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Earnings Manipulation and Adjustment Speed towards an Optimal Leverage

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ABSTRACT

This study examines whether the firms' leverage adjustment speed is influenced by real and accrual-based earnings manipulation over the period 2006-2019. We find evidence suggesting that the leverage adjustment speed in firms with a higher level of real and accrual-based earnings manipulation is slower than that of other firms. Specifically, we show that under-levered (over-levered) firms with a higher level of earnings manipulation tend to adjust their actual leverage toward an optimal level, faster (slower) than that of other firms. These results are robust to different metrics for real and accrual-based earnings management, an alternative set of leverage determinants, alternative sample periods, and various estimation methods.

1 Introduction

According to the trade-off theory, market frictions, such as transaction costs, cause the firm's leverage affects its value. It is argued that there is an optimal (target) leverage ratio that can maximize the firm's value; hence, firms should quickly adjust any deviation from the target leverage. Recent studies [21, 23, 24, 32, 34, 54, 63] extensively examine the above speculation and find that firms, in fact, have target leverage. Also, Graham and Harvey report that about 80 percent of CFOs consider target leverage for their firms [26]. Having an optimal leverage has many advantages for firms, but moving towards it can be costly; which reduces the speed of adjustment.
Korajczyk and Levy, Strebulaev and Shivdasani and Stefanescu find that transaction costs may reduce the speed of adjustment [39, 60, 61]. Devos, Rahman, and Tsang argued that specific opportunity costs adversely affect the adjustment speed [19]. Öztekin and Flannery show that the institutional environment influences the speed of adjustment [55]. Cook and Tang argue that the general economic conditions affect the adjustment costs and consequently slow down the adjustment speed [16]. Furthermore, several studies, such as Öztekin and Flannery, Öztekin, Halling, Yu, and Zechner and Jiang, Jiang, Huang, Kim, and Nofsinger investigates the influence of macroeconomic factors on the speed of adjustment [28, 35, 54, 55]. Although many theoretical and empirical studies have examined how determinants of adjustment cost affect the speed of adjustment, they paid little attention to the influence of managers' authority on the speed of adjustment. Managers are usually risk-averse and pursue their own goals [30, 31, 33]. Serfling believes that if managers are willing to influence the firms' risk,

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they should do so with tools that they control [59]. For example, to reduce the firms' risk, managers may use more conservative accounting policies, such as maintaining a lower leverage ratio [12, 15, 38, 44]. Earnings management is one of the tools that managers can use to influence the firms' risk profile [58]. Through manipulating accruals (accounting earnings management, AEM) and manipulating firms' real activities (real earnings management, REM) managers can mislead at least some stakeholders about firms' true performance [7, 29, 33, 57].

The presented hypotheses in this paper are based on the previous theoretical and empirical research, particularly [8] which show that accounting earnings management increases the information asymmetry, [1] which argue that firms with more real earnings management have higher information asymmetry, and [55], which believe that information asymmetry reduces the speed of adjustment. Based on these studies, we predict that firms with a higher level of real and accrual-based earnings management, due to higher information asymmetry, have a slower leverage adjustment speed than other firms. It should be noted that the status of firms' leverage can affect the direction of the influence of earnings management on the speed of adjustment. In over-levered firms, to reach the target leverage, firms should reduce their actual leverage. However, as earnings management increases information asymmetry [1, 8] and consequently increases the firms' leverage ratio [3] makes it more difficult for firms to achieve the target leverage. Hence, we expect that when the capital structure is over-leveraged, firms with a higher level of earnings management have a slower speed of adjustment than other firms. However, to reach the target leverage in under-levered firms, more debt should be used in the capital structure. As previously stated, earnings management exacerbates the information asymmetry, increases the leverage ratio, and consequently facilitates achievement of the target leverage ratio. Hence, we expect that when the capital structure is under-leveraged, firms with a higher level of earnings management have a faster speed of adjustment than other firms.

To test our hypotheses, we use data collected from firms listed in Tehran Stock Exchange (TSE). Firms listed in TSE prepare their financial reports in accordance with the Iranian national accounting standards, largely similar to the IFRS. Financial reports of TSE firms must be audited by external auditors. Compared to international financial markets, TSE is relatively young, and its rules and regulations are unable to effectively improve the financial reporting quality to a satisfactory level [48]. In this condition, the business environment is not transparent, and information asymmetry is high. Therefore, managers have adequate opportunity to exert their powers (such as earnings management) in preparing financial reports. However, it should be noted that in Iran, enforcement of laws that passed by the Ministry of Economic Affairs and Finance (such as tax law) is prioritized over the implementation of accounting standards, and such laws to some extent limit the managerial authorities. In this context, to achieve their reporting goals, some managers tend to manipulate firms' real activities. Therefore, in this paper, we focus on real and accrual-based earnings management. To measure accrual-based earnings management, we use the absolute value of discretionary accruals from the Jones model [36], the modified Jones model [18], and the ROA-Adjusted model [40]. We also use the first principal component of these three criteria as our overall proxy for accounting earnings management. To measure real earnings management, we follow [57] and focus on sales manipulation, overproduction, and reduction in discretionary expenses that lead to abnormal negative CFO, abnormal positive production costs, and abnormal negative discretionary expenses, respectively.

Also, we use the first principal component of these three measures as our overall metric for real earnings management. Furthermore, following [3, 23] we use market leverage and book leverage as proxies for firms' leverage ratio. To measure the speed of adjustment, following [55, 68] we use the partial adjustment model and, to control for all sources of indigeneity, we follow [68] and estimate models using Arellano and Bond difference GMM [5] and Blundell and Bond [10] system GMM estimators.

In this paper, we contribute to the literature on leverage and leverage adjustment speed with two novel findings. First, we show that real and accrual-based earnings management reduce the leverage adjustment speed and delay achieving target leverage. Second, we provide evidence suggesting that when the capital structure is over-leveraged (under-leveraged), compared to other firms, firms with the higher level of earnings management adjust their actual leverage toward the target at a slower (faster) speed. In the remainder of the paper we present the literature review and previous researches, hypotheses, and methodology, findings, and finally, we present conclusions, suggestions and research constraints.

2 Literature Review

In an efficient capital market, firms' leverage ratio does not affect their values. Nevertheless, market imperfections cause the firms' value to be affected by their leverage ratio [50].

2.1 Previous Studies

Among different capital structure theories, the trade-off theory [49], the pecking order theory [51] and the market timing theory [6] have attracted the most attention among researchers [32]. Moreover, the management inertia theory [65] confirms the predictions of market timing theory, in addition to presenting new results [23]. The pecking-order, market timing, and managerial inertia theories do not believe in the existence of an optimal target leverage ratio. However, Myers believes that, based on the trade-off theory, firms can set a target leverage ratio [51]. The trade-off theory suggests that there is an optimal leverage level, in which the costs and benefits of leverage are balanced, and subsequently, the firms' value is maximized [49].

As empirical evidence, Graham and Harvey show that about 80 percent of CFOs consider a target leverage ratio for their firms [26]. Most empirical studies on the trade-off theory agree on the existence of a target leverage ratio, but there is no consensus on how firms adjust their leverage ratio and also on the speed of adjustment [52]. Some studies [23, 33, 37,43] find that the firms' actual leverage slowly moves toward the target. Graham and Leary mention that the reported adjustment speed in the previous studies, which is measured by using various econometric methods, usually falls in the range of 10-40 percent [27]. Frank and Shen argue that the documented speed of adjustment in the previous studies is measured based on the fixed target leverage, while the target leverage changes over time and is dynamic [25]. In this regard, some studies focus on the determinants of adjustment speed and find that as the adjustment costs rise, the adjustment speed falls. For example, Devos et al. categorize adjustment costs into specific opportunity costs and securities issuance costs [19]. Aflatooni and Mansuri show that the increase in information opacity increases (decreases) the positive (negative) deviation from target leverage. Also, they indicate that the increase in information opacity decreases the adjustment speed [2]. Strebulaev show that when transaction costs are high, firms are less likely to adjust their leverage ratio [61]. Faulkender et al. find that, compared to other firms, firms with more free cash flows and firms with more leverage deviations are more likely to adjust their leverage [21]. Elsas and Florysiak note that bankruptcy costs and costs of deviations from target leverage create incentives for managers to adjust leverage more rapidly [20].

Chang et al., and Liao et al. found that compared to other firms, firms with stronger corporate governance would adjust their leverage more quickly [13, 45]. Zhou et al. found that, compared to other firms, firms whose cost of equity capital is more sensitive to deviation from optimal leverage; have a faster adjustment speed [68]. Lockhart and Devos et al. show that firms' credit lines and debt contracts affect the leverage adjustment speed [19, 46].

However, the leverage adjustment speed depends not only on the transaction costs and specific opportunity costs but also on the general conditions of the firms' business environment. In this regard, Cook and Tang show that compared to bad macroeconomic conditions, firms can more quickly adjust their leverage in a favorable economic environment [16]. Öztekin, et al., Halling et al. and Jiang et al. emphasize on the importance of institutional setting in reducing the adjustment costs, and consequently, increasing the adjustment speed [3, 28, 35, 54]. Furthermore, according to [55], different business environments can impose different costs and benefits on firms, and this affects the speed of adjustment. They believe that higher information asymmetry is associated with slower adjustment speed. In accounting literature [9, 41] earnings management is used as a measure of information asymmetry. In addition, [1, 8] argue that earnings management increase information asymmetry. Since earnings management increases information asymmetry, we expect that it reduces the leverage adjustment speed.

