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Research Paper

The Impact of Environmental Uncertainty on Informativeness of Income Smoothing in Listed Companies in Tehran Stock Exchange (TSE)

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Abstract

Results of prior studies show that investors prefer to invest in firms which have a stable trend of profitability, and environmental uncertainty is one of the factors that causes earnings volatility. Therefore environmental uncertainty reinforces the motivation of managers to smooth earnings. Income smoothing is done with two incentives: management's opportunistic incentives and disclosure of confidential information about future earnings. On this basis, the main purpose of this research is to investigate the impact of environmental uncertainty on informativeness of income smoothing. In fact, the main question research is whether income smoothing increases the informativeness of earnings in the conditions of high environmental uncertainty or it distorts the earnings information and misleads shareholders? In this research income smoothing is measured by negative correlation between changes in discretionary accruals and changes in pre-discretionary income, and environmental uncertainty is also calculated by coefficient of variation of sales and coefficient of variation of earnings before taxes in a sample of 103 firms in Listed Companies in Tehran Stock Exchange (TSE). Then the relationship between future earnings and current earnings and returns has been examined in the conditions of environmental uncertainty by income smoothing and environmental uncertainty scales in research models and choosing the best methods of the analysis of pooled data for the time period of 2003 to 2012. The results of using future earnings response coefficient (FERC) methodology shows that in the conditions of environmental uncertainty, income smoothing increases the FERC and earnings persistence, so it increases informativeness of the reported earnings.

Keywords: Future Earnings Response Coefficient Model (FERC), income stream stability, informativeness of earnings, income smoothing, Environmental uncertainty.

Introduction

Income smoothing is a special type of earnings management that management uses it to smooth its reported earnings volatility in order to provide a stable stream of earnings (Biedleman, 1973). Fudenberg and Tirole (1995) have defined the income smoothing as the process of manipulating the timing of earnings or earnings reporting to minimize earnings volatility. When a company is unable to earn and report a stable and growing stream of income over the long term, it will have enough incentives for income smoothing. In the vast majority of researches conducted in the field of income smoothing, it has been found that the shareholders prefer smooth incomes rather than unsmooth incomes (Graham, 2005)-(Graham, et al., 2005). From the perspective of investors, the smoothed income is considered as less risky, because predicting future earnings according to current and past smoothed earnings is easier.

There are two general theories on management incentives for income smoothing:

First, managers use income smoothing for the disclosure of confidential information about the company's future earnings (Chaney, 1995) (Chaney & Lewis, 1995) (Ronen & Sadan, 1981) (Tucker & Zarowin, 2006). Foundation of this process is that increasing instability and volatility of unsmoothed incomes lead to increases in the potential losses of investors whose only criterion for decision-making is liquidity. This reduces the willingness of investors to invest in stocks and thereby reducing liquidity in the market, which such a process will have a negative effect on company's stock price.

Since income smoothing leads to predictability of future earnings by investors, it is considered as the provider of confidential information regarding the future of the company. This confidential information is valuable for investors and benefit from this information will cause they respond favorably to the informative earnings and will result in a positive impact on shareholder wealth (Habib, et al, 2011).

The second theory refers to management's opportunistic incentives for income smoothing. Healy (1985) argues that managers attempt to income smoothing for personal gain. He provided evidences of income smoothing as a function of the management bonus plan. Fudenberg and Tirole (1995) had modeled income smoothing as a function of concerns about management's job security. DeFond and Park (1997) provided evidences that institutional managers who expect poor performance in the current period and good performance for future periods, use discretionary accruals that increase net income to reduce their concerns about job security and vice versa.

The question that arises here is whether income smoothing increases the informativeness of earnings or is followed by distortion of earnings information and mislead of shareholders? That is, will all firms that tend to earnings smoothing face the same response of the market?

One of the factors that can make a difference in the market reaction to earnings smoothing is environmental uncertainty. Environmental uncertainty is defined as variability rate in the external environment of organizations, including major customers, competitors, government regulations, and labor unions (Habib, et al, 2011). High environmental uncertainty

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increases the risks of detailed estimates of future earnings by shareholders and becomes a complicated issue for them. If the management does not take appropriate action to reduce the volatility, the information asymmetry between management and shareholders will be more severe. It provides managers with the necessary incentives to use smoothing in order to reduce the volatility of earnings to provide a predictable income stream and reduce the information asymmetry between management and shareholders (Ghosh & Olsen, 2009). We expect the outcome of such a process would lead to an increase in the information content of earnings.

Theoretical framework

Income smoothing: Income smoothing is a kind of deliberate action aimed at normalization of earnings that management wants thereby achieve a desired level of earnings (Belkooyi, 2003). Eckel (1981) believes that a smooth income stream is either naturally or intentionally smoothed. Natural income smoothing refers to the earnings streams that are obtained from operational processes that are inherently smooth. Intentional income smoothing is created as a result of management decisions and actions and comes in two forms: a) Actual earnings smoothing, which is done by management in response to changes in economic conditions. B) Artificial smoothing, the so- called accounting manipulations that do not affect cash flows. In other words, artificial income smoothing simply leads to shift in earnings and revenues between fiscal periods (Soleimani, et al., 2012).

