EARNINGS SMOOTHING AND EARNINGS PREDICTABILITY

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Abstract

This paper studies the relationship between earnings smoothing and earnings predictability and also between earnings smoothing and earnings persistence.

Using Tucker and Zarowin (TZ) income smoothing statistic and variance of changes in earnings and also using the simulation and bootstrapping methods, this paper studies the income smoothing behavior, earnings persistence and earnings predictability in Tehran Stock Exchange (TSE) from 2002 to the end of 2007.

The analysis of the relationship between earnings smoothing and earnings predictability (earnings persistence) relies on commonly used autoregressive regressions of current on one-year lagged earnings. Consistent with existing literature, results indicate widely held managerial beliefs that smoothing earnings increases the earnings predictability and earnings persistence.

1. Introduction

An earnings management strategy that has survived the test of time is smoothing (Buckmaster, 2001). Income smoothing has existed for decades, and there are generally two schools of thought as to what motivates managers to smooth. First, smoothing presents an arguably efficient vehicle for managers to reveal private information. Second, smoothing represents "garbling", that is, smoothing is an exercise undertaken by managers in an attempt to fool analysts and others and to enhance managerial compensation (Li and Richie, 2009). The first school of thought is reflected in the works of Ronen and Sadan (1981), Demski (1998), Sankar and Subramanyam (2001), Srinidhi, Ronen and Maindiratta (2001), Kirschenheiter and Melumad (2002), and Goel and Anjan (2003), among others. For example, Ronen and Sadan (1981) employ a signaling model and contend that only firms with good prospects elect to smooth. Essentially, the first school holds that income smoothing may aid in the revelation of private information in much the same way that dividend smoothing can occasion information revelation (Miller and Rock, 1985).

The second school of thought is reflected in the works of Beidleman (1973), Lambert (1984), Healy (1985), Fudenberg and Tirole (1995), Arya, Glover and Sunders (1998), and Demski and Frimor (1999), among others. In addition, garbling has been evidenced by some recent and high profile cases of smoothing abuse. For example, the Federal Home Loan Mortgage Corporation was found by the government to have illicitly altered the volatility mark on its put swaptions in order to achieve a smoother earnings growth profile.

Recent survey evidence is consistent with the idea that the equity market provides managers with incentives to manage earnings to achieve relatively simple earnings benchmarks and smooth earnings growth (Nelson, Elliott and Tarpley, 2002; Graham, Harvey and Rajgopal, 2005). Furthermore, there is evidence that managers directly benefit when their firms report consistent increases in earnings. As discussed above, firms reporting smooth earnings growth are priced at a premium relative to other firms, and a significant downward adjustment occurs when that growth ends.

Finally, in this paper we investigate whether financial information users understand the implications of earnings smoothing for earnings predictability and earnings persistence. We hypothesized that there is a positive relationship between earnings smoothing and earnings predictability. Using the Tucker and Zarowin (2006) statistic and variance of changes in earnings as proxies for income smoothing, we test whether smoothing earnings increases the earnings persistence and earnings predictability.

The remainder of the paper is organized as follows: section 2 presents previous related researches. Section 3 provides the research design and related theory. Section 4 presents main empirical tests and results and section 5 concludes.

2. Literature review

The smoothing literature provides a number of reasons why managers prefer to report smooth and consistent increases in earnings. Smoothing may lower investors' estimates of firms' underlying earnings volatility and risk, lowering required rates of return (Trueman and Titman, 1988).

Consistent with this, Barth, Elliott and Finn (1999) examine firms that report at least five years of increases in annual earnings and find, other things held constant, that these firms are priced at a premium to otherwise similar firms. They also find that this premium increases with the length of the string, and that the premium is reduced when the string ends. Barth et al. do not investigate whether managers of their firms engage in earnings management, other than to indicate that it seems unlikely that these firms would report such smooth earnings growth based solely on their economic performance. Hepworth (1953) states that the owners will feel more confident toward a company that reports stable earnings.

Other evidence also suggests that smoother earnings result in higher equity prices (e.g., Thomas and Zhang (2002), Francis, LaFond, Olsson and Schipper (2004)) and that the market rewards firms that consistently meet or beat analyst earnings forecasts (e.g., Bartov, Givoly, and Hayn (2002); Kasznik and McNichols (2002)) and punishes those firms that do not, especially when they are priced at relatively high multiples (Skinner and Sloan, 2002). Brown (2001) provides evidence that the proportion of firms that meet or beat analyst forecasts increased over the period 1984 to 1999, because earnings of firms with smooth and consistent earnings growth have a clear growth rate by construction. This phenomenon is also consistent with Lakonishok, Shleifer, and Vishny (1994), who suggest that investors in growth stocks tend to rely too heavily on past growth rates when extrapolating into the future.

Gordon (1964) suggests that management should smooth (within the accounting rules) reported income, for stockholder satisfaction increase with the rate of growth and stability of its income. Ronen and Sadan (1981) report that most of the rationales offered for income smoothing focus on management's desire to enhance the value of the firm's stock. Moses (1987) states that the argument for smoothing implies a direct cause-and-effect relationship between earnings fluctuations and market risk. Booth, Kallunki and Martinkainen (1996) indicate that firms that do not smooth income have higher abnormal return from earnings surprise than firms that smooth income.