2.2 Hypotheses Development

Depending on a firm's capital structure, the influence of different factors on the leverage adjustment speed can be asymmetric. For example, [11] find that over-levered firms with cash surplus (deficit) have a faster (slower) leverage adjustment speed; and under-levered firms with cash surplus (deficit) have a slower (faster) leverage adjustment speed. Also, they show that when the capital structure is over-leveraged (under-leveraged), firms with higher managerial abilities can adjust their leverage faster (slower) than other firms. We believe that the influence of real and accrual-based earnings management on the speed of adjustment can also be asymmetric concerning the status of the firm's leverage ratio. In over-levered firms, moving toward the target leverage requires the reduction in the debt ratio. In addition, increase in earnings management leads to a higher level of information asymmetry and consequently, restricts firms in financing through the equity market.

As a result, firms inevitably satisfy their financial needs by signaling private information to the debt market [1, 8]. This strengthens the role of debt in the capital structure of such firms [56, 62]. Therefore, in over-levered firms, we expect that higher levels of earnings management will reduce the leverage adjustment speed. On the other hand, in under-levered firms, moving toward the target leverage requires increasing the debt level. In this case, an increase in earnings management increases the information asymmetry [1, 8], makes it difficult to finance through the equity market, and eventually pushes firms toward the debt market [56, 62]. Increasing the debt level facilitates the achievement of the target leverage. Therefore, in under-levered firms, we expect that higher levels of earnings management will increase the leverage adjustment speed.

3 Research Methodology

3.1 Research Hypotheses

The research hypotheses that are designed based on the literature review are as follows:

Hypothesis I: Ceteris paribus, firms with a higher level of earnings management have a slower leverage adjustment speed than other firms.

Hypothesis IIa: For over-levered firms, leverage adjustment speed is slower for firms with a high level of earnings management than for firms with a low level of earnings management.

Hypothesis IIb: For under-levered firms, leverage adjustment speed is faster for firms with a high level of earnings management than for firms with a low level of earnings management.

This research is an applied, semi-experimental and retrospective study. To data analysis, we use cross-sectional, static panel data and also dynamic panel data with system generalized method of moments (system GMM). Furthermore, for model estimating and run the statistical tests, we use EViews.

3.2 Research Models and Variables

Metrics of AEM: To detect accounting earnings management, we use three accrual models, including Jones [36], Modified Jones [18] and ROA-Adjusted [39] as follows, respectively:

$$TACC_{it} = \alpha_0 + \alpha_1 1/A_{it-1} + \alpha_2 \Delta S_{it} + \alpha_3 PPE_{it} + \varepsilon_{1it} \quad (1)$$

$$TACC_{it} = \beta_0 + \beta_1 1/A_{it-1} + \beta_2(\Delta S_{it} - \Delta AR_{it}) + \beta_3 PPE_{it} + \varepsilon_{2it} \quad (2)$$

$$TACC_{it} = \gamma_0 + \gamma_1 1/A_{it-1} + \gamma_2(\Delta S_{it} - \Delta AR_{it}) + \gamma_3 PPE_{it} + \gamma_4 ROA_{it} + \varepsilon_{3it} \quad (3)$$

where $TACC_{it}$ is total accruals, S_{it} (AR_{it}) is sales revenue (receivables), ΔS_{it} (ΔAR_{it}) is defined as $S_{it} - S_{it-1}$ ($AR_{it} - AR_{it-1}$), PPE_{it} is property, plants and equipment, and ROA_{it} is the return on assets for firm i at the end of year t. All these variables (except for ROA_{it}) are scaled by total assets at the end of year t-1 (A_{it-1}). We estimate these cross-sectional regressions for all 210 industry-years. After estimating model (1), we use industry and year specific parameter estimates $\widehat{\alpha}_0$, $\widehat{\alpha}_1$, $\widehat{\alpha}_2$, and $\widehat{\alpha}_3$ to calculate unsigned discretionary accruals from the Jones model [36], as follows:

$$DAJ_{it} = |TACC_{it} - \widehat{\alpha}_0 - \widehat{\alpha}_1 1/A_{it-1} - \widehat{\alpha}_2 \Delta S_{it} - \widehat{\alpha}_3 PPE_{it}|$$

After estimating model (2), to infer unsigned discretionary accruals from the Modified Jones model [18], we use the parameter estimates $\widehat{\beta}_0$, $\widehat{\beta}_1$, $\widehat{\beta}_2$, and $\widehat{\beta}_3$ via:

$$DAMJ_{it} = \left|TACC_{it} - \widehat{\beta}_0 - \widehat{\beta}_1 1/A_{it-1} - \widehat{\beta}_2(\Delta S_{it} - \Delta AR_{it}) - \widehat{\beta}_3 PPE_{it}\right|$$

Following [4, 14] we subtract ΔAR_{it} from ΔS_{it} before estimating model (2). After estimating model (3), we use the parameter estimates $\hat{\gamma}_0$, $\hat{\gamma}_1$, $\hat{\gamma}_2$, $\hat{\gamma}_3$, and $\hat{\gamma}_4$ to calculate unsigned discretionary accruals from ROA-Adjusted model [40], as follows:

$$DAK_{it} = |TACC_{it} - \hat{\gamma}_0 - \hat{\gamma}_1 1/A_{it-1} - \hat{\gamma}_2(\Delta S_{it} - \Delta AR_{it}) - \hat{\gamma}_3 PPE_{it} - \hat{\gamma}_4 ROA_{it}|$$

In addition, the first principal component of DAJ_{it}, $DAMJ_{it}$, and DAK_{it} labeled as $DAPC_{it}$ is used as an overall measure to detect AEM. Finally, we define AM_{it} as the set of accrual-based earnings management measures (i.e., $AM_{it} = \{DAJ_{it}, DAMJ_{it}, DAK_{it}, DAPC_{it}\}$). In the next step, based on the values of DAJ_{it}, we define H_DAJ_{it} as a dummy variable that refers to firm-years with a high level of AEM. Specifically, If the firm-years belong to the top quartile sorted by DAJ_{it}, H_DAJ_{it} equals to 1 and zero otherwise. Similarly, we define H_DAMJ_{it} , H_DAK_{it}, and H_DAPC_{it}. Finally, we define H_AM_{it} as the set of dummy variables that reflects firm-years with the high level of AEM (i.e., $H\_AM_{it} = \{H\_DAJ_{it}, H\_DAMJ_{it}, H\_DAK_{it}, H\_DAPC_{it}\}$).

Metrics of REM: To detect real earnings management, we focus on sales manipulation, overproduction and abnormal reduction in discretionary expenses. More specifically, following [14, 17, 57] we define the residuals from the following regression models as abnormal levels of cash from operations, abnormal production costs and abnormal discretionary expenses, respectively:

$$CFO_{it} = \delta_0 + \delta_1 1/A_{it-1} + \delta_2 S_{it} + \delta_3 \Delta S_{it} + \varepsilon_{4it} \quad (4)$$

$$PROD_{it} = \theta_0 + \theta_1 1/A_{it-1} + \theta_2 S_{it} + \theta_3 \Delta S_{it} + \theta_4 \Delta S_{it-1} + \varepsilon_{5it} \quad (5)$$

$$DISEXP_{it} = \vartheta_0 + \vartheta_1 1/A_{it-1} + \vartheta_2 S_{it-1} + \varepsilon_{6it} \quad (6)$$

In which, CFO_{it} is cash from operations, $PROD_{it}$ is production costs, which is defined as the sum of cost of goods sold and change in inventory during the year t, $DISEXP_{it}$ is discretionary expenses, which includes selling, general and administrative expenses, advertising expenses, and R&D expenses. Other variables are defined in the previous section. All these variables are scaled by total assets at the end of year t-1 (A_{it-1}). We estimate models (4), (5) and (6) for all 210 industry-years. To calculate the abnormal levels of cash from operations ($ACFO_{it}$), we use the estimated parameters $\hat{\delta}_0$, $\hat{\delta}_1$, $\hat{\delta}_2$, and $\hat{\delta}_3$ as follows:

$$ACFO_{it} = -\left(CFO_{it} - \hat{\delta}_0 - \hat{\delta}_1\, 1/A_{it-1} - \hat{\delta}_2 S_{it} - \hat{\delta}_3 \Delta S_{it}\right)$$

Inferring abnormal production costs ($APROD_{it}$), we use the parameter estimates $\hat{\theta}_0$, $\hat{\theta}_1$, $\hat{\theta}_2$, $\hat{\theta}_3$, and $\hat{\theta}_4$ as follows:

$$APROD_{it} = PROD_{it} - \hat{\theta}_0 - \hat{\theta}_1\, 1/A_{it-1} - \hat{\theta}_2 S_{it} - \hat{\theta}_3 \Delta S_{it} - \hat{\theta}_4 \Delta S_{it-1}$$

In addition, we use the parameter estimates $\hat{\vartheta}_0$, $\hat{\vartheta}_1$, and $\hat{\vartheta}_2$ to infer abnormal discretionary expenses ($ADISEXP_{it}$), as follows:

$$ADISEXP_{it} = -\left(DISEXP_{it} - \hat{\vartheta}_0 - \hat{\vartheta}_1\, 1/A_{it-1} - \hat{\vartheta}_2 S_{it-1}\right)$$

For comparability purposes, the first and third measures are multiplied by -1. With these definitions, the higher value of our measures exhibits the greater possibility that a firm is engaged in REM activities. In addition, the first principal component of $ACFO_{it}$, $APROD_{it}$, and $ADISEXP_{it}$ labeled as $RMPC_{it}$ is used as an overall measure to detect REM. Next, we define RM_{it} as the set of REM measures (i.e., $RM_{it} = \{ACFO_{it}, APROD_{it}, ADISEXP_{it}, RMPC_{it}\}$). Furthermore, based on the values of $ACFO_{it}$, we define H_ACFO_{it} as a dummy variable that refers to firm-years with a high level of sales manipulation. Specifically, If the firm-years belong to the top quartile sorted by $ACFO_{it}$, H_ACFO_{it} equals to 1 and zero otherwise. H_APROD_{it} , H_ADISEX_{it}, and H_RMPC_{it}, are defined similarly. Furthermore, we define H_RM_{it} as the set of dummy variables that reflects firm-years with the high level of corresponding REM metrics (i.e., $H\_RM_{it} = \{H\_ACFO_{it}, H\_APROD_{it}, H\_ADISEXP_{it}, H\_RMPC_{it}\}$). Finally, we define H_EM_{it} as the set of all our dummy variables that reflects firm-years with the high level of AEM and REM (i.e., $H\_EM_{it} = \{H\_AM_{it}, H\_RM_{it}\}$).