Beidleman (1973) presents two reasons based on which management tries to smooth its reported net earnings. The first reason is based on the assumption that a steady stream of income can be associated with higher dividend income (compared to the stream of net income variable) and therefore, will have a favorable effect upon the company's share value, since it reduces the total amount of the company's risk; The second reason he gives for income smoothing is management's ability to neutralize the volatile or cyclical nature of reported net earnings and management can thereby reduce the correlation of company's expected returns to the return on total assets on the market.

Environmental uncertainty: Currently, in the twenty-first century that organizations experience chaotic and uncertain situations as open social systems in their interaction with the environment, focusing on the concept of environmental uncertainty has an important significance. All organizations act in a certain context of physical, technological, cultural and social situations that are called their environment. None of the organizations can survive independent of the environment in which they are. But its survival difficulty or easiness is related to the type of the relationship between organizations and environments that they themselves are considered as part of it. Environmental uncertainty means that decision-makers do not have sufficient information about environmental factors and are faced with the problem when predicting external changes (Bafandezende, et al., 2012).

Most studies show that environmental uncertainty is due to two aspects of environmental dynamism (stability or instability of environmental factors) or simplicity or complexity. Dynamism or stability of environment depends on the change rate of environmental factors. Dynamic environments create more uncertainty than stable environments. In a simple environment, there are only three or four external factors affecting the organization, but in a complex environment, there are a large number of external factors interacting with each other that influence the organization, such complexity leads to increase in environmental uncertainty (Bafandezende, et al., 2012).

In general, there are three kinds of uncertainty in relation to the external environment of the organization, including state uncertainty, effect uncertainty and response uncertainty. Managers who feel the organizational environment is unpredictable are experiencing the state uncertainty. Effect uncertainty is concerned with individual inability to predict the effects of events or environmental changes on the organization. Response uncertainty is defined as a kind of inability to predict the potential consequences of options (Ashrafi, 2002).

Literature Review

Some of the major domestic and foreign research results related to the topic are as follows: Subramanyam (1996) found that stock returns are completely related to discretionary accruals and the fact that discretionary accruals has positive relationship with future earnings and cash flows of the company, and we can conclude that discretionary accruals provide information about future perspective of the company. Kirschenheiter and Melumad (2002) investigated the relationship between earnings quality and income smoothing. They showed that managers who attempt to smooth income with awareness of desired future conditions lead to increase in the quality of reported earnings with a reduction in earnings volatility and increase in investor's confidence towards stability in profitability. They also found that reported earnings allow investors to estimate the future cash flows.

Tucker and Zarovin (2006) examined the effect of income smoothing on informativeness of it. Based on the results of their research, it was identified that income smoothing leads to increase in informativeness of earnings and smoothed earning provides information on future earnings, cash flows and accruals.

Habib, et al. (2011) investigated stock market reaction to income smoothing in an environment of high uncertainty. They concluded that the current stock price contain more information about future earnings in environments with high uncertainty. In other words, a positive relationship between current stock returns and future earnings of companies that smooth income are stronger in an environment of high uncertainty. In such an environment, income smoothing increases earnings stability.

Haghighat and Raygan (2008) conducted a research entitled the role of income smoothing on information content of earnings about the forecast of future earnings, the results of this study indicate that the current share price of companies that have attempted to smooth income, contain less information about the earnings and future cash flows. Thus smoothing is done more for distortion rather than transferring management confidential data. Hashemi and Samadi (2009) examined the effects of income smoothing on the information content of listed companies in Tehran Stock Exchange and concluded that income smoothing increases the ability of earnings to predict

future periods' earnings, but does not increase the ability of earnings to predict future accruals.

In a research conducted by Rahmani and Bashiri Manesh (2011), the usefulness of income smoothing through influencing the level of awareness of stock price on the company's future performance is studied, the results of this research show that the stock price of companies that have more attempted to smooth income have more information about future profitability and cash flows.

Research Hypothesis

Based on the research conducted by Tucker and Zarovin (2006), if income smoothing increases the informativeness of earnings, it should increase the future earnings response coefficients (FERC) and the stability of income stream.

So according to theoretical framework and questions, testable hypotheses are outlined as below:

Main hypothesis: In an environment of high uncertainty, income smoothing improves informativeness of earnings.

Sub-hypotheses:

1. In an environment of high uncertainty, income smoothing earnings increases future earnings response coefficient (FERC) (market reaction Hypothesis).
2. In an environment of high uncertainty, income smoothing increases income stream stability (income stream stability Hypothesis).