Gibbons, Richardson and Waterhouse (1990) provide an intriguing discussion of corporate disclose behavior that helps explain an investor's preference for firms with smoother incomes. They state that a corporation builds a financial reputation and that consistency and credibility in disclosures are central to that reputation. Moreover, a firm's choice of accounting methods may enhance that reputation. Therefore, it follows that investors place greater value on companies with consistent (smooth) financial disclosure (earnings) than on companies with fluctuating financial statements. Chaney and Lewis (1994) develop a model that shows companies smooth income in order to signal firm value to investors. This concept of signaling was also discussed by Dye in the development of his earnings management model. Dye (1988) states that, the demand for earnings management derives from current shareholders' desire to influence prospective investors' perceptions of the firm's value.

Badrinath, Gay and Kale (1989) argue that institutional investors normally avoid companies that experience large variations in earnings or firms that are perceived as risky. Therefore, intuitional investors tend to prefer companies with smoother earnings streams. Bricker, Previts, Robinson and Young (1995) present evidence that analyst's associate earnings quality "with the capability of a company's managers to manage earnings so as to avoid negative earnings surprise".

Chaney and Lewis (1994) develop a model that shows companies smooth income in order to signal firm value to investors.

Michelson, Wagner and Wootton (2000) use risk-adjusted returns to test whether the stock market response to accounting performance measure is related to the smoothness of companies' reported earnings. The results indicate that companies that report smoothed income have significantly higher cumulative average abnormal returns than firms that do not. Also, they find that when size is considered, market returns are stronger for small companies than for large companies and there is a significant relationship between the types of industry and income smoothing. Singer (2007) show that earnings management is negatively associated with long-run stock returns.

Pourheydari and Aflatooni (2006) investigate the Iranian managers' incentive to smooth income using discretionary accruals. They find that Iranian managers, smooth income by using discretionary accruals and income taxes and deviation in operating activities are managers' derives to smooth income. They also find that firms' size, debt ratio and earnings variability are not important derives to income smoothing in TSE.

Noravesh and Sepasi (2005) examine the possible impact of culture on income smoothing in Iran. Explanatory variable capturing Hofsted (1991) cultural values are used as proxy for Individualism, Masculinity, Power Distance and Uncertainty Avoidance. It is shown that the relationship between Hofsted cultural values and income smoothing is significant for firms listed in Tehran Stock Exchange (TSE).

Haghighat and Raigan (2009) show that the Iranian investors prefer smoothed income and on this regard, managers try to smooth income and on the base one classification of management incentives for income smoothing, managers smooth incomes either for purpose of garbling of information and either benefits or in order to transforming and reporting the insider information about future earnings.

3. Research design

3.1. Presenting the earnings smoothing measures

This paper starts investigation with some theoretical considerations. The goal is to provide a simple framework that formalizes the preceding motivations and link them to the empirical analysis that follows. Similar to Tucker and Zarowin (2006) we assume that there is an innate, un-managed income series (PDI_t) and managers employ discretionary accruals (DAC_t) to smooth this raw series. The un-managed or pre-discretionary income is defined as earnings minus discretionary accruals

$$PDI_t = E_t - DAC_t \tag{1}$$

Where E_t is reported earnings and defined as net income after tax. Now, using the Δ operator we have

$$\Delta PDI_t = \Delta E_t - \Delta DAC_t \tag{2}$$

Where ΔPDI_t is defined as PDI_t-PDI_{t-1}, ΔE_t is defined as E_t-E_{t-1} and ΔDAC_t is defined as DAC_t-DAC_{t-1}. Taking the variance of both sides (2) yields (3)

$$\begin{aligned} Var(\Delta E_t) &= Var(\Delta PDI_t) + Var(\Delta DAC_t) + 2.Cov(\Delta PDI_t, \Delta DAC_t) = Var(\Delta PDI_t) + Var(\Delta DAC_t) + 2. \\ &Corr(\Delta PDI_t, \Delta DAC_t).(Var(\Delta PDI_t).Var(\Delta DAC_t))^{1/2} \end{aligned} \tag{3}$$

Where Cov(Corr) is notation for covariance (correlation) between ΔPDI_t and ΔDAC_t. The Tucker and Zarowin (2006) income-smoothing measure, Corr(ΔPDI_t, ΔDAC_t), assumes that firms with more negative correlations (and based on (3) low Var(ΔE_t)) are higher smoothing firms while firms with less negative (or positive) correlations (high Var(ΔE_t)) are lower smoothing firms. Thus, to report smoothed earnings, managers should try to minimize the variance of changes in earnings over time. Therefore, In this paper, we use two measures to identify the smoothers, Corr(ΔPDI_t, ΔDAC_t) and Var(ΔE_t).

