 (d_{it}^{STO})^k + \alpha_{mb,l} X_{it}^{MB \geq 1} + h_{it}$						
Limits ( $\varphi_{it}$ )	Coefficients	Unstandardized Coefficients	Std. Error	Standardized Coefficients	T - value	Sig. Lev.	Adj. $R^2$ (Std.-Error)	F - Value
Low	Intercept ( $\alpha_0$ )	0.165327	0.110653		1.494	0.14	0.027 (0.727)	1.789
	STO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.033822	0.013849	0.501724	2.442	0.02		
	STO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	0.000627	0.000343	0.653944	1.826	0.08		
	STO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	- 0.00001	0.00000514	-0.93466	-1.99	0.05		
	MB Ratio ( $\alpha_{mb}$ )	0.009135	0.03171	0.026931	0.288	0.80		
Moderate	Intercept ( $\alpha_0$ )	0.022604	0.064661		0.349	0.80	0.1341 (0.566)	5.374
	STO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	-0.00153	0.003153	-0.10461	-0.49	0.65		
	STO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	- 0.000074	0.0000253	-1.35921	-2.93	0.01		
	STO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	0.00000031	0.000000095	1.699627	3.26	0.01		
	MB Ratio ( $\alpha_{mb}$ )	0.021851	0.013206	0.148137	1.6550	0.11		
High	Intercept ( $\alpha_0$ )	0.093774	0.085344		1.098	0.30	0.0383 (0.556)	2.134
	STO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.020993	0.01473	0.234269	1.425	0.16		
	STO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	-0.00063	0.000966	-0.1999	-0.653	0.55		
	STO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	- 0.000051	0.0000303	-0.57255	-1.67	0.10		
	MB Ratio ( $\alpha_{mb}$ )	0.043798	0.028557	0.141307	1.534	0.13		

Note: The limits of the Size of Recapitalization Costs are High (0.37 – 0.87), Moderate (0.88 – 1.71), and Low (1.73 – Above). The Sales' Turnover Variability to Mean Difference of Sales Turnover ratio serves as a direct proxy for the limit of Size of Recapitalization Costs ( $\rho_{it}$ ).

**Table 12: The  $F_{Li}$  Firms' Limits of Size of Recapitalization Costs ( $\rho_{it}$ ) and PO and DTO Debt Revisions**

Regression Model		$d_{it,l}^{DTO} = \alpha_0 + \alpha_{s,k,l} \sum_{k=1}^3 (d_{it}^{PO})^k + \alpha_{mb,l} X_{it}^{MB < 1} + h_{it}$						
Limits ( $\varphi_{it}$ )	Coefficients	Unstandardized Coefficients	Std. Error	Standardized Coefficients	t value	Sig. Lev.	Adj. $R^2$ (Std.-Error)	F - Value
Low	Intercept ( $\alpha_0$ )	0.017621	0.057317		0.307	0.80	0.811 (0.183)	64.458
	PO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.365367	0.042951	1.4449	8.507	0.01		
	PO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	-0.01054	0.018864	-0.32377	-0.559	0.60		
	PO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	-0.00154	0.001586	-0.45246	-0.968	0.35		
	MB Ratio ( $\alpha_{mb}$ )	-0.000273	0.08739	-0.000179	-0.003	0.99		
Moderate	Intercept ( $\alpha_0$ )	0.020822	0.075065		0.277	0.80	0.657 (0.141)	43.08
	PO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.161527	0.021831	33.6356	7.3990	0.01		
	PO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	Variable Excluded						
	PO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	- 0.00000095	0.00000013	-33.0054	-7.261	0.01		
Moderate	MB Ratio ( $\alpha_{mb}$ )	-0.07518	0.100698	-0.05413	-0.747	0.50		
High	Intercept ( $\alpha_0$ )	-0.0418	0.076219		-0.55	0.60	0.731 (0.132)	47.25
	PO-1 <sup>st</sup> Order ( $\alpha_{s,k=1}$ )	0.377283	0.02899	1.845	13.01	0.01		
	PO-2 <sup>nd</sup> Order ( $\alpha_{s,k=2}$ )	-0.06765	0.020185	-2.4071	-3.35	0.01		
	PO-3 <sup>rd</sup> Order ( $\alpha_{s,k=3}$ )	0.002916	0.00215	0.894932	1.356	0.20		
	MB Ratio ( $\alpha_{mb}$ )	-0.086933	0.102685	-0.054667	-0.847	0.40		

Note: The limits of the Size of Recapitalization Costs are High (0.36 – 1.20), Moderate (1.20 – 2.63), and Low (2.65 – Above). The Sales' Turnover Variability to Mean Difference of Sales Turnover ratio serves as a direct proxy for the limit of Size of Recapitalization Costs ( $\rho_{it}$ ).