Methodology

To examine the relationship between stock returns and income smoothing that is moderated by environmental uncertainty; the first step requires the income smoothing and environmental uncertainty variables become operational. For this purpose, the empirical foundations of these criteria are first expressed, and then the related regression equations are developed.

Calculation of income smoothing: Income smoothing is measured using a negative correlation between changes in discretionary accruals (ΔDAP) and changes in the pre-discretionary income (ΔPDI). The more the relationship between ΔDAP and ΔPDI for a commercial unit is negative, that commercial unit is in a higher level of income smoothing. Modified Jones model, modified by Kothari, et al. (2005), is used as follows to estimate DAP discretionary accruals:

$$Accruals_t = a\,(1/TA_{t-1}) + b\Delta sales_t + cPPE_t + dROA_t + error \qquad (1)$$

Where, **Accruals**: is the total accruals that is obtained deducting the operating cash flows from net income; **TA**: is the sum of assets**;** Δ**sales**: is the changes in annual sales; and **PPE**: is the gross properties, machinery and equipments that are all homogenized to control the dispersion by the sum of all assets in the beginning of the period, **ROA**: is the net income divided by the sum of the assets, this variable has been added to the model as an additional control variable based on the previous researches by Dechow, Sloan and Sweeny (1995) and Kothari, Leoneand and Wasley (2005). The index of nondiscretionary accruals (NDAP) is provided by matched values of equation (1). The difference between total accruals and nondiscretionary accruals (NDAP) is discretionary accruals (DAP). Pre-discretionary income (PDI) is the net income minus discretionary accruals (PDI = NI - DAP).

The amount of income smoothing is calculated using the (Pearson) correlation between the change in discretionary accruals (ΔDAP) and pre-discretionary income (ΔPDI) that has been obtained using 5-year financial information. Income smoothing is shown by IS index. This index ranks commercial units between 0 and 1 (in reverse form), in terms of income smoothing and controlling industry and time effects. Consequently, the more the relationship between ΔDAP and ΔPDI for a commercial unit is negative, the IS index is smaller and the commercial unit is placed at a higher level of income smoothing (Tucker & Zarovin, 2006).

Calculation of environmental uncertainty: Since a scale alone cannot fully explain the concept of environmental uncertainty (Kreiser & Marino, 2002) (Simerly & Li, 2000), two criteria are considered for the measurement of environmental uncertainty:

1. coefficient of variation of sales:

$$CV(Z_i) = \frac{\sqrt{\sum_{k=1}^{5} \frac{(z_i - \bar{z})^2}{5}}}{\bar{z}} \qquad (2)$$

Since the coefficient of variation of sales is based on external market conditions, so it is used as a scale to measure environmental uncertainty (Bergh & Lawless, 1988) (Dess & Beard, 1984).

In this equation: **CV**: is the coefficient of variation of sales; $\mathbf{z_i}$: is the sales observations for each institution per year; $\bar{z}$: is average of sale value.

2. The coefficient of variation of earnings before tax:

$$CV(Z_i) = \frac{\sqrt{\sum_{k=1}^{5} \frac{(z_i - \bar{z})^2}{5}}}{\bar{z}} \qquad (3)$$

In this equation: **CV**: is the coefficient of variation of earnings before tax; $\mathbf{z_i}$: is the earnings before tax observations for each institution per year**;** $\bar{z}$: is average of earnings before tax.

These two variables are environmental uncertainty specific for commercial units that are calculated using historical data during a five-year period. The calculated coefficient of variation of sales (earnings) for each company in each of the five periods is divided by the coefficient of variation of sales (earnings) of the company in the same periods. These two measures of environmental uncertainty are shown as EU_{sales} (EU_{EBT}) (Tosi, et al., 1973).

Hypotheses Testing: For the first sub-hypothesis testing, regression equation is estimated as follows (Habib, et al., 2011):

$$RET_t = \eta_0 + \eta_1 X_t + \eta_2 X_{t-1} + \eta_3 X_{t3} + \eta_4 RET_{t3} + \eta_5 IS_t + \eta_6 IS_t{*}X_t + \eta_7 IS_t{*}X_{t-1} + \eta_8 IS_t{*}X_{t3} + \eta_9 IS_t{*}RET_{t3} + \eta_{10} EU_t + \eta_{11} EU_{t*}Xt + \eta_{12} EU_t{*}X_{t-1} + \eta_{13} EU_t{*}X_{t3} + \eta_{14} EU_t{*}RET_{t3} + \eta_{15} EU_t{*}IS_t + \eta_{16} EU_t{*}IS_t{*}X_t + \eta_{17} EU_t{*}IS_t{*}X_{t-1} + \eta_{18} EU_t{*}IS_t{*}X_{t3} + \eta_{19} EU_t{*}IS_t{*}RET_t + \text{error} \quad (4)$$