3.2. Estimation of discretionary accruals

To calculate the TZ correlation coefficients, we should estimate discretionary accruals. To estimate discretionary accruals, similar to Tucker and Zarowin (2006), we use the cross-sectional version of the Jones (1991) model as modified by Kothari, Leone and Wasley (2005), namely:

$$Acc_{it} = a(1/Assets_{it-1}) + b\Delta Sales_{it} + cPPEit + dROA_{it} + \varepsilon_{it} \quad (4)$$

Where $Assets_{it-1}$ is the beginning-of-year total assets, Acc_{it} stands for total accruals estimated as earnings minus operating cash flows, $\Delta Sales_{it}$ is change in sales, PPE_{it} is gross property, plant and equipment, and ROA_{it} is return on assets using net income over lagged total assets. Acc_{it}, $\Delta Sales_{it}$ and PPE_{it} are each deflated by the beginning-of-year total assets ($Assets_{it-1}$). Return on assets (ROA_{it}) is added as an additional control variable, because previous research finds that the Jones model is misspecified for well-performing or poorly performing firms (Dechow, Sloan and Sweeney, 1995 and Kothari et al. 2005).

To employ a large number of observations, we estimate the regression on all firms in the same industry each year. The non-discretionary accruals ($NDAC_{it}$) are the fitted values of regression (4) and the discretionary accruals (DAC_{it}) are the deviations of actual accruals from $NDAC_{it}$.

The TZ income-smoothing measure is the correlation between the change in discretionary accruals and the change in pre-discretionary income: Corr(ΔPDI_t, ΔDAC_t), using the current year's and past five year's observations. We use annual data because there is much evidence that firms smooth period earnings and that fourth-quarter reporting is distinctively different from that of other quarters (Jacob and Jorgensen, 2003; Das and Shroff, 2002). Firms with more negative correlations are higher smoothing firms while firms with less negative (or positive) correlations are lower smoothing firms.

3.3. Linking smoothing measures to earnings persistence and predictability proxies

Now, we link two mentioned measures to earnings predictability and earnings persistence proxies. Based on Dichev and Tang (2009), the analysis of the relation between earnings volatility (as our inverse proxy for earnings smoothing) and earnings predictability relies on commonly used autoregressive regressions of current on 1-year lagged earnings:

$$E_t = a + \beta E_{t-1} + \varepsilon_t \quad (5)$$

Now, taking the variance of both sides of (5) yields, (6)

$$Var(E_t) = \beta^2 Var(E_{t-1}) + Var(\varepsilon_t) \quad (6)$$

Similar to previous research (e.g. Dichev and Tang, 2009) we assume that the earnings are stationary over time. Based on this assumption, earnings would have constant variance over time, Var(E), and then re-arranging (6), we obtain (7)

$$\mathrm{Var}(\varepsilon_t) = (1-\beta^2)\,\mathrm{Var(E)} \quad (7)$$

and or

$$\mathrm{Var(E)} = \mathrm{Var}(\varepsilon_t)/(1-\beta^2) \quad (8)$$

Where Var(E) is our proxy for earnings volatility and $\mathrm{Var}(\varepsilon_t)$ is our (inverse) proxy for earnings predictability, because the variance of the error term captures the variation in earnings remaining after accounting for the effect of the autoregressive coefficient, β. Eq. (7) is also a useful guide to the mechanism of the link between earnings volatility and earnings predictability, revealing a two-fold relation. First, holding β (earnings persistence) constant, earnings volatility is inversely related to earnings predictability. Second, this negative relation is likely strengthened through the effect of the persistence coefficient because there are reasons to believe that β itself is negatively related to volatility of earnings. For example, economic or accounting noise in earnings is likely to both increase the earnings volatility and decrease the earnings persistence.

Note that the notion of predictability captured in Var(ε) is "absolute" predictability, unadjusted for volatility in the earnings environment. If one is interested in "relative" predictability, a natural scalar for Var(ε) is Var(E). Taking (7), dividing it by Var(E), and re-arranging leads to

$$1-\mathrm{Var}(\varepsilon)/\mathrm{Var(E)} = \beta^2 \quad (9)$$

Expression (9) simply says that relative predictability is the R^2 of the regression, which is equal to the squared persistence coefficient. Thus, identifying the relation between earnings volatility and earnings persistence is a key to our investigation of both absolute and relative earnings predictability (Dichev and Tang, 2009).

