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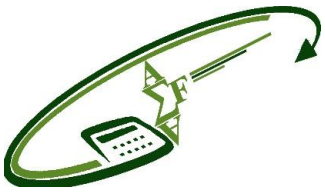

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Opaque Information, Deviation from Target Leverage and Speed of Adjustment

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ABSTRACT

Information opacity leads to information asymmetry. In this situation, in providing their own financial needs, firms face limitations and inevitably provide their financial needs from the debt market by signalling private information to it. In addition, information opacity affects the leverage adjustment speed. This research investigates the effect of information opacity on deviation from target leverage and its' adjustment speed during 2003 - 2017 in 131 firms listed in Tehran Stock Exchange. To estimate the research models, we use the regression analysis with panel data approach, the approach to control the effects of years and industries and the generalized method of moments with system estimator (system GMM). The research results show that the increase in information opacity increases (decreases) the positive (negative) deviation from target leverage. Also, research findings indicate that the increase in information opacity decreases the adjustment speed.

1 Introduction

In the theories about firms' leverage, the concept of target (optimal) leverage plays a fundamental role. According to trade-off theory, target leverage is resulted from balancing the debt tax shield and the bankruptcy costs; and if the adjustment of the leverage does not impose any charge on firm, it minimizes any deviation from the target leverage as soon as possible. The dynamic version of the trade-off theory highlights the role of adjustment costs in leverage-related decisions. In this version, if there is a deviation between the actual and the optimal leverage, firms will balance the benefits and costs of adjustment. Adjustment costs include explicit costs (such as the cost of issuing securities) and implicit costs (such as the opportunity cost related to deviations from target leverage) [22]. If the adjustment costs are high, the firm may not adjust its sub-optimal leverage, even if it is aware of its level [15]. On the other hand, information opacity leads to adverse selection and information inefficiency in the capital market [3]. Information opacity is of factors that increase the deviation from target leverage [35]. More explicitly, an increase in information opacity increases the information asymmetry, intensifies the problems of adverse selection and increases deviation from the optimal leverage [51]. Also, increase in information opacity largely eliminates investors' chances for discovering the suitable

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investment opportunities; makes it difficult for firms to finance through financial markets, and thereby reduce the leverage adjustment speed [18, 38].

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 information opacity on leverage deviation and the speed of adjustment. Managers are usually risk-averse and pursue their own goals [23, 24, 27]. Serfling [42] believes that if managers are willing to influence the firms' risk, they should do so with tools that they control [42]. For example, to reduce the firms' risk, managers may use more conservative accounting policies, such as maintaining a lower leverage ratio [12, 32, 9, 29]. Despite the importance of information environment's transparency in explaining the variation in leverage deviation and leverage adjustment speed, internal researches (e.g., [1, 2, 40, 49, 50]) have not paid attention to this issue, which can make it doubtful that the results of the research are accurate. Therefore, this paper investigates the effect of information opacity on leverage deviation and leverage adjustment 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 and Previous Studies

Deciding on the leverage combination is one of the main duties of corporate executives. Since the firm's leverage affects its expected risk and return and affects the sensitivity of the firm's financial variables to micro and macroeconomic conditions, leverage optimality is very important for firms [13]. On the other hand, the concept of transparency is a central core of modern financial reporting and helps a user in understanding the firm's financial position and performance Information transparency can lead to investor confidence. For more than a decade, financial information transparency has become an effective factor in determining investment strategies. One of the signs of a lack of information transparency in financial markets is the existence of illegal transactions. These deals not only impede market efficiency but also tend to release asymmetric information and increase the risk of investment in capital markets [28]. Theoretical fundamental of information opacity is originated from signaling theory that was introduced by Spence [46]. He believes that the information opacity leads to information asymmetry between firms and investors, and this leads to inaccurate inferences of investors from the internal conditions of business units. Moreover, lack of transparency can lead to pessimism and moral hazard, and ultimately leads to inaccurate firm's valuation and increase the uncertainty in the capital market. This uncertainty leads to information risk for market practitioners, and financing in these circumstances requires higher returns and, consequently, higher cost of capital. This can lead to a reduction in stock price and also lead to stock illiquidity [54].