Where, $\mathbf{RET_t}$: is the stock return without dividend (stock price returns) during the financial year t**;** $\mathbf{X_t}$: is the earnings per share for fiscal year t; $\mathbf{X_{t-1}}$: Earnings per share that have been modified for stock decomposition and dividends paid on a share for fiscal year t-1**;** $\mathbf{X_{t3}}$: is sum of earnings per share in fiscal year t +1 to t +3; $\mathbf{RET_{t3}}$: Annual compound returns of fiscal year t +1 to t +3; all variables before earnings have been homogenized in the beginning of the period by stock prices; $\mathbf{IS_t}$: is the Pearson correlation between changes in discretionary accruals (ΔDAP) and pre-discretionary incomes (ΔPDI) that has been obtained using information of the current year and the previous four years; and $\mathbf{EU_t}$: is the two indices used to calculate the concept of environmental uncertainty: first EU_{sales} and second EU_{EBT}.

Regression coefficients of the model, η_1 to η_4, present future earnings response coefficients (FERC) that has been proposed by Collins, Kothari, Shanken and Sloan (1994). Regression coefficients, η_5 to η_9, test income smoothing effect on the informativeness of the smoothed income (Tucker & Zarovin, 2006). Since this study is attempts to test the informativeness of smoothed incomes of commercial units in environments with high uncertainty, so the additional coefficients, η_{10} η_{19}, are add up. Our desired variable is $\mathbf{EU_t * IS_t * X_{t3}}$, which estimates market reaction to informativeness of earnings in an environment with high uncertainty. Therefore, we expect the coefficient **(η_{18})** to be positive and statistically significant (Habib, et al., 2011).

According to the model of Tucker and Zarovin (2006), it is necessary to control the variables such as size of the commercial unit, commercial unit's growth opportunities and earnings variability as the special variables of commercial unit that may affect the relationship between future earnings and current stock price. The following regression model is estimated to determine the impact of environmental uncertainty on the information content of smoothed incomes after that the three special control variables of commercial unit are added:

$$RET_t = \eta_0 + \eta_1 X_t + \eta_2 X_{t-1} + \eta_3 X_{t3} + \eta_4 RET_{t3} + \eta_5 IS_t + \eta_6 IS_t{*}X_t + \eta_7 IS_t{*}X_{t-1} + \eta_8 IS_t{*}X_{t3} + \eta_9 IS_t{*}RET_{t3} + \eta_{10} EU_t + \eta_{11} EU_t{*}X_t + \eta_{12} EU_t{*}X_{t-1} + \eta_{13} EU_t{*}X_{t3} + \eta_{14} EU_t{*}RET_{t3} + \eta_{15} EU_t{*}IS_t + \eta_{16} EU_t{*}IS_t{*}X_t + \eta_{17} EU_t{*}IS_t{*}X_{t-1} + \eta_{18} EU_t{*}IS_t{*}X_{t3} + \eta_{19} EU_t{*}IS_t{*}RET_{t3} + \eta_{20} SIZE_t + \eta_{21} GROWTH_t + \eta_{22} EARNSTD_t + \eta_{23} SIZE_t{*}X_{t3} + \eta_{24} GROWTH_t{*}X_{t3} + \eta_{25} EARNSTD_t{*}X_{t3} + \text{error} \quad (5)$$

In the above equation: **SIZE**: is the natural logarithm of market value of equity; **GROWTH**: is the ratio of book value of equity to market value of equity at the beginning of the year; and **EARNSTD**: is future earnings variability that is measured as the standard deviation of earnings per share during the financial year t +1 to t +3, and is homogenized by the stock price at the beginning of year t. In this model, the two criteria of EU_{EBT} and EU_{sales} has been also used as environmental uncertainty criteria.

The following regression model is estimated for the second sub-hypothesis testing: (Habib, et al., 2011):

$$X_{t3} = \eta_0 + \eta_1 X_t + \eta_2 IS_t + \eta_3 X_t{*}IS_t + \eta_4 EU_t + \eta_5 X_t{*}EU_t + \eta_6 X_t{*}IS_t{*}EU_t + \text{error} \quad (6)$$

(All the variables have been defined before)

If smoothing improves the information content of earnings, so it should increase the stability of earnings stream. Therefore, this property is used to measure earnings smoothing awareness in an environment of high uncertainty. That is, if the smoothed earnings in the current period lead to reduction in earnings volatility due to the uncertainty of business environment, then we expect the coefficient of $\mathbf{X_t * IS_t * EU_t}$ **(η_6)** to be positive and statistically significant.