Now, by subtracting E_{t-1} from both sides of (5) we also can write

$$\Delta E_t = a + (\beta-1)E_{t-1} + \varepsilon_t \quad (10)$$

Taking the variance of both sides of (10) yields (11)

$$\mathrm{Var}(\Delta E_t) = (\beta-1)^2\,\mathrm{Var}(E_{t-1}) + \mathrm{Var}(\varepsilon_t) \quad (11)$$

Assuming that the earnings are stationary over time, they would have constant variance over time and thus

$$\mathrm{Var}(\Delta E_t) = (\beta-1)^2\,\mathrm{Var(E)} + \mathrm{Var}(\varepsilon_t) \quad (12)$$

Substituting (8) in to (12) yields (13)

$$\mathrm{Var}(\Delta E_t) = (2/(1+\beta))\mathrm{Var}(\varepsilon_t) \quad (13)$$

The Eq.13 links the earnings changes volatility (our inverse proxy for smoothing) to earnings predictability. The Eq.3 and Eq.13 provide a linkage between $\mathrm{Corr}(\Delta PDI_t, \Delta DAC_t)$ and earnings predictability. In Eq.13, holding β (earnings persistence) constant, variance of change in earnings is positively related to $\mathrm{Var}(\varepsilon_t)$. Also, holding $\mathrm{Var}(\varepsilon_t)$ constant, variance of change in earnings is inversely related to β. Examining the relation between $\mathrm{Corr}(\Delta PDI_t, \Delta DAC_t)$ and $\mathrm{Var}(\varepsilon_t)$ yields similar results. Based on above discussions, we present following hypotheses:

Hypothesis 1: The earnings predictability of smoothers is higher than that of other firms.

Hypothesis 2: The earnings persistence of smoothers is higher than that of other firms.

This paper uses the insights from discussed framework for empirical tests of hypotheses research that earnings volatility is inversely related to earnings predictability. To test the hypotheses, we first divide all sample firms to five quintiles (based on each income smoothing measures) and then run regression (5) in each quintile. Finally, to test the first hypothesis we examine the statistical significance of differences for relative predictability (adjusted R^2) between first and last quintiles. Testing for difference in adjusted R^2 is problematic because it involves comparing adjusted R^2 across two essentially different regressions. Although the dependent variable looks the same (current earnings), traditional tests like the Vuong's (1989) Z test are inappropriate because the variation of the dependent variable is quite different across earnings volatility quintiles. Instead, this paper uses a test based on bootstrapping the empirical distribution of the adjusted R^2s in quintiles, suggested by Ohtani (2000). See Ohtani (2000) for a complete discussion of the bootstrap procedure. This paper repeats the procedure 1000 times; yielding 1000-observations of adjusted R^2s. The tests that compare adjusted R^2s from two different quintiles i and j are based on the following Z-statistics:

$$Z_{adj.R2} = [R^2_{Quintile(i)} - R^2_{Quintile(j)}]/[Var(R^2_{BP-Quintile(i)}) + Var(R^2_{BP-Quintile(j)})]^{1/2} \quad (14)$$

Where $R^2_{Quintile\ (i)}$ is the adjusted R_2 of regression (5) in quintile i and $Var(R^2_{BP-Quintile\ (i)})$ is the variance of adjusted R^2s from bootstrapping procedure. The $Z_{adj.R2}$ is the test statistic to examine the significance of difference between adjusted R^2s in quintile i and quintile j. Under the null hypothesis of no difference between both adjusted R^2s, these Z-statistics are approximately standard normal in large samples. One caveat of the tests is that they assume that both samples are independent. We think that this assumption could be sustainable under our analysis. In this case, the null hypothesis is that earnings smoothing is unrelated to earnings predictability.

The test for difference in persistence is a simple t-test from a regression that combines quintiles 1 and 5 observations, with dummy intercept and slope variables for quintile 5 observations. In this case, the null hypothesis is that earnings smoothing is unrelated to earnings persistence. Based on the theoretical considerations discussed above, we present the research results in following section.

4. Main empirical tests

Table 1: Cross-sectional estimation of discretionary accruals

	a	b	c	d	R^2
Mean	0.041	0.038	-0.128	0.460	0.455
Median	0.061	0.018	-0.097	0.444	0.454
Minimum	-2.941	-0.865	-0.900	-0.527	0.022
Maximum	3.119	1.643	0.708	1.565	1
Std. Dev	0.709	0.304	0.249	0.402	0.250

The table presents the summary statistics of the estimated coefficients and R2s of 66 industry-year regressions from 2002 to 2007. The Jones Model, modified by Kothari et al. (2005):

$$Acc_{it}=a(1/Assets_{it-1}) + b\Delta Sales_{it} + cPPE_{it} + dROA_{it} + \varepsilon_{it}$$

We use the 2009 version of Tadbirpardaz (the Iranian database of Tehran stock market) annual data files and choose 2002-2007 as the sample period for the test. The period begins with 2002 because 2001 is the first year in which firms are required to report cash flow statements. To have more observations on cash flows data, we use six observations of ΔDAC_{it} and ΔPDI_{it} to calculate the TZ income-smoothing measure from 2002 to 2007. Firms in the financial and regulated industries are excluded due to their unique nature of accounting.

4.1. Estimation of discretionary accruals

For this estimation, we use the data from 2002–2007 and estimate Regression (4) on each of the 66 industry-year cross-sections, we require at least 10 observations for each industry-year grouping. Table 1 presents the mean, standard deviation, median, minimum, and maximum of the coefficient estimates and R^2s. The mean coefficients on PPE_{it} (-0.128) is lower than that in Subramanyam (1996) and Tuker and Zarowin (2006) due to our additional control for earnings performance. The coefficient on ROA_{it} has a mean of 0.455, confirming that accruals are associated with firm performance. We calculate a firm's asset-deflated nondiscretionary and discretionary accruals as the fitted values and residuals, respectively.