When the capital market is not informationally transparent in, due to the adverse selection problem, firms cannot fully finance their needs through the equity market, and this will lead them to finance from debt markets. Compared with equity, this increases the role of debt in leverage ratio, and leads the firm's leverage to an over-levered situation. More precisely, an increase in information opacity decreases the negative deviation from the target leverage and instead increases the positive deviation from the target leverage [48]. In addition, according to Wang et al. [52], with the reduction of information transparency, in order to meet the financial needs, following the pecking order theory; firms prefer the use of debt instruments and thereby increase the leverage ratio. Furthermore, in debt

markets, in addition to financial reports (which are a public message); creditors request more information from firms, which typically include private information [52].

According to trade-off theory, it is believed that capital market imperfections create a link between the firm's leverage and its value, and firms take positive actions to correct their deviation from optimal leverage. The adjustment speed of leverage depends on adjustment costs. If the adjustment benefits are not more than its costs, the firms will not adjustment their leverage [18]. If firms rely on outsourcing to correct their deviations from the target leverage, this costly method (as opposed to other methods) can reduce the leverage adjustment speed. In these circumstances, information opacity misleads investors in identifying good and bad investment opportunities, increases adverse selection costs, and ultimately increases the cost of outsourcing [31]. In addition, an increase in information opacity increases in the information asymmetry; reduces the ability of investors to discover appropriate investment opportunities; reduces the ability of managers to finance through equity and debt markets' and ultimately reduces the leverage adjustment speed [38].

In this line, Faulkender et al. [17] find that, by increasing the adjustment costs, information opacity can reduce the leverage adjustment speed. Drobetz and Wanzenried [16] show that an increase in the firm's growth leads to an increase in leverage deviation and the favorable economic conditions increase the leverage adjustment speed. Byoun [8] indicates that the most leverage adjustment occurs when the firms' actual leverage is higher than its target and firms face a cash deficit. Chang et al. [10] find that firms with higher reporting quality and, consequently, lower information opacity, have more flexibility in issuing stocks since by reducing the adverse selection problems, information transparency leads to the more optimal leverage. Barth et al. [7] find that an increase in information opacity increases the cost of equity capital; increases deviation from the optimal leverage and, by increasing the adjustment costs, reduces the leverage adjustment speed.

Graham and Leary [20] estimated the adjustment speed of their studied firms in the range of 10 to 40 percent. Cuong Manh [14] and Smith et al. [45] find that, compared with other firms, the capital structure of over-levered firms is being adjusted more quickly towards optimal leverage [14, 45]. Öztekin and Flannery [38] find that an increase in t information opacity and, consequently, an increase in information asymmetry, reduced the speed of adjustment. Antão and Bonfim [4] indicate that firm size is negatively associated with leverage adjustment speed. Petacchi [39] shows that an increase in information asymmetry (that results from the lack of transparency in the market), increases the cost of equity capital. Thus, firms tend to meet their financial needs through more credits, and thus, they will experience an over-leverage situation. Synn and Williams [48] show that an increase in financial reporting quality and, consequently, an increase in the level of information transparency reduce the deviation from the target leverage. The results of Öztekin [37] show that a more qualitative institutional environment increases the leverage adjustment speed. Zhou et al. [56] show that an increase in information opacity increases the cost of capital, and intensifies the deviation from optimal leverage. Findings of Supra et al. [47] show that information asymmetry between business units and an investor is one of the factors reducing the speed of adjustment.