**Table 13: The Firms' Characteristics and Dynamic Revisions at Different Recapitalization Boundaries**

Firms	Regression Model	Coefficients	Unstandardized Coefficients	Std. Error	Standardized Coefficients	t -value	Sig. Lev.	Adj. R <sup>2</sup> (Std.-Error)	F - Value
High-value	$\bar{d}_{it} = \alpha_{k,\bar{d}} \sum_{k=1}^5 \pi_{it,k} + h_{3t}$	Risk Free Return ( $R_f$ )	-0.00156	0.003071	-0.01195	-0.50718	0.65	0.0252 (0.4015)	10.11
		Changes in ITS ( $\Delta\tau$ )	0.542542	0.229794	0.056178	2.360995	0.02		
		Solvency limits ( $inv-\varphi$ )	-0.03592	0.005281	-0.16208	-6.80173	0.01		
		Assets' Variance ( $\sigma^2$ )	0.0000181	0.000024	0.017744	0.754371	0.45		
		Size of Recapitalization Cost ( $\rho$ )	-0.00043	0.000479	-0.02122	-0.90219	0.40		
Low-value	$\bar{d}_{it} = \alpha_{k,\bar{d}} \sum_{k=1}^5 \pi_{it,k} + h_{3t}$	Risk Free Return ( $R_f$ )	0.014102	0.09159	0.003656	0.153974	0.88	0.0098 (1.197)	4.476
		Changes in ITS ( $\Delta\tau$ )	-5.94587	6.85279	-0.02081	-0.86766	0.40		
		Solvency limits ( $inv-\varphi$ )	-0.40575	0.157496	-0.06187	-2.57627	0.01		
		Assets' Variance ( $\sigma^2$ )	-0.00273	0.000717	-0.09016	-3.80297	0.01		
		Size of Recapitalization Cost ( $\rho$ )	-0.00423	0.014299	-0.00701	-0.29557	0.80		

Note:  $\pi_{it}$  represents the set of the proxy variables for the elements of adjustment costs. The Atman's Z-score ( $inv-\varphi$ ) serves as an inverse proxy for the limit of bankruptcy risks ( $\varphi$ ). It may also be called as the solvency limits.

**Table 14: Matrix of Pearson Correlation Coefficient (two tailed) of the firm-specific Characteristics**

	Risk Free Return	$\Delta ITS$	Atman's Z-score	Assets' Variability	Var of Sales Turnover to Absl. Mean Deviation of Sales Turnover	MB Ratio
Risk Free Return	1	-0.02336 (0.333406)	0.053725 (0.1236)	9.26E-17 (0.999)	0.025568 (0.262805)	0.028682 (0.22778)
$\Delta ITS$	-0.02336 (0.333)	1	0.0557 (0.121)	0.002653 (0.912518)	0.002798 (0.907758)	0.04278 (0.11766)
Atman's Z-score	0.053725 (0.1236)	0.055727 (0.12093)	1	0.035771 (0.132161)	0.013115 (0.58103)	0.04368 (0.1173)
Assets' Variability	9.26E-17 (0.999)	0.002653 (0.912518)	0.035771 (0.132161)	1	-0.01974 (0.387262)	0.0812 (0.1623)
Var of Sales Turnover to Absl. Mean Deviation of Sales Turnover	0.025568 (0.262805)	0.002798 (0.907758)	0.013115 (0.58103)	-0.01974 (0.387262)	1	0.011609 (0.6255)
MB Ratio	0.028682 (0.2278)	0.0427 (0.11766)	0.0436 (0.1173)	0.0812 (0.1623)	0.0116 (0.625)	1

Note: Figures in the parentheses represent the level of significance.

than those of low-value firms. Furthermore, the negative effects of firms' asset's variance ( $\sigma^2$ ) at the higher debt recapitalization boundary are lower than that at the lower debt recapitalization boundary. On the other variables, which are not statistically tenable, any comparison of the dynamic behaviours by  $F_{Hi}$  firms' and those by  $F_{Li}$  firms is not possible.