4.2. Income-smoothing measures and data cleaning

The PDI_{it} is calculated as net income minus DAC_{it}, both deflated by the beginning-of-year total assets. A firm-year observation is deleted if its ΔDAC_{it} or ΔPDI_{it} is missing in the current year or any of the past five years. The income-smoothing measures are calculated for the remaining firm-year observations. At first, we have 2698 observations, we delete the firm-year observations that have missing data for past, current, and future four years' earnings, operating cash flows, and accruals (in this stage 518 observations are deleted). To minimize the effect of outliers, we delete the observations that are in the top or bottom 2 percent of the distributions of the above variables (in this stage 84 observations are deleted). Even with this effort, extreme outliers are still observed. We further delete the observations whose earnings, operating cash flows, or total accruals in the past, current, or any of the future four years are greater than 20 times or less than -20 times the total assets (in this stage 82 observations are deleted). These procedures result in 2014 (336) firm-years (firms) for the test. Also, the number of remained firms is equal to 336. Table 2 provides the number and percent of sample firms in 11 industry groups.

Table 2: The number of firms in industry groups

Industry Groups	Total sample	
	Num.	%
Mines	10	2.98
Food	46	13.69
Wood & Paper	18	5.36
Drugs & Chemical	58	17.26
Rubber & Plastic	14	4.17
Cement	43	12.80
Metals & Metal Products	34	10.12
House Appliances & Equipments	32	9.52
Electrics & Television	21	6.25
Auto	26	7.74
Others	34	10.12
Total	336	100

4.3. Descriptive statistics

Descriptive statistics of 2014 firm-years observations over 2002- 2007 are presented in table 4. The mean of earnings, operating cash flows and total accruals are 0.137, 0.083 and 0.045, respectively. The mean (median) of discretionary accruals is 0.002 (0.00). The mean of variance of changes in earnings is 0.112 and their quintile values are 0.046, 0.071, 0.103 and 0.153, respectively. The mean of correlation coefficients between changes in pre-discretionary accruals and changes in discretionary accruals is -0.748 and their quintile values are -1, -1, -0.975 and -929, respectively. The maximum (minimum) value of $Var(\Delta E_t)$ and $Corr(\Delta PDI_t, \Delta DAC_t)$ are 0.941 (0.007) and 1 (-1), respectively.

Table 3: Descriptive statistics (2014 firm-year observations during 2002–2007)

Variables	E_t	CFO_t	Acc_t	DAC_t	Var (ΔE_t)	Corr (ΔPDI_t, ΔDAC_t)
Mean	0.137	0.083	0.045	0.002	0.112	-0.748
Median	0.114	0.067	0.038	0.000	0.085	-0.959
Std. Dev	0.216	0.214	0.199	0.178	0.101	0.488
Minimum	-1.270	-1.374	-1.312	-1.708	0.007	-1
Q1	0.022	-0.041	-0.068	-0.104	0.046	-1
Q2	0.083	0.033	0.004	-0.027	0.071	-0.975
Q3	0.153	0.102	0.068	0.025	0.103	-0.929
Q4	0.261	0.212	0.161	0.105	0.153	-0.673
Maximum	1.440	1.356	1.316	1.073	0.941	1

Table 3 provides descriptive statistics for all observations however it is beneficial that we compare the descriptive statistics of quintiles that are formed based on Corr(ΔPDI_t, ΔDAC_t) (Var(ΔE_t)). Table 4 presents such results.

Table 4, panel A compare the means (medians) of E_t, CFO_t, Acct and DAC_t between quintiles 1 and 5 that are formed based on Corr(ΔPDI_t, ΔDAC_t). In this panel, it is more (less) probable that firms in the first (fifth) quintile manage their earnings. The mean (median) of earnings for quintiles 1 and 5 are 0.082 (0.083) and 0.168 (0.143), respectively and the difference between them is equal to -0.086 (-0.060). The results of t- test (t-stat=-3.829) and Wilcoxon Z-test (z-stat=-3.883) indicate that the difference between means (medians) of E_t in quintiles 1 and 5 is significant at the 1% level. The results also indicate that the difference between means (medians) of Acc_t in the first and fifth quintiles is significant (t-stat= -3.177 and z-stat=-3.167). Finally, the results show that the difference between mean (median) of discretionary accruals in quintiles 1 and 5 is significant at the 5% level (t-stat=-2.065 and z-stat=-2.215).

Table 4, panel B compare the means (medians) of earnings, cash from operations, total accruals and discretionary accruals between the first and fifth quintiles that are formed based on Var(ΔE_t). In panel B, it is more (less) probable that firms in the first (fifth) quintile engage in smoothing. The results indicate that the difference between means (medians) of earnings in quintiles 1 and 5 is significant, t-stat=-3.934 (z-stat=-4.800). The results also confirm the significance of differences between means (medians) of other variables (except for difference between the means of total accruals) in quintiles 1 and 5.