In some internal investigations, the leverage adjustment speed is estimated at 54% (e.g., [36]) and in others about 45%. Jabbarzade kangarlouei et al. [26] show that operating cash flow has a negative and significant effect on financial leverage and its modifications, while its effect on the speed of adjustment is positive and significant. The results of Gorji and Raei [19] showed that competition in the

product market has a significant effect on leverage adjustment speed. Hashemi and Keshavarzmehr [21] find that the financial deficit and over-investment have a positive effect and firm's profitability and sales' fluctuations have a negative and significant effect on the speed of adjustment. Sheri Anaqiz et al. [44] show that there is a positive and significant relationship between financial flexibility and the speed of adjustment in under-levered firms. Ramesheh et al. [40] show that compared with other firms, over-levered firms and firms faced with the financial deficit has a quicker adjustment speed. In addition, they find that profitability and growth opportunities have a positive and significant impact on leverage adjustment speed. Aflatooni and Amirbakhtiarvand [1] find that an increase in financial reporting quality and disclosure quality of financial information decreases the level of leverage deviation. Aflatooni and Nikbakht [2] show that an increase in disclosure quality significantly increases the speed of adjustment, but an increase in financial reporting quality does not have a significant effect on leverage adjustment speed. Valizadeh Larijani and Esnaashari [50] find that matured firms tend to adjust their debt faster than others. In addition, they find that the change in firms' life-cycle reduces the speed of adjustment. Valiyan et al. [49] show that firms with the most sensitivity of asset restructuring, adjusting their actual leverage to the target leverage at a rate of 85% per annum, while the adjustment speed of firms with the least sensitivity of asset restructuring is at least 16% more than other firms.

3 Research Methodology

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

H_1: An increase in information opacity increases the total leverage deviation.
H_2: An increase in information opacity increases the positive leverage deviation.
H_3: An increase in information opacity increases the negative leverage deviation.
H_4: An increase in information opacity decreases the leverage adjustment speed.

3.1 Research Models and Variables

In the first step, we estimate Kothari et al [30] accruals model cross-sectionally (for 14 years) in the level of every 15 industries:

$$ACC_{it} = \alpha + \beta_1 1/A_{it-1} + \beta_2(\Delta REV_{it} - \Delta REC_{it}) + \beta_3 PPE_{it} + \beta_4 ROA_{it} + \varepsilon_{it} \quad (1)$$

where ACC_{it} is total accruals, ΔREV_{it} is changes in sales revenue, ΔREC_{it} is changes in receivables, PPE_{it} is property, plants and, equipment at the end of period t which are scaled by totals assets and the end of period t-1. Furthermore, ROA_{it} is asset return. After estimating model (1), we follow Hutton et al. [25] and define the sum of absolute value of residuals from model (1) at three latest periods as our metric for information opacity, $IOPACITY_{it}$, at the end of period t. More precisely, we define $IOPACITY_{it} = |\varepsilon_{it}| + |\varepsilon_{it-1}| + |\varepsilon_{it-2}|$.

To calculate the deviation from target leverage we follow Synn and Williams [48] and estimate model (2). In this model it is expected that the firm's leverage is a function of some variables as follows:

$$LEV_{it+1} = \beta_0 + \beta_1 IOB_{it} + \beta_2 SIZE_{it} + \beta_3 BTM_{it} + \beta_4 TANG_{it} + \beta_5 PROFIT_{it} + \beta_6 INF_{it} + \beta_7 ILEV_{it} + \sum_l Ind_l + \sum_m year_m + \varepsilon_{it+1} \quad (2)$$

where LEV_{it} is debt ratio (total debt to total assets) or leverage [6, 33], IOB_{it} is interest to total assets, $SIZE_{it}$ is the logarithm of total assets [55], BTM_{it} is book to market ratio (book value to market value of equity), $TANG_{it}$ is tangibility (fixed assets to total assets), $PROFIT_{it}$ is firm's profitability (operating income to total assets), INF_{it} is annual inflation rate and $ILEV_{it}$ is the mean of leverage in industry. In addition, to control the industry and year effects, $\sum_l Ind_l$ and $\sum_m year_m$ are added to model (2). After estimating model (2), the absolute value of its residuals is considered as total leverage deviation ($DLEV_{it}$). Furthermore, positive (absolute value of negative) residuals are considered as positive $OLEV_{it}$ (negative $ULEV_{it}$) leverage deviation from target leverage. Investigating the effect of information opacity on total, positive and negative leverage deviation, we estimate the models (3), (4) and (5), respectively:

$$DLEV_{it+1} = \beta_0 + \beta_1 IOPACITY_{it} + \beta_2 DIOB_{it} + \beta_3 DSIZE_{it} + \beta_4 DBTM_{it} + \beta_5 DTANG_{it} + \beta_6 DPROFIT_{it} + \beta_7 INF_{it} + \beta_8 ILEV_{it} + \sum_l Ind_l + \sum_m year_m + \varepsilon_{it+1} \quad (3)$$

$$OLEV_{it+1} = \beta_0 + \beta_1 IOPACITY_{it} + \beta_2 DIOB_{it} + \beta_3 DSIZE_{it} + \beta_4 DBTM_{it} + \beta_5 DTANG_{it} + \beta_6 DPROFIT_{it} + \beta_7 INF_{it} + \beta_8 ILEV_{it} + \sum_l Ind_l + \sum_m year_m + \varepsilon_{it+1} \quad (4)$$

$$ULEV_{it+1} = \beta_0 + \beta_1 IOPACITY_{it} + \beta_2 DIOB_{it} + \beta_3 DSIZE_{it} + \beta_4 DBTM_{it} + \beta_5 DTANG_{it} + \beta_6 DPROFIT_{it} + \beta_7 INF_{it} + \beta_8 ILEV_{it} + \sum_l Ind_l + \sum_m year_m + \varepsilon_{it+1} \quad (5)$$

Since the dependent variable of models (3), (4) and (5) are essentially the deviation of the firm's leverage from its optimal level, to achieve unbiased statics we follow Chen et al. [11] and enter the all explanatory variables of model (2) into models (3), (4) and (5) as control variables [11]. In addition, following Roychowdhury [41] the amount of control variables (except INF_{it}, $ILEV_{it}$, and $IOPACITY_{it}$) is subtracted from their average in each industry year and named them by adding "D" in the first of each notation. All other variables are defined previously. According to H_1 and H_2, it is expected that the coefficient of $IOPACITY_{it}$ will be significantly positive in models (3) and (4). In addition, according to H_3, it is expected that the coefficient of $IOPACITY_{it}$ will be significantly negative in models (5). Investigating the effect of information opacity on leverage adjustment speed, following Öztekin and Flannery [38], Zhou et al. [47] and Supra et al. [56], we use partial adjustment approach and design the model (6).

$$LEV_{it+1} = \beta_0 + \beta_1 LEV_{it} + \beta_2 H.IOPACITY_{it} + \beta_3 H.IOPACITY_{it} * LEV_{it} + \beta_4 IOB_{it} + \beta_5 SIZE_{it} + \beta_6 BTM_{it} + \beta_7 TANG_{it} + \beta_8 PROFIT_{it} + \beta_9 QTOBIN_{it} + \beta_{10} TAXR_{it} + \beta_{11} LIQ_{it} + \beta_{12} INF_{it} + \beta_{13} LGDP_{it} + \beta_{14} ILEV_{it} + \varepsilon_{it+1} \quad (6)$$

where $H.IOPACITY_{it}$ is a dummy variable and equal to 1 when $IOPACITY_{it}$ is greater than its median and is zero in other cases. In addition, $QTOBIN_{it}$ is equal to THE sum of total equity market value and book value of debt to total assets, $TAXR_{it}$ is tax effective rate (tax to earnings before tax), LI-

Q_{it} is asset liquidity (current assets to current liabilities) and $LGDP_{it}$ is the logarithm of general domestic product (GDP). Following Öztekin and Flannery [38], Zhou et al. [47] and Supra et al. [56] we use these four latest variables and other variables presented in model (6) as our control variables. Since the first lag of the dependent variable in model (6) comes with independent variables, we use a dynamic panel data approach with the generalized method of moments (GMM) estimator from Arellano and Bond [5] to estimate it. According to H_4, it is expected that the coefficient of $H.IOPACITY_{it} * LEV_{it}$ will be significantly positive.