Detecting over/under-levered firms: Detecting over/under-levered firms, we first follow [11, 63, 68] and define firms' target leverage ($\widehat{LEV}_{it+1}$) as the fitted values from the regression of leverage ratio on determinants of capital structure (Z_{it}) specified as follows:

$$LEV_{it+1} = \omega + \psi \mathbf{Z}_{it} + \zeta_{it+1} \qquad (7)$$

where LEV_{it+1} is considered as firms' book leverage ($BLEV_{it+1}$) and market leverage ($MLEV_{it+1}$) for the next period. Following [3, 23, 66], book leverage is defined as the book value of total debts scaled by book value of total assets, and market leverage is defined as the book value of total debts scaled by the sum of the book value of total debts and market value of equity. In model (7), $\mathbf{Z}_{it}$ refers to the vector of leverage determinants. Following [23, 47], we consider some independent variables in estimating regression (7), including market to book value of equity (MTB_{it}), assets' tangibility defined as fixed assets scaled by total assets ($TANG_{it}$), depreciation expenses as a proportion of total assets

(DEP_{it}), earnings before interest and tax scaled by total assets ($EBIT_{it}$), effective tax rate defined as the ratio of current income taxes to income before taxes ($TAXR_{it}$), following [58, 67] firm size defined as the logarithm of total assets ($LNTA_{it}$), asset liquidity defined as the ratio of current assets to current liabilities (LIQ_{it}), the median industry book leverage and the median industry market leverage for a given industry-year ($IBLEV_{it}$ and $IMLEV_{it}$, respectively), and annual inflation rate defined as growth in consumer price index ($INFL_{it}$). Second, after estimating this cross-sectional regression for all 210 industry-years, total signed deviation from target leverage is defined as:

$$DLEV_{it+1} = LEV_{it+1} - \widehat{LEV}_{it+1} = LEV_{it+1} - \widehat{\omega} - \widehat{\psi}\mathbf{Z}_{it},$$

where $DLEV_{it+1}$ is the leverage deviation (i.e., actual leverage minus target leverage). Positive (negative) values of $DLEV_{it+1}$ denote the over-levered (under-levered) firms.

Earnings management and speed of adjustment: Inferring the leverage adjustment speed, we follow [55, 68] and use the integrated dynamic partial adjustment model as our base model:

$$LEV_{it+1} = \alpha + (1 - \lambda)LEV_{it} + (\lambda\psi)\mathbf{Z}_{it} + \vartheta_{it+1}\ , \tag{8}$$

where all variables are defined in the previous section. We estimate model (8) using book leverage and market leverage for the next period as the dependent variable. In model (8), the parameter λ refers to the speed of adjustment. Flannery and Hankins [22] argue that the Blundell and Bond's system-GMM (BB) [10] is the most reliable estimator for estimating dynamic short panels in the presence of endogenous explanatory variables. Thus we estimate model (8) using the system-GMM estimator, and to validate the results we also use the Arellano and Bond's difference-GMM (AB) estimator [5]. To test the significance of H_EM_{it} on leverage adjustment speed, we augment model (8) with H_EM_{it} and $H\_EM_{it} * LEV_{it}$. Eventually, we use the following dynamic model to test **Hypothesis I**:

$$LEV_{it+1} = \alpha + (1 - \lambda)LEV_{it} + \eta_1 H\_EM_{it} + \eta_2 H\_EM_{it} * LEV_{it} + (\lambda\psi)\mathbf{Z}_{it} + \varepsilon_{it+1}, \tag{9}$$

where all variables are defined in the previous section. We estimate model (9) using book leverage and market leverage for the next period, as proxies for the dependent variable. Furthermore, we estimate model (9) for all our AEM and REM dummy variables, separately. In model (9), the main focus is the coefficient on $H\_EM_{it} * LEV_{it}$. **Hypothesis I** predicts a positive η_2, suggesting that the coefficient on LEV_{it} is higher for firms in the top quartile than firms in the other quartiles sorted by EM_{it} and, therefore, they display a slower adjustment speed. Similar to model (8), we estimate model (9) using system-GMM and difference-GMM estimators. To test **Hypothesis IIa** and **Hypothesis IIb** we estimate model (9) in over levered and under-levered firms, respectively. For over-levered (under-levered) firms, **Hypothesis IIa** (**Hypothesis IIb**) predicts a positive (negative) η_2, suggesting that the coefficient on LEV_{it} is higher (lower) for firms in the top quartile than firms in the other quartiles sorted by EM_{it} and, therefore, they show a slower (faster) adjustment speed.

3.3 Sample Selection and Data Collection

We retrieve financial statements data from CODAL, RDIS and Rahavard Nowin database, and share price data from the Tehran Stock Exchange over the period 2006-2019. The initial sample consists of 6,678 observations. We exclude banks, financial firms and regulated utilities from the sample. Delisted firms, industry-years with fewer than eight observations and firm-years with a negative equity book value are dropped from our sample. Finally, to reduce the potential impact of outliers, we winsorize all variables at the 1st and 99th percentiles. This process limits the sample to 4,508 observations that are grouped into 15 industries. See Table 1 for details.

Table 1: Sample Selection Procedure and Industry Distribution

	Number of Observations
Initial sample during 2006-2019	6678
Delisted firms	(168)
Banks, financial firms and regulated utilities	(826)
Industry-years with fewer than eight observations	(434)
Firm-years with a negative equity book value	(308)
Firm-years with missing values	(434)
Total observations in the final analysis	4508

4 Results

4.1 Descriptive Statistics

Table 2 reports the descriptive statistics (mean, standard deviation, minimum, 25th, 50th, and 75th percentile values and maximum) for the main variables over the period 2006-2019.

Table 2: Descriptive Statistics for the Main Variables

Variables		#obs	Mean	SD	Min.	Q1	Median	Q3	Max
$BLEV_{it+1}$		4186	0.5948	0.2076	0.0501	0.4618	0.6297	0.7588	0.8670
$MLEV_{it+1}$		4186	0.4218	0.2199	0.0333	0.2350	0.4136	0.6068	0.7684
MTB_{it}		4508	2.9027	2.0390	0.4094	1.2933	2.2476	3.9828	7.2853
$TANG_{it}$		4508	0.2495	0.1843	0.0005	0.0996	0.2064	0.3737	0.6027
DEP_{it}		4508	0.1685	0.0580	0.0169	0.1273	0.1656	0.2070	0.3628
$EBIT_{it}$		4508	0.1477	0.1333	-0.3549	0.0759	0.1438	0.2360	0.3571
$TAXR_{it}$		4508	0.1002	0.0899	0.0000	0.0000	0.0946	0.1941	0.2250
$LNTA_{it}$		4508	5.7414	0.6786	4.2423	5.2451	5.7267	6.2342	6.8991
LIQ_{it}		4508	1.2064	0.5592	0.1022	0.8250	1.1242	1.4967	2.3343
$IBLEV_{it}$		4508	0.6181	0.0960	0.2858	0.5620	0.6395	0.6912	0.8151
$IMLEV_{it}$		4508	0.4326	0.1549	0.0705	0.3170	0.4174	0.5636	0.7684
$INFL_{it}$		4508	0.1690	0.0729	0.0901	0.1169	0.1542	0.1983	0.3479
AEM metrics:									
DAJ_{it}		4508	0.0863	0.0786	0.0445	0.0232	0.0664	0.1296	0.4828
$DAMJ_{it}$		4508	0.0880	0.0804	0.0154	0.0239	0.0667	0.1330	0.4673
DAK_{it}		4508	0.0695	0.0675	0.0122	0.0157	0.0516	0.1029	0.4781
$DAPC_{it}$		4508	0.1226	0.1080	0.0273	0.0375	0.0918	0.1833	0.7323
REM metrics:									
$ACFO_{it}$		4508	-0.0211	0.1123	-0.4933	-0.0602	0.0049	0.0626	0.4897
$APROD_{it}$		4508	0.0062	0.1232	-1.1456	-0.0546	0.0008	0.0563	0.9284
$ADISEXP_{it}$		4508	-0.0093	0.0377	-0.3337	-0.0127	0.0011	0.0172	0.3721
$RMPC_{it}$		4508	0.0015	-1.1751	-0.6157	-0.5277	0.0507	0.6390	1.4917
Note: This table reports the descriptive statistics for the key variables.									

The mean for $BLEV_{it}$ (0.5948) shows that about 60% of firms' financial resources are financed from debt markets. The mean for $MLEV_{it}$ (0.4218) indicates that the market value of equity is on average 1.37 times of debt. The mean for MTB_{it} (2.9027) indicates that the market value of equity is on average 2.90 times of its book value. Assets' tangibility, depreciation expenses, and earnings before interest and tax represent 24.95%, 16.85% and 14.77% of total assets, respectively. The mean for LIQ_{it} (1.2064) shows that current assets are on average 1.21 times of current liabilities. The mean for median industry book leverage (market leverage) is 0.6381 (0.4326), and the mean for inflation rate during 2006-2019 is about 17%. All AEM metrics exhibit mean values between 7% and 13% of total assets; and all proxies for REM show mean values between -0.03% and 0.01% of total assets.

4.2 AEM and REM Model Estimations

In Table 3, Panel A represents the estimation results for AEM models including Jones model [36], Modified Jones model [18], and ROA-Adjusted models [40], and Panel B reports the estimation results for REM models.