## 8. Conclusion

The paper shows unique findings on C - 2.1, 2.2 and 2.3. The study (read with Table 1 and 2) set forth empirical validity for C-2.1 given that high-value ( $F_{Hi}$ ) firms follow STO-track of financing, low-value ( $F_{Li}$ ) firms pursue PO-track, and proposition - 1 and 2 are already satisfied.  $F_{Hi}$  firms' STO debt-revisions are exposed to DTO-track at 'low' limits of debts' lower recapitalization boundary.  $F_{Li}$  firms' PO debt-revisions exhibit persistent exposure to DTO-track over different limits of upper recapitalization boundary of debts. These confirm a limited acceptance of dynamic recapitalization policy in the DTO theory within STO debt-revisions by  $F_{Hi}$  firms but a general appreciation of the same within PO debt-revisions by  $F_{Li}$  firms. C-2.1 exists empirically with regard to Indian firms' financing data.

On C-2.2, with regard to the different elements of adjustments cost viz., risk-less rate of return ( $R_f$ ), changes in interest tax-shield benefits ( $\Delta\tau$ ), bankruptcy risks ( $\varphi$ ), assets' variability ( $\sigma^2$ ), and size of recapitalization costs ( $\rho$ ), the study read (with the tables, Table 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12) are of mixed implications. In dynamic recapitalization,  $F_{Hi}$  firms' STO debt-revisions are biased to (i) low limits of  $R_f$  and  $\Delta\tau$ , (ii) low and moderate limits of  $\varphi$ , and (iii) low and high limits of  $\sigma^2$ . Those are considerably consistent at all limits of  $\rho$ . C-2.2 is thus empirically tenable for  $F_{Hi}$  firms' STO debt-revisions on  $R_f$  and  $\Delta\tau$ ; and it is fairly reasonable on  $\varphi$ . The corollary is subject to mixed revelation on  $\sigma^2$  while on  $\rho$   $F_{Hi}$  firms' STO debt-revisions purely follow DTO-revisions. These once again confirm the limited acceptability of STO debt-revisions within dynamic recapitalization of debts. At the different limits of  $R_f$ ,  $\Delta\tau$ ,  $\varphi$ ,  $\sigma^2$  and  $\rho$ ,  $F_{Li}$  firms' PO-revisions are consistently relevant over different limits of adjustment cost rather than that only at higher limits. C-2.2 is justified with  $F_{Li}$  firms and it generally confirms the firms' dynamic recapitalizations.

The observations (read with Table: 13) corroborate validity of C-2.3. The lower recapitalization boundaries of  $F_{Hi}$  firms are biased to STO elements of debt-revisions (changes in tax-shield benefits,  $\Delta\tau$  and solvency limits, inverse proxy of bankruptcy risks). Both would result in presence of lower adjustment cost as net effect at lower limit of lower recapitalization boundary of debts.  $F_{Li}$  firms are biased to both bankruptcy risks and assets' underlining risks at upper debt-recapitalization boundary; and these result into presence of higher adjustment cost as net effect at higher limits of upper debt-recapitalization boundary.

There are a few limitations of the observations in the study. The data have used upper and lower recapitalization boundaries of debts only. Debt-equity ratio rather than debt-total assets' ratio is utilized to proxy for the variables of debt boundaries. The recapitalization boundary of equity is assumed to be inverse of debt-boundary. It abstracts from using equity recapitalization boundary and its empirical exploration as well. The examinations of C-2.1, 2.2 and 2.3 are therefore set forth with the assumption that high (low)-value firms follow STO (PO)-track of financing. In dynamic recapitalization, the reverse (that is, low (high)-value firms' STO (PO) debt-revisions), if any is not revisited in the study. Future research may explore and re-examine the persistency of the present study. Firm-specific characteristics in this paper however show the absence of multi-colinearity within these variables (see, Table 14).

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