Population and estimation methods

The panel data over the period of 2003 to 2012 has been used to measure variables and to test the hypothesis of the research. In this study, first the index of income smoothing and environmental uncertainty of each year has been measured using data from the same year and four years ago. Then, the relationship between earnings and current revenues with future earnings has been studied in terms of environmental uncertainty adding the income smoothing parameters and environmental uncertainty in research models for 2006 to 2008 using the model of Collins et al. (ckss) expanded by Tucker and Zarovin (2006), and the proposed independent model of Habib, et al. (2011). We need data of 2010 to 2012, because we need earnings per share information as well as returns from year t +1 to t +3 in the existing models for hypothesis testing.

Due to the high broadness of the population and heterogeneous nature of some of its members, the systematic elimination sampling has been used to select the sample. For this purpose, the following restrictions are considered to select the sample:

- Companies should be listed in Tehran Stock Exchange from the beginning of 2003.
- Companies' stock should be traded on an exchange. (Their activity should not be interrupted. For this purpose, companies that have been trading interruption for at least six months are eliminated from the sample).
- Fiscal period of the company has not changed.
- Companies' fiscal year should be ended in March every year. (The reason is matching the period of stock returns computing).
- The selected companies should not be investment and mediator companies.

Based on the above criteria, 103 companies have been selected from 2003 till 2012 and has been tested for the period stated.

In this study, the multivariate regression model with emphasize on data pooling approach is used to test the hypothesis. Standard linear regression model's hypothesis including no autocorrelation, normality of research variables, reliability of variables in the panel data and consistency of variance have been tested at 95% confidence level.

To collect the data needed to test the hypotheses, document mining method has been used. The required data has been gathered from the audited financial statements of listed companies in Tehran Stock Exchange, the software of "Tadbir Pardaz" and the website of "Research, Development and Islamic Studies of Stock Exchange" and the website of "Kadal".

In this study, after extracting the required information from the sources listed and preparation of variables using Excel software and conducting necessary calculations to achieve the required variables for research, Eviews software has been used to calculate the regression models using data collected.

Data analysis

In this section the descriptive statistics of the variables are shown. In Table 1, Statistical parameters of variables used in the main models of the research, and in Table 2, statistical parameters of control variables are shown.

Table 1: Descriptive statistics of dependent and independent variables of the study

Variables	sign	mean	Median	maximum	Minimum	Standard deviation
stock return of the current year	RET_t	38.3865	34.1439	165.4236	-27.5428	12.6529
Earnings per share of the current year	X_t	894.21	978.44	7238.93	-1382.78	28.862
Earnings per share in the previous fiscal year	X_{t-1}	628.39	722.16	6903.22	-1194.14	18.967
Total earnings per share in the next three years	X_{t3}	2138.76	2032.91	22316.89	-1653.06	132.562
The compound stock return in next three years	RET_{t3}	142.199	126.323	784.437	- 48.387	43.027
Income smoothing index	IS_t	0.2638	0.3283	0.7839	- 0.4258	12.4238
Environmental uncertainty with sales criterion	EU_{Sales}	0.4139	0.3673	0.6894	- 0.0866	0.0683
Environmental uncertainty with earnings criterion	EU_{EBT}	0.3486	0.2982	0.5348	- 0.1175	0.0685

Table 2: Descriptive statistics of research control variables

Variables	sign	Mean	Median	Maximum	Minimum	Standard Deviation
Firm Size	**SIZE**	5.6387	5.2938	7.2938	4.2923	0.2731
Firm's growth opportunities	**GROWTH**	0.5132	0.4879	0.6981	- 0.1206	0.0934
Variability of future earnings	**EARNSTD**	0.2684	0.2285	0.4651	- 0.0499	0.1547

As was stated earlier, the main objective of the study that was investigated in the main hypothesis of the research is to investigate the information content of income smoothing in an environment with high uncertainty. Two sub-hypotheses have been used to test the main hypothesis. If the first and second sub-hypotheses are confirmed statistically, the main research hypothesis is accepted, too.

The first research sub-hypothesis examines the relationship between income smoothing and future earnings response coefficients in an environment with uncertainty. Based on Chow test, pooled data estimation method is a better choice for estimating model (4) in both modes of determining the index of environmental uncertainty. Significance test results of model (4) without regard to the control variables, and investigation of the aforementioned coefficients using pooled data for 2006 to 2008 are presented in Table 3. The index of environmental uncertainty with two measures of coefficient of variation of sale and coefficient of variation of earnings before tax is measured over 5 years ago.

In order to confirm or reject the first sub-hypothesis, we should consider the significance of coefficient of η_{18} in the research model. In other words, the researcher's desired variable is $EU_t * IS_t * X_{t3}$ that estimates the market reaction to informativeness of earnings in an environment of high uncertainty (Habib, et al., 2011).