Table 3: The Estimation Results of Real and Accrual-Based Earnings Management Models

	Panel A			**Panel B**		
Variable	Jones	Modified Jones	Kothari	CFO	PROD	DISEXP
Intercept	0.0161*** (4.19)	0.0279*** (8.17)	-0.0335*** (-10.11)	0.0624*** (15.62)	-0.0835*** (-9.36)	0.0221*** (10.06)
$1/A_{it-1}$	-1.1732*** (-3.60)	-1.1301*** (-3.83)	-2.6891* (-1.73)	-2.3148*** (-7.03)	2.8890*** (3.52)	2.9078*** (12.28)
S_{it}				0.0604** (2.03)	0.9173* (1.80)	
S_{it-1}						0.0306** (2.32)
ΔS_{it}	0.1348** (2.27)			0.0459** (2.15)	-0.1292** (-2.30)	
ΔS_{it}-ΔAR_{it}		0.0205** (2.53)	-0.0697** (-2.15)			
ΔS_{it-1}					-0.0809*** (-6.47)	
PPE_{it}	-0.1151*** (-15.96)	-0.1077*** (-16.96)	-0.1042*** (-22.11)			
ROA_{it}			0.5514*** (38.25)			
Adjusted R^2	14.39%	18.70%	64.36%	14.27%	88.83%	29.52%
*, ** and *** denote significance at the 10%, 5% and 1% level, respectively.						

AEM and REM models are estimated for all 210 industry-years during 2006-2019. Table 4 reports the mean coefficient estimates, associated t-statistics (in parentheses), and the mean adjusted R^2s across industry-years for each model. The adjusted R^2s for Jones, Modified Jones, and ROA-Adjusted models are about 14%, 19%, and 64%, respectively. Furthermore, the mean adjusted R^2s for REM models including models (4), (5) and (6) are about 14%, 89%, and 30%. The sign of regression coefficients for AEM models are strongly consistent with the previous literature [18, 36, 40] and the sign of coefficient estimates for REM models are largely consistent with [14, 57].

4.3 Target Leverage Regression

In Table 4, Panels A and B report the estimation results for book leverage and market leverage regressions, respectively. The first column of each panel shows the predicted sign for regression coefficient according to the literature, and the second column represents the mean coefficient estimates, associated t-statistics (showed in parentheses and calculated using the mean standard errors across industry-years), and the mean adjusted R^2s across all industry-years for each model. The mean adjusted R^2s for book leverage and market leverage regressions are about 69%. The signs for coefficient estimates are largely consistent with the findings of the previous literature such as [23, 47, 55, 53]. For example, firms with a high MTB_{it} ratio have a more attractive future growth options, which firms try to protect by limiting their leverage and larger firms generally operate with more leverage, because they have better access to debt markets and are also more transparent [23, 55].

Table 4: Book/Market Target Leverage Regression

	Panel A Book leverage ($BLEV_{it}$) regression		**Panel B** Market leverage ($MLEV_{it}$) regression	
Variable	Sign in the literature	Estimated coefficient	Sign in the literature	Estimated coefficient
Intercept		0.6930*** (19.34)		0.7751*** (23.00)
MTB_{it}	-	-0.0346*** (-2.94)	-	-0.0292*** (-19.45)
$TANG_{it}$	+	0.2801*** (15.02)	+	0.2690*** (14.94)
DEP_{it}	-	-0.0458* (-1.71)	-	-0.0276 (-1.23)
$EBIT_{it}$	-	-0.3427*** (-12.66)	-	-0.4936*** (-18.49)
$TAXR_{it}$	+	0.1987*** (7.91)	+	0.1453*** (4.78)
$LNTA_{it}$	+	0.0884** (2.03)	+	0.0110** (2.34)
LIQ_{it}	-	-0.2097*** (-28.75)	-	-0.1862*** (-29.98)
$IBLEV_{it}$	+	0.4986*** (23.17)		
$IMLEV_{it}$			+	0.3663*** (17.23)
$INFL_{it}$	+	0.1115*** (4.87)	+	0.1945*** (7.30)
Adjusted R^2		68.66%		69.22%

4.4 Leverage Adjustment Speed in the Base Model

In Table 5, panels A and B report the estimation results of the model (8) using book leverage and market leverage for the next period as the dependent variable, respectively. Furthermore, the first and the second columns of each panel report the regression results using BB and AB, respectively. In model (8), industry and year effects are controlled by adding industry and year dummies to the regression models and the robust t-statistics (enclosed in parentheses) are calculated using standard errors corrected for firm-level clustering. In panel A, the coefficient estimates on lagged book leverage using BB and AB estimators show that the adjustment speed for book leverage is about 26% and 23%, respectively. In panel B, adopting BB and AB methods to estimate model (8) using market leverage for the next period as the dependent variable, we estimate the adjustment speed for market leverage by about 36% and 35%, respectively.

Panels A and B report the Sargan-Hansen over-identification test (with J-statistic) for the validity of instruments. In Panel A, the J-statistic in BB (106.36) and AB (105.88) is not significant. Also, in Panel B the J-statistic in BB (106.52) and AB (101.34) is not significant. These results indicate that all of our instruments are valid. Furthermore, panels A and B report the Arellano-Bond test for autocorrelation in differenced residuals. The AR(2) test yields a statistic of -0.82 (-1.19) in BB and -0.48 (-1.57) in AB, in Panel A (Panel B). These results show that the GMM models do not suffer from the second-order autocorrelation.

Table 5: Book/Market Leverage Adjustment Speed - Base Models

	Panel A Book leverage adjustment speed		**Panel B** Market leverage adjustment speed	
Variable	$BLEV_{it+1}$ (BB)	$BLEV_{it+1}$ (AB)	$MLEV_{it+1}$ (BB)	$MLEV_{it+1}$ (AB)
$BLEV_{it}$	0.7401*** (11.72)	0.7666*** (13.37)		
$MLEV_{it}$			0.6373*** (16.26)	0.6520*** (15.47)
MTB_{it}	-0.0107*** (-7.97)	-0.0260*** (-12.20)	-0.0211*** (-7.04)	-0.0382*** (-9.73)
$TANG_{it}$	0.1640*** (5.06)	0.3581*** (8.19)	0.1042*** (3.29)	0.2353*** (4.67)
DEP_{it}	-0.0822** (-2.33)	-0.0616* (-1.86)	-0.0186 (-0.41)	-0.0668 (-1.09)
$EBIT_{it}$	0.0457 (1.60)	-0.2351*** (-5.82)	-0.3334*** (-8.10)	-0.3795*** (-7.45)
$TAXR_{it}$	0.0034 (0.14)	0.0934*** (2.69)	0.0917** (2.16)	-0.0342 (-0.62)
$LNTA_{it}$	0.0591*** (5.05)	0.1834*** (5.62)	-0.0114 (-0.77)	-0.0357 (-1.43)
LIQ_{it}	-0.0374** (-2.06)	-0.1816*** (-8.88)	-0.0499*** (-4.00)	-0.1015*** (-7.39)
$IBLEV_{it}$	0.0840*** (2.70)	0.0189 (0.48)		
$IMLEV_{it}$			0.0268 (0.75)	-0.0181 (-0.41)
$INFL_{it}$	0.0480 (1.05)	0.0698 (0.95)	0.0786 (1.29)	0.1584* (1.77)
Industry effects	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
#obs	4186	4186	4186	4186
Leverage adjustment speed= λ	0.26	0.23	0.36	0.35
Sargan-Hansen test	106.36	105.88	106.52	101.34
Arellano-Bond test for:				
AR(1)	-3.84***	-8.01***	-4.75***	-9.12***
AR(2)	-0.82	-0.48	-1.19	-1.57

4.5 Leverage Adjustment Speed in the Firms with High Level of AEM

Panel A (Panel B) in Table 6 reports the estimation results of the model (9) using book leverage (market leverage) for the next period as the dependent variable. To save space, this table only reports the estimated coefficients on interaction terms. In each sub-panel, the first and the second column presents the regression results using BB and AB, respectively. Furthermore, industry and year effects are controlled by adding industry and year dummies to the regression model. The robust t-statistics (presented in parentheses) are calculated using standard errors corrected for firm-level clustering. In Panel A, model (9) is augmented with the elements of H_AM_{it}. Sub-panel A.1 (A.2) in Table 7 reports the estimation results of the model (9) which compare the adjustment speed for book leverage in high AEM firms based on discretionary accruals calculated using Jones (Modified Jones) model with other firms. Furthermore, Sub-panel A.3 reports the results based on the discretionary accruals calculated using ROA-Adjusted model and Panel A.4 reports the results based on our overall proxy for AEM.