3.2 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 2003-2017. The initial sample consists of 558 firms. We exclude firms which their end of the financial period is not 20 March as our delisted firms (183 firms), and also exclude banks, financial firms and regulated utilities from the sample (52 firms). Industry-years with fewer than eight observations (93 firms) and firm-years with a negative equity book value (94 firms) are dropped from our sample. Finally, we exclude firm-years with missing values (32 firms) and to reduce the potential impact of outliers, we winsorize all variables at the 1st and 99th percentiles. This process limits the sample to 131 firms. See Table 1 for details.

Table 1: Sample selection procedure and industry distribution

		Number of firms
Initial sample during 2003-2017		585
Delisted firms		(183)
Banks, financial firms and regulated utilities		(52)
Industry-years with fewer than eight observations		(93)
Firm-years with a negative equity book value		(94)
Firm-years with missing values		(32)
Total observations in the final analysis		131

4 Analysis and Results

Table 2 reports the descriptive statistics for the main variables. The results show that 61.1% of firms' financial resources are financed from debts and the mean for positive (negative) leverage deviation is equal to 6.1% (3.4%); showing that the studied firms often are over-levered. The mean (median) for information opacity is 0.068 (0.049) and in 6% of the firms, information opacity is higher than the average. Furthermore, results indicate that interests are 3.5% of assets; the equity book value is 52.7% of stock market value, fixed assets include 25.9% of total assets; the mean for effective tax rate is 14.2%, operating income is about 11.7% of assets; the mean for inflation rate is 16.9% and the mean for industry leverage is 0.63. Furthermore, the mean (median) for total accruals -0.013 (-0.017), changes in sales revenue -0.037 (-0.027) and changes in receivables 0.026 (0.015) are also reported in Table 2. Finally, property, plants and, equipment include 29.4% and net income is 11.4% of total assets.

Table 2: Descriptive Statistics

	Mean	Median	Max.	Min.	St.Dev
LEV_{it}	0.611	0.622	0.983	0.237	0.201
$DLEV_{it}$	0.061	0.046	0.492	0.001	0.055
$OLEV_{it}$	0.034	0.021	0.492	0.002	0.049
$ULEV_{it}$	0.031	0.010	0.343	0.001	0.050
$IOPACITY_{it}$	0.068	0.049	0.363	0.001	0.068
$H.IOPACITY_{it}$	0.059	0.000	1.000	0.000	0.235
IOB_{it}	0.035	0.029	0.120	0.003	0.027
$SIZE_{it}$	5.626	5.610	7.218	4.269	0.654
BTM_{it}	0.527	0.442	1.510	0.086	0.341
$TANG_{it}$	0.259	0.215	0.745	0.029	0.175
$TAXR_{it}$	0.142	0.154	0.236	0.006	0.069
$PROFIT_{it}$	0.117	0.109	0.362	-0.119	0.102
INF_{it}	0.169	0.154	0.348	0.090	0.073
$ILEV_{it}$	0.632	0.638	0.908	0.293	0.086
$LGDP_{it}$	6.766	6.767	6.825	6.694	0.033
$TACC_{it}$	-0.013	-0.017	0.294	-0.281	0.114
ΔREV_{it}	-0.037	-0.027	0.475	-0.605	0.212
ΔREC_{it}	0.026	0.015	0.270	-0.252	0.100
PPE_{it}	0.294	0.242	0.876	0.032	0.205
ROA_{it}	0.114	0.098	0.456	-0.192	0.130

4.1 The Results of Models

To measure the information opacity, the Kothari et al. [30] accruals model is estimated cross-sectionally (14 years) in every 15 industries, and an average of the estimated regressions is presented in Table 3. The estimation results of model (1) show that the intercept (-0.025) and the coefficient of ΔREV_{it}-ΔREC_{it} (-0.068), property, plants and, equipment (-0.089) and assets return (0.395) is significant at 1% level. The VIFs indicate that there is no collinearity between the explanatory variables of model (1). In order to reduce the possible heteroscedasticity, White's correction has been used to estimate the cross-sectional model at each industry level. The adjusted R^2 indicates that the independent variables of model (1) account for about 23% of the variations of the dependent variable. Finally, we follow Hutton et al. [25] and define the absolute value of the past three years' residuals as our measure for information opacity.