According to the results of estimating the model, the t statistic related to the independent variable of $EU_t * IS_t * X_{t3}$ and its significance level (p-value) in the first case of measurement of environmental uncertainty (EU_{Sales}) are 4.2434 and 0.0216, respectively. These figures indicate that the coefficients of

variation with 95% confidence level is statistically significant. The same figures in the second case of the measuring the index of environmental uncertainty (EU_{EBT}) are 4.6883 and 0.0006, respectively. These figures indicate that the coefficients of variation with 99% confidence level is statistically significant. Therefore, we can conclude of the estimation of the model (4) that in an environment of high uncertainty, the income smoothing increases the response coefficients to future earnings. In other words, the first research sub-hypothesis is not rejected.

The adjusted coefficient of determination obtained from the model estimation in the mode of EU_{Sales} (EU_{EBT}) estimation, shows that approximately 23 (19) percent of the variability of dependent variable, i.e. stock returns of this year, are due to changes in the independent and control variables of the model. Comparison of these figures shows that using the coefficient of variation of sales is more appropriate to measure environmental uncertainty.

For the first sub-hypothesis testing and in order to increase the confidence, some variables were added to the model (4) as control variables and a new model was obtained. The new model, i.e. the model (5), investigates the first sub-hypothesis by considering the effect of the control variables. The control variables that were added to the previous model include firm size, firm growth opportunities and future earnings variability. Based on Chow test, pooled data estimation method is a better choice for estimating model (5) in both modes of determining the index of environmental uncertainty. Significance test results of model (5) and investigation of the aforementioned coefficients of variation using pooled data for 2006 to 2008 are presented in Table 4. In this model, the index of environmental uncertainty is measured with two criteria, too.

In order to confirm or reject the first sub-hypothesis using model (5), we should consider the significance of researcher's desired coefficient of variation $EU_t * IS_t * X_{t3}$, i.e. η_{18} in the research model (Habib, et al., 2011). According to the results of estimating the model, the t statistic related to the independent variable of $EU_t * IS_t * X_{t3}$ and its significance level (p-value) in the first case of measurement of environmental uncertainty (EU_{Sales}) are 5.2328 and 0.0058, respectively. These figures indicate that the coefficients of variation with 99% confidence level are statistically significant. The same figures in the second case of the measuring the index of environmental uncertainty (EU_{EBT}) are 3.9841 and 0.0000, respectively and the coefficients of variation with 99% confidence level is statistically significant. Therefore, we can conclude of the estimation of the model (5) that in an environment of high uncertainty, the income smoothing increases the response coefficients to future earnings. In other words, the first research sub-hypothesis is not rejected.

The adjusted coefficient of determination obtained from the model estimation in the mode of EU_{Sales} (EU_{EBT}) estimation, shows that approximately 31 (26) percent of the variability of dependent variable, i.e. stock returns of this year, are due to changes in the independent and control variables of the model. Comparison of these two figures shows that using the coefficient of variation of sales is more appropriate to measure environmental uncertainty. But comparing these figures with the determination coefficient obtained from estimating model (4) shows that the addition of control variables to the model increases the coefficient of determination of the model. In other words, the model and its results are more reliable.

Table 3: Results of the first sub-hypothesis model testing - without the control variable

Description	Model testing with the first index of the environmental uncertainty EU_{Sales}				Model testing with the second index of the environmental uncertainty EU_{EBT}			
	parameter	coefficient	t-static	p-value	Parameter	coefficient	t-static	p-value
Constant coefficient	η_0	0.0818	4.2316	0.0017	η_0	- 0.3244	3.7682-	0.0000
X_t	η_1	1.1138	4.8794	0.0153	η_1	0.2438	2.9883	0.0185
X_{t-1}	η_2	1.3809	6.0267	0.0000	η_2	- 0.1879	-0.6879	0.2381
X_{t3}	η_3	0.0026	3.3249	0.0000	η_3	0.4435	2.2147	0.0573
RET_{t3}	η_4	0.1729	2.0928	0.1744	η_4	0.0048	-4.2144	0.0064
IS_t	η_5	-1.0216	1.3269	0.1192	η_5	0.6578	-3.0079	0.0288
IS_t*X_t	η_6	0.2674	0.8342	0.2946	η_6	- 0.1349	-5.1327	0.0000
IS_t*X_{t-1}	η_7	- 0.4396	-2.8243	0.0326	η_7	0.5647	3.2436	0.0213
IS_t*X_{t3}	η_8	0.1894	0.3241	0.2139	η_8	0.2436	4.1658	0.0022
IS_t*RET_{t3}	η_9	- 0.2905	0.4266	0.0893	η_9	0.2238	6.2133	0.0000
EU_t	η_{10}	- 0.1657	2.9846	0.0166	η_{10}	0.1438	-0.3244	0.2875
EU_t*X_t	η_{11}	0.2128	2.6518	0.1218	η_{11}	0.9805	1.0328	0.2548
EU_t*X_{t-1}	η_{12}	0.0084	1.8463	0.2186	η_{12}	- 0.3242	0.9804	0.0983
EU_t*X_{t3}	η_{13}	- 0.4136	0.8674	0.4236	η_{13}	- 0.6132	-2.2436	0.0439
EU_t*RET_{t3}	η_{14}	0.0164	4.4236	0.0000	η_{14}	0.3431	2.6243	0.0184
EU_t*IS_t	η_{15}	0.1895	0.7864	0.3258	η_{15}	0.2156	0.7892	0.1683
$EU_t*IS_t*X_t$	η_{16}	0.2139	2.0468	0.0261	η_{16}	-1.0064	-0.2326	0.3452
$EU_t*IS_t*X_{t-1}$	η_{17}	- 0.0006	1.5408	0.04137	η_{17}	0.2436	3.2487	0.0175
$EU_t*IS_t*X_{t3}$	η_{18}	0.3436	4.2434	**0.0216**	η_{18}	0.4138	4.6883	**0.0006**