Table 6: Accrual-Based Earnings Management and Leverage Adjustment Speed

Panel A: Book leverage	**Sub-panel A.1**		**Sub-panel A.2**		**Sub-panel A.3**		**Sub-panel A.4**	
	$BLEV_{it+1}$ (BB)	$BLEV_{it+1}$ (AB)	$BLEV_{it+1}$ (BB)	$BLEV_{it+1}$ (AB)	$BLEV_{it+1}$ (BB)	$BLEV_{it+1}$ (AB)	$BLEV_{it+1}$ (BB)	$BLEV_{it+1}$ (AB)
$H\_DAJ_{it}*BLEV_{it}$	0.0272* (1.80)	-0.0259 (-1.47)						
$H\_DAMJ_{it}*BLEV_{it}$			0.0620*** (3.88)	0.0702*** (5.34)				
$H\_DAK_{it}*BLEV_{it}$					0.0493** (2.23)	0.0662*** (3.45)		
$H\_DAPC_{it}*BLEV_{it}$							0.0300*** (2.92)	0.0467*** (5.05)
#obs	4186	4186	4186	4186	4186	4186	4186	4186
Sargan-Hansen test	84.18	95.58	80.73	94.80	79.54	103.56	84.38	96.53
Arellano-Bond test for:								
AR(1)	-4.43***	-4.39***	-5.26***	-6.17***	-4.03***	-6.52***	-4.91***	-6.10
AR(2)	-0.75	-0.92	-0.95	-1.07	-1.25	-0.91	-1.27	-1.33
	Sub-panel B.1		**Sub-panel B.2**		**Sub-panel B.3**		**Sub-panel B.4**	
Panel B: Market leverage	$MLEV_{it+1}$ (BB)	$MLEV_{it+1}$ (AB)	$MLEV_{it+1}$ (BB)	$MLEV_{it+1}$ (AB)	$MLEV_{it+1}$ (BB)	$MLEV_{it+1}$ (AB)	$MLEV_{it+1}$ (BB)	$MLEV_{it+1}$ (AB)
$H\_DAJ_{it}*MLEV_{it}$	0.0265* (1.78)	0.0282* (1.69)						
$H\_DAMJ_{it}*MLEV_{it}$			0.0483*** (2.87)	0.0482*** (4.55)				
$H\_DAK_{it}*MLEV_{it}$					0.0553*** (4.48)	0.0606*** (5.32)		
$H\_DAPC_{it}*MLEV_{it}$							0.0451*** (7.10)	0.0840*** (7.03)
#obs	4186	4186	4186	4186	4186	4186	4186	4186
Sargan-Hansen test	96.35	100.67	95.27	100.72	107.35	105.39	99.04	104.51
Arellano-Bond test for:								
AR(1)	-4.92***	-8.76***	-4.96***	-8.08***	-4.96***	-7.33***	-5.23***	-7.48***
AR(2)	-0.93	-0.99	-0.20	-0.17	-0.98	-0.24	-0.96	-0.25

Hypothesis I predicts a positive and significant coefficient on the interaction term $H\_EM_{it} * LEV_{it}$. Consistent with this, Sub-panel A.1 in Table 7 reports that the coefficient estimate on the interaction term $H\_DAJ_{it} * BLEV_{it}$ using BB (0.0272) is positive and significant; indicating that compared with other firms, adjustment speed for book leverage is slower in high AEM firms. In Sub-panel A.2 (A.3), the coefficient estimates on the interaction term $H\_DAMJ_{it} * BLEV_{it}$ ($H\_DAK_{it} * BLEV_{it}$) using BB is 0.0620 (0.0493), and AB is 0.0702 (0.0662), which are positive and significant. Furthermore, Sub-panel A.4 which reports the results on our overall AEM metric shows that the coefficient estimates on the interaction term $H\_DAPC_{it} * BLEV_{it}$ using BB (0.0300) and AB (0.0467) are significantly positive. Compared with Sub-panel A.1, other sub-panels in Panel A provide more solid evidence in support of **Hypothesis I.** Furthermore, the Sargan-Hansen over-identification test shows that our instruments are valid and the Arellano-Bond test for autocorrelation in differenced residuals show that our GMM models do not suffer from the second-order autocorrelation. Sub-panel B.1 (B.2) in Table 7 reports that the estimated coefficients on the interaction term $H\_DAJ_{it} * MLEV_{it}$ ($H\_DAMJ_{it} * MLEV_{it}$) using BB is 0.0265 (0.0483), and AB is 0.0282 (0.0482), which are positive and significant at 10% (1%) level, shows that the market leverage adjustment speed in high AEM firms is slower than that of other firms. In addition, other sub-panels in Panel B provide similar results in support of **Hypothesis I.**

4.6 Leverage Adjustment Speed in Firms with the High Level of REM

Panel A (Panel B) in Table 7 reports the estimation results of the model (9) using book leverage (market leverage) for the next period as the dependent variable. To save space, this table only reports the estimated coefficients on interaction terms.

Table 7: Real Earnings Management and Leverage Adjustment Speed

	Sub-panel A.1		**Sub-panel A.2**		**Sub-panel A.3**		**Sub-panel A.4**	
Panel A: Book leverage	$BLEV_{it+1}$ (BB)	$BLEV_{it+1}$ (AB)	$BLEV_{it+1}$ (BB)	$BLEV_{it+1}$ (AB)	$BLEV_{it+1}$ (BB)	$BLEV_{it+1}$ (AB)	$BLEV_{it+1}$ (BB)	$BLEV_{it+1}$ (AB)
$H\_ACFO_{it}*BLEV_{it}$	0.0485*** (3.30)	0.0304** (2.02)						
$H\_APROD_{it}*BLEV_{it}$			0.0389*** (2.82)	0.0656*** (4.91)				
$H\_ADISEXP_{it}*BLEV_{it}$					-0.0382 (-1.09)	0.0824* (1.79)		
$H\_RMPC_{it}*BLEV_{it}$							0.0298* (1.86)	0.0533* (1.75)
#obs	4186	4186	4186	4186	4186	4186	4186	4186
Sargan-Hansen test	92.28	94.77	108.13	96.16	88.14	87.25	82.69	101.07
Arellano-Bond test for:								
AR(1)	-4.38***	-6.75***	-2.84***	-4.60***	-3.51***	-5.23***	-3.46***	-4.95***
AR(2)	-0.42	-0.49	-0.76	-1.17	-0.76	-1.31	-0.77	-1.38
	Sub-panel B.1		**Sub-panel B.2**		**Sub-panel B.3**		**Sub-panel B.4**	
Panel B: Market leverage	$MLEV_{it+1}$ (BB)	$MLEV_{it+1}$ (AB)	$MLEV_{it+1}$ (BB)	$MLEV_{it+1}$ (AB)	$MLEV_{it+1}$ (BB)	$MLEV_{it+1}$ (AB)	$MLEV_{it+1}$ (BB)	$MLEV_{it+1}$ (AB)
$H\_ACFO_{it}*MLEV_{it}$	0.0401*** (3.92)	0.0346* (1.94)						
$H\_APROD_{it}*MLEV_{it}$			0.0266** (2.31)	0.0499*** (3.30)				
$H\_ADISEXP_{it}*MLEV_{it}$					0.0754 (1.23)	0.0740* (1.74)		
$H\_RMPC_{it}*MLEV_{it}$							0.0232** (1.98)	0.0240* (1.94)
#obs	4186	4186	4186	4186	4186	4186	4186	4186
Sargan-Hansen test	109.58	100.21	107.58	107.27	101.92	100.71	92.38	97.89
Arellano-Bond test for:								
AR(1)	-2.84***	-8.41***	-3.85***	-9.22***	-3.46***	-8.47***	-3.66***	-7.42***
AR(2)	-0.79	-0.78	-0.74	-0.54	-0.33	-1.32	-0.45	-1.14

In this table, model (9) is augmented with the elements of H_RM_{it}. In each sub-panel, the first and the second column presents the regression results using BB and AB estimators, respectively. Furthermore, industry and year effects are controlled by adding industry and year dummies to the regression model. The robust t-statistics (presented in parentheses) are calculated using standard errors corrected for firm-level clustering.

Table 8: AEM/REM and Leverage Adjustment Speed in Over/Under Levered Firms

Panel A: Book leverage	**Sub-panel A.1:** Over-levered firms (#obs=2202)		**Sub-panel A.2:** Under-levered firms (#obs=1984)	
	$BLEV_{it+1}$ (BB)	$BLEV_{it+1}$ (AB)	$BLEV_{it+1}$ (BB)	$BLEV_{it+1}$ (AB)
$BLEV_{it}$	0.6923*** (11.37)	0.6844*** (7.38)	0.7765*** (15.06)	0.7806*** (9.09)
$H\_DAJ_{it}*BLEV_{it}$	0.0026* (1.68)	0.0202 (1.13)	-0.0028 (-1.11)	0.0264 (1.34)
$H\_DAMJ_{it}*BLEV_{it}$	0.0691** (2.09)	0.0732*** (11.26)	-0.0731*** (-3.08)	-0.0724** (-2.09)
Panel A: Book leverage	**Sub-panel A.1:** Over-levered firms (#obs=2202)		**Sub-panel A.2:** Under-levered firms (#obs=1984)	
	$BLEV_{it+1}$ (BB)	$BLEV_{it+1}$ (AB)	$BLEV_{it+1}$ (BB)	$BLEV_{it+1}$ (AB)
$H\_DAK_{it}*BLEV_{it}$	0.0481** (2.24)	0.0699*** (8.10)	-0.0557** (-2.28)	-0.0792*** (-6.67)
$H\_DAPC_{it}*BLEV_{it}$	0.0543*** (2.68)	0.0619** (2.36)	-0.0556** (-2.31)	-0.0678** (-2.33)
$H\_ACFO_{it}*BLEV_{it}$	0.0401*** (2.70)	0.0231** (2.18)	-0.0489*** (-5.74)	-0.0327*** (-3.98)
$H\_APROD_{it}*BLEV_{it}$	0.0359** (3.17)	0.0622*** (6.34)	-0.0418** (-2.41)	-0.0711*** (-7.78)
$H\_ADISEXP_{it}*BLEV_{it}$	-0.0090 (-0.98)	0.0583* (1.77)	-0.0077 (-1.09)	-0.0681** (-2.24)
$H\_RMPC_{it}*BLEV_{it}$	0.0247** (2.41)	0.0575** (2.25)	-0.0309** (-2.33)	-0.0611** (-2.04)
Panel B: Market leverage	**Sub-panel B.1:** Over-levered firms (#obs=2195)		**Sub-panel B.2:** Under-levered firms (#obs=1991)	
	$MLEV_{it+1}$ (BB)	$MLEV_{it+1}$ (AB)	$MLEV_{it+1}$ (BB)	$MLEV_{it+1}$ (AB)
$MLEV_{it}$	0.5834*** (5.58)	0.5907*** (14.06)	0.6555*** (20.33)	0.6641*** (13.72)
$H\_DAJ_{it}*MLEV_{it}$	0.0049 (0.057)	0.0192* (1.76)	-0.0011 (-1.19)	0.0023 (1.09)
$H\_DAMJ_{it}*MLEV_{it}$	0.0480** (2.51)	0.0210*** (5.08)	-0.0498** (-2.17)	-0.0247*** (-8.70)
$H\_DAK_{it}*MLEV_{it}$	0.0953*** (3.29)	0.0155 (1.07)	-0.0980*** (-4.80)	-0.0152* (-1.79)
$H\_DAPC_{it}*MLEV_{it}$	0.0947*** (4.43)	0.0279** (2.26)	-0.0951** (-2.44)	-0.0320*** (-9.93)
$H\_ACFO_{it}*MLEV_{it}$	0.0841*** (7.19)	0.0616*** (6.38)	-0.0937*** (-10.07)	-0.0652*** (-5.20)
$H\_APROD_{it}*MLEV_{it}$	0.0613*** (4.34)	0.0206* (1.83)	-0.0701*** (-5.29)	-0.0288** (-2.33)
$H\_ADISEXP_{it}*MLEV_{it}$	-0.0067 (-0.87)	0.0052* (1.73)	-0.0074* (-1.86)	-0.0054* (-1.69)
$H\_RMPC_{it}*MLEV_{it}$	0.0414** (2.30)	0.0588*** (6.06)	-0.0450** (2.16)	-0.0668** (2.55)