Overall, the results in table 4 show that there are significant differences between the values of research variables in smoother and non-smoother firms. In following section, we present the regression results for hypotheses testing.

4.4. Regression results

The results of regression analyses are presented in table 5. Table 5, panel A presents the results of regression (5) for full sample. The persistence coefficient is 0.713 and adjusted R^2 is 0.501. All β (persistence) coefficients in table 5 are significant at the 0.001 level. Table 5, panel B presents the results of regression (5) in quintiles formed based on Corr(ΔPDI_t, ΔDAC_t) . An examination of Panel B reveals that there is a strong and monotonic relation between smoothing of earnings and earnings persistence. The persistence coefficient declines from 0.920 in quintile 1 to 0.681 in quintile 5 and the adjusted R^2 declines from 0.733 in quintile 1 to 0.435 in quintile 5. These declines seem large in absolute magnitude and suggest that conditioning on earnings volatility is economically important. Panel B also provides tests of the statistical significance of these differences, specifically the differences for persistence and adjusted R^2 between quintile 1 and 5. The test statistic for difference in β coefficients (and adjusted R^2s) of quintiles 1 and 5 is significant at the 0.001 level. Results robustly reject the null hypothesis of no differences between both adjusted R^2s (persistence coefficients). Therefore, while Corr(ΔPDI_t, ΔDAC_t) increases (earnings smoothing decreases) across quintiles, persistence coefficients and adjusted R^2s significantly decline. Thus, in this case we conclude that there is a positive and significant relation between earnings smoothing and earnings predictability. Also, there is a positive relationship between smoothing and earnings persistence.

Table 4: The comparison of means and medians of variables in the first and fifth quintiles.

Panel A: The comparison of means and medians of variables in quintiles formed based on Corr(ΔPDI_t, ΔDAC_t)						
Variables	Quintile 1 Obs. =402 firm-years		Quintile 5 Obs. =408 firm-years		Difference in	
	Mean	Median	Mean	Median	Means (t-stat)	Medians (z-stat)
E_t	0.082	0.083	0.168	0.143	-0.086**	-0.060**
					(-3.829)	(-3.883)
CFO_t	0.076	0.055	0.096	0.062	-0.020	-0.008
					(-1.469)	(-1.529)
Acc_t	0.006	0.010	0.072	0.049	-0.066**	-0.038**
					(-3.177)	(-3.167)
DAC_t	-0.016	-0.011	0.014	0.009	-0.030*	-0.020*
					(-2.065)	(-2.215)
Panel B: The comparison of means and medians of variables in quintiles formed based on Var(ΔE_t)						
Variables	Quintile 1 Obs. =402 firm-years		Quintile 5 Obs. =408 firm-years		Difference in	
	Mean	Median	Mean	Median	Means (t-stat)	Medians (z-stat)
E_t	0.102	0.090	0.159	0.149	-0.057**	-0.059**
					(-3.934)	(-4.800)
CFO_t	0.056	0.043	0.129	0.104	-0.073**	-0.061**
					(-3.322)	(-3.450)
Acc_t	0.045	0.041	0.029	0.007	0.016	0.034*
					(1.108)	(2.027)
DAC_t	0.015	0.013	-0.025	-0.033	0.040*	0.046**
					(2.477)	(3.578)

** Significant at the 5% level. ** Significant at the 1% level.*

The sample period spans 2002–2007. In panel A, Based on the correlation between ΔDAC_t and ΔPDI_t, we formed firms in to quintiles and compare the means and medians of variables in quintile 1 and quintile 5. In panel B, Based on the variance of changes in firm's earnings (Var(ΔE_t)) over 2002-2007, we formed firms in to quintiles and compare the means and medians of variables in quintile 1 and quintile 5. The numbers in parentheses are t-statistics from t-tests for the differences in means and z-statistics from Wilcoxon tests for the differences in medians.

Table 5, panel C presents the results of regression (5) in quintiles formed based on Var(ΔE_t). In this case, the persistence coefficient declines from 0.855 in quintile 1 to 0.612 in quintile 5 and the adjusted R^2 declines from 0.743 in quintile 1 to 0.352 in quintile 5. The test statistic for difference in β coefficients (and adjusted R^2s) of quintiles 1 and 5 is significant at the 0.001 level

These results also reject the null hypothesis of no differences between both adjusted R^2s (persistence coefficients). Therefore, while Var(ΔE_t) increases (earnings smoothing decreases) across quintiles, earnings persistence and adjusted R^2s significantly decline and thus we conclude that there is a positive relation between earnings smoothing and earnings predictability.

Also, these results confirm previous results in panel B that there is a positive relationship between smoothing and earnings persistence.