Table 3: The Average Estimated Results of Model (1) in Industry-Year Level

Variables	Coefficient	T-stat	P-value	VIF
Intercept	-0.025***	-3.489	0.001	---
$1/A_{it-1}$	-468.246	-0.651	0.515	1.003
ΔREV_{it}-ΔREC_{it}	-0.068***	-4.069	0.000	1.007
PPE_{it}	-0.089***	-5.579	0.000	1.011
ROA_{it}	0.395***	15.315	0.000	1.011
Adjusted R^2	0.232		Mean for VIF	1.008
*** denotes significance at 1% level.				

To calculate the deviation from target leverage, we estimate model (2) by controlling the industry and year effects and report the results in Table 4. The results indicate that the intercept (0.574) and the coefficient estimates of IOB_{it} (2.100), BTM_{it} (-0.089), $PROFIT_{it}$ (-0.507) and $ILEV_{it}$ (0.344) is significant at the 1%, and INF_{it} (-0.243) is significant at the 5% level, and the coefficient of $SIZE_{it}$ (-0.023) and $TANG_{it}$ (-0.118) is significant at the 10%. The results show that an increase in taxes and the mean industry leverage, and a decrease in other explanatory variables, will increase the next year leverage. The VIFs indicate that there is no collinearity in model (2), and F-stat (21.267) shows that the model (2) is significant. The amount of Durbin-Watson (1.685) does not provide convincing evidence on the existence of serial correlation issue in residuals, but LR-stat (7.304) at 5% shows that there is heteroskedasticity in residuals of model (2), and in order to alleviate this problem, we calculate the standard error of model (2) using cluster correction based on firms.

Table 4: The Estimation Results of Model (2)

Variables	**Coefficient**	**T-stat**	**P-value**	**VIF**
Intercept	0.574***	4.143	0.000	---
IOB_{it}	2.100***	8.567	0.000	1.242
$SIZE_{it}$	-0.023*	-1.746	0.081	1.472
BTM_{it}	-0.089***	-4.375	0.000	1.513
$TANG_{it}$	-0.118*	-1.791	0.074	3.057
$PROFIT_{it}$	-0.507***	-7.533	0.000	1.379
INF_{it}	-0.243**	-2.461	0.014	1.538
$ILEV_{it}$	0.344**	3.034	0.003	2.227
Year effects	Yes			
Industry effects	Yes			
Adjusted R^2	32.53%		Durbin-Watson	1.685
F-stat (P-value)	21.267 (0.00)		LR-stat (P-value)	7.304 (0.03)
*, ** and *** denote significance at the 10%, 5% and 1% level, respectively.				

The adjusted R^2 shows that the independent variables of model (2) account for about 33% of the variations of the dependent variable. After estimating model (2), the absolute value of its residuals is considered as total leverage deviation, positive (absolute value of negative) residuals are considered as positive (negative) leverage deviation from target leverage.

4.2 Testing the Research Hypotheses

In order to test H_1, H_2 and H_3, we estimate models (3), (4) and (5), respectively; and report their results in Table 5.

Table 5: The Estimation Results of Models (3), (4) and (5)

Variables		**Model (3)**			**Model (4)**			**Model (5)**	
		Coef.	**T-stat**		**Coef.**	**T-stat**		**Coef.**	T-stat
Intercept		0.054	1.652		0.083*	1.853		-0.032	-0.066
$IOPACITY_{it}$		0.083**	2.339		0.111***	2.822		-0.083***	-2.634
$DIOB_{it}$		0.161*	1.903		-0.071	-1.015		0.093	1.546
$DSIZE_{it}$		-0.007	-1.285		-0.001	-0.127		0.009***	2.627