Sub-panel A.1 (A.2) in Table 8 reports the estimation results of the model (9) which compare adjustment speed for book leverage in high REM firms based on abnormal CFO (abnormal PROD), calculated using model (4) (model (5)) with other firms. Furthermore, Sub-panel A.3 reports the results based on abnormal DISEXP calculated using model (6) and Sub-panel A.4 reports the results based on our overall proxy for REM. Sub-panel A.1 (A.2) in Table 8 reports that the coefficient estimates on the interaction term $\mathrm{H\_ACFO_{it}} * \mathrm{BLEV_{it}}$ ($\mathrm{H\_APROD_{it}} * \mathrm{BLEV_{it}}$) using BB is 0.0485 (0.0389), and AB is 0.0304 (0.0656), which are positive and significant, indicating that compared with other firms, adjustment speed for book leverage is slower in high REM firms. In Sub-panel A.3, only the coefficient estimates on the interaction term $\mathrm{H\_ADISEX_{it}} * \mathrm{BLEV_{it}}$ using AB (0.0824) is positive and significant. In addition, Sub-panel A.4, which reports the results on our overall REM metric shows that the coefficient estimates on interaction term $\mathrm{H\_RMPC_{it}} * \mathrm{BLEV_{it}}$ using BB (0.0298) and AB (0.0533) are significantly positive at 10% level. Furthermore, the Sargan-Hansen over-identification test shows that all of our instruments are valid and the Arellano-Bond test for autocorrelation in differenced residuals show that the GMM models do not suffer from the second-order autocorrelation.

Sub-panel B.1 (B.2) in Table 8 reports that the estimated coefficients on the interaction term $\mathrm{H\_ACFO_{it}} * \mathrm{MLEV_{it}}$ ($\mathrm{H\_APROA_{it}} * \mathrm{MLEV_{it}}$) using BB is 0.0401 (0.0266), and AB is 0.0346 (0.0499), which are positive and significant, showing that the market leverage adjustment speed in high REM firms is slower than that of other firms. However, in Sub-panel B.3, only the estimated coefficient on the interaction term $\mathrm{H\_ADISEXP_{it}} * \mathrm{MLEV_{it}}$ is significantly positive for AB (0.0740). Sub-panel B.4 shows that the coefficient estimates on the interaction term $\mathrm{H\_RMPC_{it}} * \mathrm{BLEV_{it}}$ using BB (0.0232) and AB (0.0240) are positive and significant. Compared with Sub-panel A.3 and Sub-Panel B.3, other sub-panels in Table 8 provide stronger evidence in support of **Hypothesis I.**

4.7 Earnings Management and Leverage Adjustment Speed in Over/Under-Levered Firms

Panel A (Panel B) in Table 8 reports the estimation results of the model (9) in over and under-levered firms using book leverage (market leverage) for the next period as the dependent variable. Saving the space, this table only reports the estimated coefficients on lagged leverage and interaction terms. Specifically, the shaded rows report the coefficient estimates on lagged book (market) leverage (i.e., $1 - \lambda$) and un-shaded rows report the coefficient estimates on interaction term (i.e., η_2) in the model (9). In each sub-panel, the first and the second column present the regression results of the model (9) using BB and AB estimators, respectively. Industry and year effects are controlled by adding industry and year dummies to the regression models. The robust t-statistics (enclosed in parentheses) are calculated using standard errors corrected for firm-level clustering. For over-levered firms, the coefficient estimates in the shaded row of Sub-Panel A.1 (Sub-Panel B.1) indicate that the adjustment speed for book leverage (market leverage) is about 31% (41%). In addition, for under-levered firms, reported results in Sub-Panel A.2 (Sub-Panel B.2) show that the adjustment speed for book leverage (market leverage) is about 22% (34%).

Hypothesis IIa predicts that for over-levered firms, the adjustment speed is slower for firms with higher level of earnings management than for other firms. Consistent with this, reported results in Sub-Panel A.1 show that the coefficient estimates on interaction terms (except for $\mathrm{H\_DAJ_{it}} * \mathrm{BLEV_{it}}$ in AB and $\mathrm{H\_ADISEXP_{it}} * \mathrm{BLEV_{it}}$ in BB) are positive and significant, indicating that the coefficient on lagged leverage is higher for firms in the top quartile than firms in the other quartiles sorted by AEM and REM metrics, and thus, they show a slower leverage adjustment speed. Furthermore, reported results in Sub-Panel B.1 shows that the coefficient estimates on interaction terms (except for

$H\_DAJ_{it} * BLEV_{it}$ and $H\_ADISEXP_{it} * BLEV_{it}$ in AB) are positive and significant. These results generally provide evidence in support of **Hypothesis IIa.** For under-levered firms, **Hypothesis IIb** predicts a negative coefficient estimates on the interaction term in the model (9). Consistent with this, reported results in Sub-Panel A.2 show that the coefficient estimates on interaction terms (except for $H\_DAJ_{it} * MLEV_{it}$ in BB and AB, and $H\_ADISEXP_{it} * MLEV_{it}$ in BB) are negative and significant, implying that in under-levered firms, the adjustment speed is faster for firms with higher level of real and accrual-based earnings management than for other firms. Also, the results in Sub-Panel B.2 show that the coefficient estimates on interaction terms (except for $H\_DAJ_{it} * MLEV_{it}$) are negative and significant. The results in sub-Panels A.2 and B.2 generally provide evidence in support of **Hypothesis IIb.**

Table 9: Additional Robustness Tests

	Full sample (Hypothesis I: $\eta_2 > 0$)		Over-levered firms (Hypothesis IIa: $\eta_2 > 0$)		Under-levered firms (Hypothesis IIb: $\eta_2 < 0$)	
	$BLEV_{it+1}$ (BB)	$MLEV_{it+1}$ (BB)	$BLEV_{it+1}$ (BB)	$MLEV_{it+1}$ (BB)	$BLEV_{it+1}$ (BB)	$MLEV_{it+1}$ (BB)
$H\_DAPC_{it}*BLEV_{it}$	0.0297*** (2.89)		0.0368*** (6.14)		-0.0393*** (-5.50)	
$H\_RMPC_{it}*BLEV_{it}$	0.0221** (2.38)		0.0420** (2.16)		-0.0419*** (-7.28)	
$H\_DAPC_{it}*MLEV_{it}$		0.0303*** (5.94)		0.0377*** (6.21)		-0.0370** (-2.35)
$H\_RMPC_{it}*MLEV_{it}$		0.0216* (1.87)		0.0161 (1.28)		-0.0465* (-1.91)
	Full sample (Hypothesis I: $\eta_2 > 0$)		Over-levered firms (Hypothesis IIa: $\eta_2 > 0$)		Under-levered firms (Hypothesis IIb: $\eta_2 < 0$)	
	$BLEV_{it+1}$ (BB)	$MLEV_{it+1}$ (BB)	$BLEV_{it+1}$ (BB)	$MLEV_{it+1}$ (BB)	$BLEV_{it+1}$ (BB)	$MLEV_{it+1}$ (BB)
Panel B: Alternative sample periods						
	Full sample (Hypothesis I: $\eta_2 > 0$)		Over-levered firms (Hypothesis IIa: $\eta_2 > 0$)		Under-levered firms (Hypothesis IIb: $\eta_2 < 0$)	
Sub-Panel B.1: (Pre-EU & U.S. sanctions)						
$H\_DAPC_{it}*BLEV_{it}$	0.0301** (2.20)		0.0857*** (9.93)		-0.0671* (-1.87)	
$H\_RMPC_{it}*BLEV_{it}$	0.0455** (2.05)		0.0411** (2.54)		-0.0497*** (-4.62)	
$H\_DAPC_{it}*MLEV_{it}$		0.0334* (1.93)		0.0137* (1.87)		-0.0183*** (-3.31)
$H\_RMPC_{it}*MLEV_{it}$		0.0283*** (7.28)		0.0423*** (4.26)		-0.0380** (-2.25)
Sub-Panel B.2: (During-EU & U.S. sanctions)						
$H\_DAPC_{it}*BLEV_{it}$	0.0289** (2.36)		0.0378* (1.93)		-0.0311** (-2.08)	
$H\_RMPC_{it}*BLEV_{it}$	0.0279* (1.92)		0.0509 (1.33)		-0.0277 (-1.30)	
$H\_DAPC_{it}*MLEV_{it}$		0.0317* (1.78)		0.0314** (2.11)		-0.0292* (-1.84)
$H\_RMPC_{it}*MLEV_{it}$		0.0291* (1.77)		0.0110 (0.30)		-0.0214 (-1.32)

4.8 Additional Analysis

To check the robustness of our main findings, we employ (1) an alternative set of leverage determinants from Zhou et al. [68] and (2) alternative sample periods, including Pre-EU & U.S. sanctions and

During-EU & U.S. sanctions. To save space, we only report the coefficients estimates on interaction term (i.e., η_2) in the model (9) for our overall proxies for AEM and REM, including H_DAPC_{it} and H_RMPC_{it}, respectively. We provide results in Table 9.