5- Conclusion

In this paper, we examine the relationship between earnings smoothing behavior and earnings persistence (earnings predictability). The analysis of the relationship between earnings smoothing and earnings predictability (earnings persistence) relies on commonly used autoregressive regressions of current on one-year lagged earnings. At first, using Tucker and Zarowin (2006) income smoothing statistic and variance of changes in earnings, we classify all firms into quintiles so that it is more (less) probable that firms in the first (fifth) quintile engage in smoothing behavior. Then we estimate the autoregressive regression in each quintile and examine the significance of differences in persistence coefficients and adjusted R^2s in first and fifth quintiles. Overall, we conclude that there is a positive relation between earnings smoothing and earnings predictability (earnings persistence).

Table 5: The results for earnings persistence regression: $E_t=\alpha+\beta E_{t-1}+\varepsilon_t$

Panel A: Regression results for full sample		
	β (persistence)	**Adj.R^2**
	0.713	0.501
Panel B: Regression results by quintiles of Corr(ΔPDI_t, ΔDAC_t)		
	β (persistence)	**Adj.R^2**
Quintile 1	0.920	0.733
Quintile 2	0.891	0.723
Quintile 3	0.752	0.624
Quintile 4	0.771	0.659
Quintile 5	0.681	0.435
Difference (Quintile 1- Quintile 5)	0.239	0.298
p-value on difference	<0.001	<0.001
Panel C: Regression results by quintiles of Var(ΔE_t)		
	β (persistence)	**Adj.R^2**
Quintile 1	0.855	0.743
Quintile 2	0.865	0.745
Quintile 3	0.863	0.742

Panel C: Regression results by quintiles of Var(ΔE_t)		
	β (persistence)	Adj.R^2
Quintile 4	0.750	0.531
Quintile 5	0.612	0.352
Difference (Quintile 1- Quintile 5)	0.243	0.391
p-value on difference	<0.001	<0.001

All β (persistence) coefficients are significant at the 0.001 level. The p-value for the difference in persistence coefficients across quintiles is derived from a t-test. The p-value for the difference in the Adj. R^2 across quintiles is derived from a bootstrap test (see text for full details). Earnings (E_t) is defined as earnings after tax deflated by the lagged total assets.

References

Arya, A. Glover, J. and Sunder, S (1998), "Earnings management and the revelation principle", Review of Accounting Studies, 3, 7–34.

Badrinath, S.G. Gay, G.D. and Kale, J.R (1989), "Patterns of Institutional Investment, prudence, and the managerial 'safety-net' hypothesis", Journal of Risk and Insurance, 56, 605-629.

Barth, M.E. Elliott, J.A. and Finn M.W (1999), "Market Rewards Associated with Patterns of Increasing Earnings", Journal of Accounting Research, 37, 387-413.

Bartov, E. Givoly D. and Hayn C (2002), "The Rewards to Meeting or Beating Earnings Expectations", Journal of Accounting and Economics, 33, 173-204.

Beidleman, C (1973), "Income smoothing: The role of management", The Accounting Review, 48 (4), 653–667.

Booth, G.G. Kallunki, J.P. and Martikainen, T (1996), "Post-announcement drift and income smoothing: Finnish evidence", Journal of Business Finance and Accounting, 23(8), 1197–1212.

Bricker, R. Previts, G. Robinson, T. and Young, S (1995), "Financial analysts' assessment of company earnings quality", Journal of Accounting Auditing and Finance, 10, 541-544.

Brown, L.D (2001), "A Temporal Analysis of Earnings Surprises: Profits versus Losses", Journal of Accounting Research, 39, 221-241.

Buckmaster, D.A (2001), In Gary Previs and Robert J. Bricker eds., Development of the Income Smoothing Literature 1893-1998: A Focus on the United States. Studies in the Development of Accounting Thought, Volume 4. Elsevier.

Chaney, P.K, and Lewis, C.M (1994), "Earnings management and firm valuation under asymmetric information", Journal of Corporate Finance: Contracting, Governance, and Organization, 1(3-4), 319–345.

Das, S. and Shroff, P.K (2002), "Fourth quarter reversals in earnings changes and earnings management", Working Paper, University of Illinois at Chicago.

Dechow, P.M. Sloan, R G. and Sweeney, A.P (1995), "Detecting earnings management", The Accounting Review, 70(2), 193–225.

Demski, J.S (1998), "Performance measure manipulation", Contemporary Accounting Research, 15 (3), 261–285.

Demski, J.S. and Frimor, H (1999), "Performance measure garbling under renegotiation in multi-period agencies", Journal of Accounting Research, 37 (Supplement), 187–214.

Dye, R.A (1988), "Earnings management in an overlapping generations model", Journal of Accounting Research, 26(2), 195–235.

Francis, J. LaFond R. Olsson P.M. and Schipper K (2004), "Costs of Equity and Earnings Attributes", The Accounting Review, 79, 967-1010.

Fudenberg, D. and Tirole, J (1995), "A theory of income and dividend smoothing based on incumbency rents", Journal of Political Economy, 103(1), 75–93.

Gibbons, M. Richardson, A.J. and Waterhouse, J (1990), "The management of corporate financial disclosure: Opportunism, ritualism, policies, and processes", Journal of Accounting Research, 32, 75–102.

Goel, A.M. and Anjan, V.T (2003), "Why do firms smooth earnings?", The Journal of Business, 76(1), 151–192.