Table 5: Continue

Variables		Model (3)			Model (4)			Model (5)	
		Coef.	**T-stat**		**Coef.**	**T-stat**		**Coef.**	**T-stat**
$DBTM_{it}$		-0.028***	-3.069		-0.006	-0.820		-0.002	-0.367
$DTANG_{it}$		-0.025	-1.255		-0.001	-0.072		-0.007	-0.390
$DPROFIT_{it}$		-0.045*	1.704		0.009	0.360		0.013	0.893
INF_{it}		-0.083	-0.531		-0.149	-0.758		0.045	0.225
$ILEV_{it}$		0.046	1.036		-0.014	-0.314		0.022	0.625
Year effects		Yes			Yes			Yes	
Industry effects		Yes			Yes			Yes	
Mean VIFs		1.769			1.756			1.759	
Adjusted R^2		64.49%			19.00%			47.85%	
F-stat		46.820***			3.436**			10.530***	
Durbin-Watson		1.794			1.902			1.785	
*, ** and *** denote significance at the 10%, 5% and 1% level, respectively.									

The estimation results of model (3) show that the coefficient of $DBTM_{it}$ (-0.028) is significant at 1%, the coefficient of $IOPACITY_{it}$ (0.083) is significant at 5%, and the coefficient of $DIOB_{it}$ (0.161) and $DPROFIT_{it}$ (-0.045) is significant at 10%. Furthermore, the results show that an increase in $IOPACITY_{it}$ and $DIOB_{it}$, and a decrease in $DBTM_{it}$ and $DPROFIT_{it}$ increases leverage deviation. Mean VIFs show that the explanatory variables in model (3) are not collinear, and F-stat (46.820) indicates that the model (3) is significant. The amount of Durbin-Watson (1.794) does not provide sufficient evidence on the existence of serial correlation issue in residuals, but LR-stat (15.107) at 1% show that there is heteroskedasticity in residuals of model (3), and in order to alleviate this problem, we calculate the standard error of model (2) using cluster correction based on firms. The adjusted R^2 shows that the independent variables of model (3) account for about 64% of the variations of the dependent variable. $\mathbf{H_1}$ predicts a positive and significant coefficient on $IOPACITY_{it}$. Consistent with this, our results reports that the coefficient estimate on $IOPACITY_{it}$ (0.083) is positive and significant, indicating that an increase in information opacity increases the total leverage deviation. This result provides more solid evidence in support of $\mathbf{H_1}$.

The estimation results of model (4) show that the intercept (0.083) is significant at 10% and the coefficient of $IOPACITY_{it}$ (0.111) is significant at 1%. In model (5), the coefficient estimates of $IOPACITY_{it}$ (-0.083) and $DSIZE_{it}$ (0.009) are significant at 1% level. In models (4) and (5), Mean VIFs show that the explanatory variables are not collinear, and F-stat indicates that these models are significant. The amount of Durbin-Watson does not provide sufficient evidence on the existence of serial correlation issue in residuals while LR-stat show that there is heteroskedasticity in residuals, and to alleviate this problem, we calculate the standard error of models using cluster correction based on firms. The adjusted R^2 shows that the independent variables of model (4) and (5) account for about 19% and 48% of the variations of the dependent variable, respectively. $\mathbf{H_2}$ ($\mathbf{H_3}$) predicts a positive (negative) and significant coefficient on $IOPACITY_{it}$ in model (4) (model 5). Consistent with this, our results show that the coefficient estimate on $IOPACITY_{it}$ is positive (negative) and significant in

model (4) (model 5); indicating that an increase in information opacity increases (decreases) the positive (negative) leverage deviation. This result provides more solid evidence in support of $\mathbf{H_2}$ and $\mathbf{H_3}$.

To test $\mathbf{H_4}$, we estimate model (6) using dynamic pane data approach and in this line, we use the generalized method of moments (GMM). The estimation results of model (6) are reported in Table 6. The results show that the coefficients of LEV_{it} (0.667), $H.IOPACITY_{it}*LEV_{it}$ (0.074), BTM_{it} (0.065), $TANG_{it}$ (0.168), $QTOBIN_{it}$ (-0.018), LIQ_{it} (0.076), $ILEV_{it}$ (0.688) are significant at 1%, the coefficients of $PROFIT_{it}$ (0.104) and INF_{it} (0.131) are significant at 5% level. The VIFs show that the explanatory variables are not collinear.