An alternative set of target leverage determinants: In our main analyses, we use the nine factors applied in [23, 47] as the target leverage determinants. To check the sensitivity of our findings to an alternative set of leverage determinants, we employ the variables used in [68]. Compared with the main results in tables 6 and 7, the results in Panel A in Table 9 for full sample strongly confirm that firms with a higher level of AEM and REM have a slower leverage adjustment speed than other firms. Furthermore, compared with the main results in Table 8, reported results for over-levered (under-levered) firms in Panel A in Table 9 confirm that firms with a higher level of AEM and REM have a slower (faster) leverage adjustment speed than other firms. The reported findings for the full sample, over-levered firms, and under-levered firms provide consistent results and evidence in support of **Hypothesis I, Hypothesis IIa** and **Hypothesis IIb,** respectively.

Alternative sample periods considering EU & U.S. economic sanctions: Over the years, firms will probably make their capital structure decisions in different market conditions. For Iranian firms, EU & U.S. economic sanctions may affect capital structure decisions, adjustment costs, and consequently, leverage adjustment speed. Therefore, we check the robustness of our key results in two sub-sample periods (Pre-EU & U.S. sanctions) and (during-EU & U.S. sanctions). Sub-Panel B.1 (Sub-Panel B.2) in Table 9 presents robustness testing results for pre-EU & U.S. sanctions (during-EU & U.S. sanctions). In full sample, our results are robust in two new sample periods and provide additional evidence in support of **Hypothesis I**. However, it should be noted that in over-levered (under-levered) firms, the coefficient estimates on $H\_RMPC_{it} * BLEV_{it}$ and $H\_RMPC_{it} * MLEV_{it}$ is not significant and thus we cannot find strong evidence in support of **Hypothesis IIa** (**Hypothesis IIb**).

5 Discussion and Conclusions

In this paper, we examine whether the firms' leverage adjustment speed is influenced by AEM and REM. We also investigate the influence of AEM and REM on the speed of adjustment in over-levered and under-levered firms. Our sample consists of firms listed in Tehran Stock Exchange, and we retrieve data for 4508 firm-year observations from CODAL, RDIS, and Rahavard Nowin for the period 2007 to 2019. According to the previous literature, we infer our AEM metrics based on Jones model, Modified Jones model and ROA-Adjusted accrual model [18, 35, 39]. We also extract our REM metrics based on Roychowdhury [57], Cohen et al. [14] and Cupertino et al. [17]. In addition, we use the first principal component of our three AEM (REM) metrics as an overall measure for AEM (REM). Furthermore, following [3, 23], we use book leverage and market leverage as our metrics for firms' leverage ratio. Adopting the system-GMM and the difference-GMM as our estimators, we report two novel results. First, we find that firms with a higher level of AEM and REM tend to adjust their actual leverage toward the target slower than that of other firms.

Second, for over (under) levered firms, we show that the leverage adjustment speed in firms with a higher level of AEM and REM is slower (faster) than that of other firms. To confirm our analysis, we conduct some robustness checks. Our findings are robust to a variety of different proxies for AEM and REM, two measures of capital structure, an alternative set of leverage determinants, alternative sample periods considering EU & U.S. economic sanctions, and different approaches in model estimation. Our results show that across all sample firms, the leverage adjustment speed for firms with a higher level of earnings management is slower than that of other firms. However, when we split the full sample into over-levered and under-levered firms, we obtained asymmetric results. We find that when the capital structure is over-leveraged (under-leveraged), firms with a higher level of earnings management have a slower (faster) adjustment speed compared to other firms. To ensure the robustness of our results, we use different proxies for accrual-based and real earnings management, two measures for firms' leverage ratio, an alternative set of leverage determinants, alternative sample periods and different estimation methods. Our findings are comparable to results in Abad et al., [1], Liao, Mukherjee and Wang [45], and Öztekin and Flannery [55].

References

[1] Abad, D., Cutillas-Gomariz, M.F., Sánchez-Ballesta, J.P., Yagüe, J., *Real earnings management and information asymmetry in the equity market*, European Accounting Review, 2018, **27**(2), P. 209-235. Doi: 10.1080/09638180.2016.1261720

[2] Aflatooni, A., Mansouri, K., *Opaque information, deviation from target leverage and speed of adjustment*, Advances in Mathematical Finance and Applications, 2019, **4**(2), P. 15-29. Doi: 10.22034/amfa.2019.585872.1191

[3] An, Z., Li, D., Yu, J., *Earnings management, capital structure, and the role of institutional environments,* Journal of Banking and Finance, 2016, **68**(1), P. 131-152. Doi: 10.1016/j.jbankfin.2016.02.007

[4] Anagnostopoulou, S.C., Tsekrekos, A.E., *The effect of financial leverage on real and accrual-based earnings management*, Accounting and Business Research, 2017, **47**(2), P. 191-236. Doi: 10.1080/00014788.2016.1204217

[5] Arellano, M., Bond, S., *Some tests of specification for panel data: Monte-Carlo evidence and an application to employment equations*, Review of Economic Studies, 1991, **58**(2), P. 277–297. Doi: 10.2307/2297968

[6] Baker, M., Wurgler, J., *Market timing and capital structure*, The Journal of Finance, 2002, **57**(1), P. 1-32. Doi: 10.1111/1540-6261.00414

[7] Bazrafshan, E., Kandelousi, A.S., Hooy, C.W., T*he impact of earnings management on the extent of disclosure and true financial performance: Evidence from listed firms in Hong Kong,* The British Accounting Review, 2016, **48**(2), P. 206-219. Doi: 10.1016/j.bar.2015.09.001

[8] Bhattacharya, N., Desai, H., Venkataraman, K., *Does earnings quality affect information asymmetry? Evidence from trading costs,* Contemporary Accounting Research, 2013, **30**(2), P. 482-516. Doi: 10.1111/j.1911-3846.2012.01161.x

[9] Bhattacharya, U., Daouk, H., Welker, M., *The world price of earnings opacity*, The Accounting Review, 2003, **78**(3), P. 641-678. www.jstor.org/stable/3203220

[10] Blundell, R., Bond, S., *Initial conditions and moment restrictions in dynamic panel data models*, Journal of Econometrics, 1998, **87**(1), P. 115-143. Doi: 10.1016/S0304-4076(98)00009-8

[11] Byoun, S., *How and when do firms adjust their capital structures toward targets?* Journal of Finance, 2008, **63**(6), P. 3069-3096. Doi: 10.1111/j.1540-6261.2008.01421.x

[12] Cassell, C.A., Huang, S.X., Manuel Sanchez, J., Stuart, M.D., *Seeking safety: The relation between CEO inside debt holdings and the riskiness of firm investment and financial policies*, Journal of Financial Economics, 2012, **103**(3), P. 588-610. Doi: 10.1016/j.jfineco.2011.10.008

[13] Chang, Y.K., Chou, R.K., Huang, T.H., *Corporate governance and the dynamics of capital structure: New evidence*, Journal of Banking and Finance, 2014, **48**(1), P. 374-385. Doi: 10.1016/j.jbankfin.2014.04.026

[14] Cohen, D.A., Dey, A., Lys, T.Z., *Real and accrual-based earnings management in the pre-and post-Sarbanes-Oxley periods*, The Accounting Review, 2008, **83**(3), P. 757-787.

[15] Coles, J.L., Daniel, N.D., Naveen, L., *Managerial incentives and risk-taking*, Journal of Financial Economics, 2006, **79**(2), P. 431-468. Doi: 10.1016/j.jfineco.2004.09.004

[16] Cook, D.O., Tang, T., *Macroeconomic conditions and capital structure adjustment speed*, Journal of Corporate Finance, 2010, **16**(1), P. 73-87. Doi: 10.1016/j.jcorpfin.2009.02.003

[17] Cupertino, C.M., Martinez, A.L., da Costa Jr, N.C., *Earnings manipulations by real activities management and investors' perceptions*, Research in International Business and Finance, 2015, **34**(1), P.309-323. Doi: 10.1016/j.ribaf.2015.02.015

[18] Dechow, P.M., Sloan, R.G., Sweeney, A.P., *Detecting earnings management*, The Accounting Review, 1995, **70**(2), P. 193-225. https://www.jstor.org/stable/248303

[19] Devos, E., Rahman, S., Tsang, D., *Debt covenants and the speed of capital structure adjustment*, Journal of Corporate Finance, 2017, **45**(1), P. 1-18. Doi: 10.1016/j.jcorpfin.2017.04.008

[20] Elsas, R., Florysiak, D., *Heterogeneity in the speed of adjustment toward target leverage*, International Review of Finance, 2011, **11**(2), P. 181-211. Doi: 10.1111/j.1468-2443.2011.01130.x

[21] Faulkender, M., Flannery, M.J., Hankins, K.W., Smith, J.M., *Cash flows and leverage adjustments*, Journal of Financial Economics, 2012, **103**(3), P. 632-646. Doi: 10.1016/j.jfineco.2011.10.013

[22] Flannery, M.J., Hankins, K.W., *Estimating dynamic panel models in corporate finance*, Journal of Corporate Finance, 2013, **19**, P. 1-19. Doi: 10.1016/j.jcorpfin.2012.09.004

[23] Flannery, M.J., Rangan, K.P., *Partial adjustment toward target capital structures*, Journal of Financial Economics, 2006, **79**(3), P. 469-506. Doi: 10.1016/j.jfineco.2005.03.004

[24] Frank, M.Z., Goyal, V.K., *Capital structure decisions: Which factors are reliably important?* Financial Management, 2009, **38**(1), P. 1-37. Doi: 10.1111/j.1755-053X.2009.01026.x