$EU_t*IS_t*RET_{t3}$	η_{19}	0.5672	1.6681	0.0000	η_{19}	0.0078	3.9904	0.0107
Adjusted R^2		0.2293				0.1936		
F-static		6.4358				6.2169		
p-value		0.0000				0.0000		
D-W		1.8904				1.9276		

Table 4: Results of the first sub-hypothesis model testing - with the control variable

Description	Model testing with the first index of the environmental uncertainty EU_{Sales}				Model testing with the second index of the environmental uncertainty EU_{EBT}			
	parameter	coefficient	t-static	p-value	Parameter	coefficient	t-static	p-value
Constant coefficient	η_0	0.0924	4.0089	0.0000	η_0	0.2156-	2.4338-	0.0034
X_t	η_1	1.5428	-2.4237	0.0043	η_1	0.7687	1.9087	0.0894
X_{t-1}	η_2	0.5476	4.5436	0.0060	η_2	0.0977	-0.3244	0.6429
X_{t3}	η_3	0.0426	0.6589	0.1276	η_3	-0.1232	4.3426	0.0213
RET_{t3}	η_4	0.1128	2.6537	0.0328	η_4	0.0546	4.0988	0.0000
IS_t	η_5	-1.9833	1.8905	0.0782	η_5	-0.2133	-2.8986	0.1324
IS_t*X_t	η_6	-0.2537	0.9078	0.1687	η_6	0.3266	5.7656	0.0000
IS_t*X_{t-1}	η_7	-0.0231	-4.2133	0.0098	η_7	0.1216	-1.2333	0.3246
IS_t*X_{t3}	η_8	0.1218	-3.2166	0.0000	η_8	0.1164	0.5436	0.0984
IS_t*RET_{t3}	η_9	0.1068	0.4268	0.2139	η_9	-0.0342	-4.8966	0.0000
EU_t	η_{10}	-0.2136	0.9808	0.1687	η_{10}	0.3246	-2.2326	0.2675
EU_t*X_t	η_{11}	-0.4255	-2.2265	0.0534	η_{11}	0.1265	1.0328	0.2548
EU_t*X_{t-1}	η_{12}	0.0894	3.8790	0.0313	η_{12}	-0.0878	2.9304	0.0423
EU_t*X_{t3}	η_{13}	-0.1216	0.8676	0.1227	η_{13}	0.0423	2.2213	0.0419
EU_t*RET_{t3}	η_{14}	0.3144	6.7556	0.0000	η_{14}	-0.0085	6.4537	0.0000
EU_t*IS_t	η_{15}	0.0897	1.2437	0.1098	η_{15}	1.3244	0.2146	0.4699
$EU_t*IS_t*X_t$	η_{16}	-0.3146	3.1165	0.2435	η_{16}	-1.6564	-2.4538	0.0677
$EU_t*IS_t*X_{t-1}$	η_{17}	-0.0644	1.7768	0.0215	η_{17}	0.0896	1.4539	0.0238
$EU_t*IS_t*X_{t3}$	η_{18}	0.2985	5.2328	0.0058	η_{18}	0.2133	3.9841	0.0000
$EU_t*IS_t*RET_{t3}$	η_{19}	0.3327	-4.2329	0.0001	η_{19}	0.0544	3.2243	0.0000
$SIZE_t$	η_{20}	0.1325	8.1174	0.0000	η_{20}	-0.1675	2.6578	0.0231
$GROWTH_t$	η_{21}	0.0978	2.3361	0.0132	η_{21}	0.2334	-1.4366	0.1164
$EARNSTD_t$	η_{22}	0.2133	0.4377	0.0906	η_{22}	-0.0988	8.2345	0.0000
$SIZE_t*X_{t3}$	η_{23}	1.5433	3.4786	0.0042	η_{23}	0.3244	0.4587	0.2143
$GROWTH_t*X_{t3}$	η_{24}	-0.0224	6.1326	0.0000	η_{24}	0.1687	4.5654	0.0142
$EARNSTD_t*X_{t3}$	η_{25}	-0.2133	2.6642-	0.0425	η_{25}	1.0073	-2.9890	0.0056
Adjusted R^2		0.3148				0.2649		
F-static		6.1328				4.9086		
p-value		0.0000				0.0000		
D-W		1.9894				2.4258		