Table 6 reports the Sargan-Hansen over-identification test (with J-statistic) for the validity of instruments. The J-statistic (69.708) is not significant and this result indicates that all of our instruments are valid. Furthermore, Table 6 reports the Arellano-Bond test for autocorrelation in differenced residuals. The AR (1) and AR (2) tests yield a statistic of -3.051 and -0.223. These results show that the GMM model, does not suffer from the second-order autocorrelation. $\mathbf{H_4}$ predicts a positive and significant coefficient on $H.IOPACITY_{it}*LEV_{it}$. Consistent with this, our results report that the coefficient estimate on $H.IOPACITY_{it}*LEV_{it}$ (0.074) is positive and significant, indicating that an increase in information opacity decreases the leverage adjustment speed. This result provides sufficient evidence in support of $\mathbf{H_4}$.

Table 6: The Estimation Results of Model (6)

Variables	**Coefficient**	**T-stat**	**P-value**	**VIF**
LEV_{it}	0.667***	9.909	0.000	3.377
$IOPACITY_{it}$	0.001	0.082	0.934	1.316
$H.IOPACITY_{it}*LEV_{it}$	0.074***	2.920	0.004	1.303
IOB_{it}	-0.038	-0.322	0.747	1.321
$SIZE_{it}$	0.023	1.450	0.148	1.660
BTM_{it}	0.065***	4.865	0.000	2.735
$TANG_{it}$	0.168***	4.619	0.000	3.565
$PROFIT_{it}$	0.104**	2.325	0.021	1.651
$QTOBIN_{it}$	-0.018***	-5.320	0.000	2.598
$TAXR_{it}$	-0.001	-0.019	0.985	1.247
LIQ_{it}	0.076***	4.293	0.000	3.014
INF_{it}	0.131**	2.557	0.011	1.048
$LGDP_{it}$	-0.195	-1.565	0.118	1.564
$ILEV_{it}$	0.688***	2.841	0.005	1.423
Sargan-Hansen test (J-statistic)	69.708 (0.387)			
Arellano-Bond test for:				
AR(1) in first differences	-3.051*** (0.002)			
AR(2) in first differences	-0.223 (0.823)			
** and *** denote significance at the 5% and 1% level, respectively.				

5 Discussion and Conclusions

According to Modigliani and Miller [33], in an efficient market, firm's leverage has no impact on firm's value, but the capital market imperfections create the link between the leverage and the value of firms. In this condition, any deviation from the optimum leverage decreases the firm's value. Information opacity is of factors that affect leverage deviation [34]. In addition, information opacity will

increase the adjustment cost and reduce the speed of adjustment [38]. The results of this study indicate that an increase in information opacity increases the leverage deviation. More precisely, results show that an increase in information opacity, decreases the firm's ability to finance through equity market and so, firms tend to go to debt markets; and finally, decrease (increase) the negative (positive) deviation from the target leverage. These results are consistent with the findings of Barth et al. [1], Synn and Williams [7] and Aflatooni and Amirbakhtiarvand [48]. In addition, the research results show that the leverage adjustment speed in firms with higher information opacity is significantly lower than other firms. These results are consistent with the findings of Zhou et al. [2] and Aflatooni and nikbakht [56]. Having the optimal leverage has many advantages (such as lower cost of capital and consequently, higher firm's value), but information opacity will increase the positive deviation from target leverage and create an over-levered capital structure. Therefore, we advise to managers that by making effective decisions reduce the information opacity; and thereby create optimal leverage and finally increase the leverage adjustment speed. In addition, auditors and market supervisory authorities are also advised to reduce the information opacity by intensifying and deepening their regulatory processes and, as a result, increase the leverage adjustment speed, because, in the long run, this can increase the market's allocative efficiency.

Among the cases which limits research generalizability is using merely one model (i.e., Kotari et al., [30]) to measure the information opacity. Since different models may result in different results (or not); in order to strengthen the results, future researchers are advised to use several different models to measure the information opacity.

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