[25] Frank, M.Z., Shen, T., *Common factors in corporate capital structure*, 2013, Doi:10.2139/ssrn.2288767

[26] Graham, J.R., Harvey, C.R., *The theory and practice of corporate finance: evidence from the field*, Journal of Financial Economics, 2001, **60**(2), P. 187-243. Doi: 10.1016/S0304-405X (01)00044-7

[27] Graham, J.R., Leary, M.T., *A review of empirical capital structure research and directions the future*, Annual Review of Financial Economics, 2011, **3**, P. 309-345. Doi: 10.1146/annurev-financial-102710-144821

[28] Halling, M., Yu, J., Zechner, J., *Leverage dynamics over the business cycle*, Journal of Financial Economics, 2016, **122**(1), P. 21-41. Doi: 10.1016/j.jfineco.2016.07.001

[29] Healy, P.M., Wahlen, J.M., *A review of the earnings management literature and its implications for standard setting*, Accounting Horizons, 1999, **13**(4), P. 365-383. Doi: 10.2308/acch.1999.13.4.365

[30] Hirshleifer, D., Thakor, A.V., *Managerial conservatism, project choice, and debt*, The Review of Financial

Studies, 1992, **5**(3), P. 437-470. Doi: 10.1093/rfs/5.3.437

[31] Holmström, B., *Managerial incentive problems: A dynamic perspective*, The Review of Economic Studies, 1999, **66**(1), P. 169-182. Doi: 10.1111/1467-937X.00083

[32] Huang, R., Ritter, J.R., *Testing theories of capital structure and estimating the speed of adjustment*, The Journal of Financial and Quantitative Analysis, 2009, **44**(2), P. 237-271.

[33] Hussain, H.I., Ali, M., Hassan, M.K., El-Khatib, R., *Asymmetric capital structure speed of adjustment, equity mispricing and Shari'ah compliance of Malaysian firms*, International Review of Economics Finance, 2020, In Press. Doi: 10.1016/j.iref.2020.10.017

[34] Jensen, M.C., Meckling, W.H., *Theory of the firm: managerial behavior, agency costs and ownership structure*, Journal of Financial Economics, 1976, **3**(4), P. 305-360. Doi: 10.1016/0304-405X(76)90026-X

[35] Jiang, F., Jiang, Z., Huang, J., Kim, K.A., Nofsinger, J.R., *Bank competition and leverage adjustments*, Financial Management, 2017, **46**(4), P. 995-1022. Doi: 10.1111/fima.12174

[36] Jones, J.J., *Earnings management during import relief investigations*, Journal of Accounting Research, 1991, **29**(2), P. 193-228. Doi: 10.2307/2491047

[37] Kayhan, A., Titman, S., *Firms' histories and their capital structures*, Journal of Financial Economics, 2007, **83**(1), P. 1-32. Doi: 10.1016/j.jfineco.2005.10.007

[38] Kini, O., Williams, R., *Tournament incentives, firm risk, and corporate policies*, Journal of Financial Economics, 2012, **103**(2), P. 350-376. Doi: 10.1016/j.jfineco.2011.09.005

[39] Korajczyk, R.A., Levy, A., *Capital structure choice: macroeconomic conditions and financial constraints*, Journal of Financial Economics, 2003, **68**(1), P. 75-109. Doi: 10.1016/S0304-405X(2)00249-0

[40] Kothari, S., Leone, A., Wasley, C., *Performance matched discretionary accrual measures*, Journal of Accounting and Economics, 2005, **39**(1), P. 35-50. Doi: 10.1016/j.jacceco.2004.11.002

[41] Lang, M., Lins, K.V., Maffett, M., *Transparency, liquidity, and valuation: International evidence on when transparency matters most*, Journal of Accounting Research, 2012, **50**(3), P. 729-774. Doi: 10.1111/j.1475-679X.2012.00442.x

[42] Leary, M.T., Roberts, M.R., *Do firms rebalance their capital structures?* The Journal of Finance, 2005, **60**(6), P. 2575-2619. Doi: 10.1111/j.1540-6261.2005.00811.x

[43] Lemmon, M.L., Roberts, M.R., Zender, J.F., *Back to the beginning: persistence and the cross-section of corporate capital structure*, The Journal of Finance, **63**(4), 2008, P. 1575-1608. Doi: 10.1111/j.1540-6261.2008.01369.x

[44] Lewellen, K., *Financing decisions when managers are risk averse*, Journal of Financial Economics, 2006, **82**(3), P. 551-589. Doi: 10.1016/j.jfineco.2005.06.009

[45] Liao, L.K., Mukherjee, T., Wang, W., *Corporate governance and capital structure dynamics: An empirical study,* Journal of Financial Research, 2015, **38**(2), P. 169-192. Doi: 10.1111/jfir.12057

[46] Lockhart, G.B., *Credit lines and leverage adjustments,* Journal of Corporate Finance, 2014, **25**, P. 274-288. Doi: 10.1016/j.jcorpfin.2013.12.011

[47] Marchica, M.T., Mura, R., *Financial flexibility, investment ability and firm value: evidence from firms with spare debt capacity,* Financial Management, 2010, **39**(4), P. 1339-1365. Doi: 10.1111/j.1755-053X.2010.01115.x

[48] Mashayekhi, B., Mashayekh, S., *Development of accounting in Iran*, The International Journal of Accounting, 2008, **43**(1), P. 66-86. Doi: 10.1016/j.intacc.2008.01.004

[49] Miller, E.M., *Risk, uncertainty, and divergence of opinion*, The Journal of Finance, 1977, **32**(4), P. 1151-1168. Doi: 10.2307/2326520

[50] Modigliani, F., Miller, M., *The cost of capital, corporation finance and the theory of investment*, American Economic Review, 1958, **49**(4), P. 261-275. https://www.jstor.org/stable/1809766

[51] Myers, S.C., *The capital structure puzzle*, The Journal of Finance, 1984, **39**(3), P. 574-592. Doi: 10.1111/j.1540-6261.1984.tb03646.x

[52] Neffati, A., Fred, I.B., Schalck, C., *Earnings management, risk and corporate governance in US companies,* Corporate Ownership and Control, 2011, **8**(2), P. 170-176. Doi: 10.22495/cocv8i2c1p2

[53] Nguyen, C., *Essays on corporate capital structure and cash holdings*, The University of Manchester (United Kingdom), 2012.

[54] Öztekin, Ö., *Capital structure decisions around the world: Which factors are reliably important?* Journal of Financial and Quantitative Analysis, 2015, **50**(3), P. 301-323. Doi: 10.1017/S0022109014000660

[55] Öztekin, Ö., Flannery, M.J., *Institutional determinants of capital structure adjustment speeds*, Journal of Financial Economics, 2012, **103**(1), P. 88-112. Doi: 10.1016/j.jfineco.2011.08.014

[56] Petacchi, R., *Information asymmetry and capital structure: evidence from Regulation FD*, Journal of Accounting and Economics, 2014, **59**(2-3), P. 143-162. Doi: 10.1016/j.jacceco.2015.01.002

[57] Roychowdhury, S., *Earnings management through real activities manipulation*, Journal of Accounting and Economics, 2006, **42**(3), P. 335-370. Doi: 10.1016/j.jacceco.2006.01.002

[58] Safari Gerayli, M., *Comparability of financial reports and negative skewness of firm-specific monthly returns: evidence from Iranian firms*, Advances in Mathematical Finance and Applications, 2021, **6**(1), P. 153-165. Doi: 10.22034/amfa.2019.1864043.1196

[59] Serfling, M. A., *CEO age and the riskiness of corporate policies*, Journal of Corporate Finance, 2014, **25**, P. 251-273. Doi: 10.1016/j.jcorpfin.2013.12.013

[60] Shivdasani, A., Stefanescu, I., *How do pensions affects corporate capital structure decisions?* The Review of Financial Studies, 2010, **23**(3), P. 1287-1323. Doi: 10.1093/rfs/hhp094

[61] Strebulaev, I.A., *Do tests of capital structure theory mean what they say?* The Journal of Finance, 2007, **62**(4), P. 1747-1787. Doi: 10.1111/j.1540-6261.2007.01256.x

[62] Synn, C., Williams, C., *Financial reporting quality and optimal capital structure*, The 8th CAPANA Annual Research Conference. www.capana.net /www/ conference 2015/synn Williams.pdf.

[63] Tone, K., Toloo, M., Izadikhah, M., *A modified slacks-based measure of efficiency in data envelopment analysis*, European Journal of Operational Research, 2020, **287**(2), P. 560-571, Doi: 10.1016/j.ejor.2020.04.019.

[64] Uysal, V.B., *Deviation from the target capital structure and acquisition choices*, Journal of Financial Economics, 2011, **102**(3), P. 602-620. Doi: 10.1016/j.jfineco.2010.11.007

[65] Welch, I., *Capital structure and stock returns*, Journal of Political Economy, 2004, **112**(1), P. 106-131. Doi: 10.1086/379933

[66] Yazdi, H., Mohammadian, M., *Effect of profitability indices on the capital structure of listed companies in Tehran Stock Exchange*, Advances in Mathematical Finance and Applications, 2017, **2**(3), P.1-11, Doi: 10.22034/amfa.2017.533085

[67] Zalaghi, H., Godini, M., mansouri, K., *The moderating role of firms characteristics on the relationship between working capital management and financial performance*, Advances in Mathematical Finance and Applications, 2019, **4**(1), P. 71-88. Doi: 10.22034/amfa.2019.581878.1158

[68] Zhou, Q., Keng Tan, K.J., Faff, R., Zhu, Y., *Deviation from target capital structure cost of equity and speed of adjustment*, Journal of Corporate Finance, 2016, **39**(1), P. 99-120. Doi: 10.1016/j.jcorpfin.2016.06.002