Gordon, M.J (1964), "Postulates, principles and research in accounting", The Accounting Review 39(2), 251–263.

Graham, J.R. Harvey C.R. and Rajgopal S (2005), "The Economic Implications of Corporate Financial Reporting", Journal of Accounting and Economics, 40, 3-73

Haghighat, H. and Raigan, E (2009), "Investigating the effect of Income smoothing on information content of current earnings about predicting future earnings", The Iranian Accounting and Auditing review, 15 (54), 33-46.

Healy, P.M (1985), "The effect of bonus schemes on accounting decisions", Journal of Accounting and Economics, 7(1-3), 85–107.

Hepworth, S.R (1953), "Periodic income smoothing", The Accounting Review, 28(1), 32–39.

Hofsted, G (1991), Cultures and Organizations-Softwares of the Mind, New York, McGraw Hill.

Jacob, J. and Jorgensen, B (2003), "Earnings management and accounting income aggregation", Journal of Accounting and Economics, 43, 369-390.

Jones, J.J (1991), "Earnings management during import relief investigations", Journal of Accounting Research, 29(2), 193–228.

Kasznik R. and McNichols M.F (2002), "Does Meeting Earnings Expectations Matter? Evidence from Analyst Forecast Revisions and Share Prices", Journal of Accounting Research, 40, 737-759

Kirschenheiter, M. and Melumad, N (2002), "Can Big Bath and earnings smoothing co-exist as equilibrium financial reporting strategies?", Journal of Accounting Research, 40(3), 761–796.

Kothari, S.P. Leone, A.L. and Wasley, C.E (2005), "Performance matched discretionary accrual measures", Journal of Accounting and Economics, 39(1), 163–197.

Lakonishok, J. Shleifer, A. and Vishny R.W (1994), "Contrarian Investment, Extrapolation, and Risk", The Journal of Finance, 49, 1541-1578.

Lambert, R (1984), "Income smoothing as rational equilibrium behavior", The Accounting Review, 41(4), 604–618.

Leuz, C. Nanda, D.J. and Wysocki, P.D (2003), "Earnings management and investor protection: An intentional comparison", Journal of Financial Economics, 69(3), 505–527.

Li, S. and Richie, N (2009), "Income smoothing and the cost of debt", available at:http://69.175.2.130/~finman/Reno/Papers/IncomeSmoothingandtheCostofDebtJan2009.pdf (accessed 22 October2009).

Michelson, S.E. Wagner J.J. and Wootton C.W (2000), "The relationship between the smoothing of reported income and risk-adjusted return", Journal of Economics and Finance, 24(2), 141-159.

Miller, M.H. and Rock, K (1985), "Dividend policy under asymmetric information", Journal of Finance, 40(4), 1031–1051.

Moses, D.O (1987), "Income smoothing and incentives: Empirical tests using accounting changes", The Accounting Review, 62(2), 358–377.

Myers, L. and Skinner, D (2002), "Earnings momentum and earnings Management", Working Paper, University of Michigan.

Nelson, M.W. Elliott J.A. and Tarpley R.A (2002), "Evidence from Auditors about Managers' and Auditors' Earnings Management Decisions", The Accounting Review, 77, 175-202.

Noravesh, I. and Sepasi, S (2005), "Study of the relation between cultural values and income smoothing in Tehran Stock Exchange", Iranian Accounting and Auditing review, 12 (40), 81-96.

Pourheydari, O. and Aflatooni, A (2006)," The investigation of incentives of income smoothing in the Tehran Stock Exchange", Iranian Accounting and Auditing review, 13 (44), 55-70.

Ronen, J., and Sadan, S. (1981). Smoothing Income Numbers: Objectives, Means, and Implications. Boston, MA: Addison-Wesley Publishing Company.

Sankar, M. and Subramanyam, K.R (2001), "Reporting discretion and private information communication through earnings", Journal of Accounting Research, 39(2), 365–386.

Singer, Z (2007), "Discretionary financial reporting: Items manipulated by IPO firms, and investors' increased awareness", SSRN.com/abstract=898644.

Skinner, D.J. and Sloan R.G (2002), "Earnings Surprises, Growth Expectations, and Stock Returns", Review of Accounting Studies, 7, 289-312.

Srinidhi, B. Ronen, J. and Maindiratta, A.J (2001), "Market imperfections as the cause of accounting income smoothing-the case of differential capital access", Review of Quantitative Finance and Accounting, 17(3), 283–300.

Subramanyam, K.R (1996), "The pricing of discretionary accruals", Journal of Accounting and Economics, 22, 249–281.

Thomas, J.K. and Zhang H (2002), "Inventory Changes and Future Returns", Review of Accounting Studies, 7, 163-187.

Trueman, B. and Titman S (1988), "An explanation for accounting income smoothing", Journal of Accounting Research, 26 (Supplement), 127–139.

Tucker, J.W. and Zarowin, P (2006), "Does income smoothing improve earnings informativeness?", The Accounting Review, 81(1), 251–270.