The second sub-hypothesis of the research examines the relationship between income smoothing and stability of income stream (income stability) in an environment with high uncertainty. According to Chow and Hausman test, the panel data estimation method (with random effects) is a better choice for the estimation of model (6) in both modes of determining the index of environmental uncertainty. Significance test results of model (6) and investigation of the aforementioned coefficients using panel data and random effects for 2006 to 2008 are presented in Table 5. The index of environmental uncertainty with two measures of coefficient of variation of sale and coefficient of variation of earnings before tax and income is measured over 5 years ago.

Table 5: Test results of the second sub-hypothesis of the model

Description	Model testing with the first index of the environmental uncertainty EU_{Sales}				Model testing with the second index of the environmental uncertainty EU_{EBT}			
	parameter	coefficient	t-statistics	p-value	Parameter	coefficient	t-statistics	p-value
Constant coefficients	η_0	0.2386	6.6548	0.0000	η_0	0.0283	-2.5467	0.0050
X_t	η_1	2.4369	4.5638	0.0137	η_1	0.1136	8.4459	0.0000
IS_t	η_2	0.8795	3.4377	0.0036	η_2	-0.5462	4.5663	0.0182

X_t*IS_t	η_3	-0.0818	2.6224	0.0389	η_3	0.2436	2.4336	0.0044
EU_t	η_4	0.1709	-4.0934	0.1287	η_4	0.0984	3.2387	0.0000
X_t*EU_t	η_5	-1.4323	6.0084	0.0000	η_5	1.2213	3.3465	0.0231
$X_t*IS_t*EU_t$	η_6	0.5327	6.7804	0.0000	η_6	0.2879	6.8905	0.0000
Adjusted R^2		0.4238				0.2906		
F-static		6.3426				4.4489		
p-value		0.0000				0.0000		
D-W		2.4984				2.5134		

According to the results of estimating the model, the t statistic related to the independent variable of $EU_t * IS_t * X_{t3}$ and its significance level (p-value) in the first case of measurement of environmental uncertainty (EU_{Sales}) are 6.7804 and 0.0000, respectively. These figures indicate that the coefficient of variation with 99% confidence level is statistically significant. The same figures in the second case of the measuring the index of environmental uncertainty (EU_{EBT}) are 6.8905 and 0.0000, respectively. These figures show that the coefficient of variation with 99% confidence level is statistically significant. Therefore, we can conclude of the estimation of the model (6) that in an environment of high uncertainty, the income smoothing increases the response coefficients to future earnings. In other words, the second research sub-hypothesis is not rejected.

The adjusted coefficient of determination obtained from the model estimation in the mode of EU_{Sales} (EU_{EBT}) estimation, shows that approximately 42 (29) percent of the variability of dependent variable, i.e. the sum of upcoming years income, are due to changes in the independent and control variables of the model. Comparison of these two figures shows that using the coefficient of variation of sales is more appropriate to measure environmental uncertainty.

As mentioned earlier, if the first and second sub-hypotheses are confirmed statistically, the main research hypothesis is accepted. Therefore, as the first and second sub-hypotheses are not rejected, it is concluded that the main research hypothesis is not rejected. Confirming the first and second sub-hypotheses showed that in an environment with high uncertainty, income smoothing has a significant positive relationship with earnings response coefficients and stability of income stream. By confirming the main hypothesis, it is concluded that there is a significant relationship between income smoothing and informativeness of earnings in an environment with high uncertainty.

Summary and Conclusions

The purpose of this study was to investigate the informativeness of income smoothing in terms of environmental uncertainty. The research hypotheses were proposed on the basis that the income smoothing in a situation of environmental uncertainty increases the informativeness of earnings if it increase the future earnings response coefficient and also increase the stability of earnings stream.

Hypotheses testing showed that income smoothing increases future earnings response coefficient and the stability of earnings stream in an environment of high uncertainty. In other words, in an environment of high uncertainty, income smoothing leads to increase in the informativeness of earnings.

As we know, if information confirm or change users' decisions and attitudes about the company, it contains information content. Investors consider the income fluctuations as company's overall risks and consider smoother income as a factor reducing the risk, therefore, managers try to decrease earnings volatility during fiscal years in different ways in order to show their company as a stable and dynamic company. It is expected that income smoothing phenomenon, especially in uncertain conditions, can meet the needs and preferences of both sides and have a positive impact on market performance. The results of hypotheses testing are similar to the results of studies conducted by Zarovin and Tucker (2006), Chen (2009), Sun (2009), Habib, et al. (2011) and Hashemi and Samadi (2009). However, the results are not compatible with the research of Raygan (2008).

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