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Research article

Impact of firm-level uncertainty on earnings management and role of accounting conservatism

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Abstract: This study investigates whether accounting conservatism can reduce earnings management in the wake of uncertainty. It is hypothesized that conservative reporting during uncertainty can reduce earnings management and increase firm value. Using 5354 firm-year observations from 2005–2018 through Khan and watts model, we provide evidence that accounting conservatism is a way to put limits on earnings management for firms facing uncertainty. We find a statistically significant impact of conservative reporting on firm value during an uncertainty. Uncertainty at the firm level is measured by applying "prospector" and "defender" business strategy. To measure earnings management Modified Jones model and Dechow and Dichev approach models applied. Our results provide insights into conservative accounting and have critical and practical implications for investors, researchers and standard setters. After addressing endogeneity and applying GMM estimator, our results remain confirmed.

Keywords: uncertainty; earnings management; accounting conservatism

JEL Codes: D81, M41, M49

1. Introduction

Earnings management is the maneuver of earnings by management to report a specific image of the firm (Kothari et al., 2005). Financial reporting requires managerial judgment that could give management an opportunity for manipulation (Schipper, 1989). Since managers have more information, which increases the possibility of managing earnings (Myers & Majluf, 1984). Financial scandals like Enron, Parmalat, WorldCom, Adelphia, and Tyco, and 2007 global financial crisis support the incidence of earnings management and questions the transparency of financial reporting (Iqbal et al., 2009; Yanqiong, 2011; Ahmad-Zaluki et al., 2011). Like other countries, companies in Pakistan involved in earning management, and financial market scandals, i.e. Housing Cooperative Societies, KASB Bank, and Taj Company scandals. Earnings reported in financial statements of these companies could not help shareholders, and financial analysts to predict and forecast earnings and make correct financial decisions. The possibility of such an occurrence is more for developing countries like Pakistan due to uncertainty and deficient financial disclosures (El Ghoul et al., 2011). Firm-level uncertainty has a decisive impact on the financial and economic output, as during uncertainty possibility of all outcomes unknown.

Literature documents effect of macro-level uncertainty on economic growth, business cycle and investment (Bloom et al., 2018; Bloom, 2009; Basu & Bundick, 2017; Bachmann & Bayer, 2014). Tough, both macro and firm-level uncertainty is important that could impact the managerial decision making including financial reporting, investment, hiring and advertising (Bloom, 2009; Stein & Stone, 2013; Arif et al., 2016; Gulen& Ion, 2015), a few papers analyzed the impact of micro-level uncertainty on managerial decision making related to reporting of the firm's earnings (Cormier et al., 2013). According to Graham et al. (2005) top-level management spent a considerable time for planning to achieve financial objectives and to present the positive image of firm's performance to shareholders (Healy & Wahlen, 1999).

However, opportunistic decisions by management could create a moral hazard as shareholders do not have much information. Such opportunistic behaviors could be controlled through accounting standards (Wilson, 2015; Sohn, 2016; Commerford et al., 2018). One such accounting standard is accounting conservatism, which keeps balance among the use of accounting information. According to Guay & Verrecchia (2006), conservatism reduces opportunities for earnings management due to timely recognition of losses and delayed the recognition of profits. It also decreases the opportunities for opportunistic financial reporting behavior, and hence it is beneficial for financial statement users. Conservative reporting also reduces moral hazard and adverse selection issues between management, investors and lenders (Watts, 2003a; Kim, et al., 2015).

This paper aims to examine the impact of firm-level uncertainty on managerial decision-making, i.e. reporting and management of earnings and role of accounting conservatism to put limits on earnings management during micro-level uncertainty for firms listed on Pakistan stock exchange for the period 2005–2018. The rational for conducting this research work for Pakistan as it is an emerging economy with lower saving rate (13.5 percent only), higher macro and micro-level uncertainty and weak investors' protection. The prevalence of earnings management could erode the investors' confidence. According to Pakistan Economic survey (2018–2019), investment of country has dropped from 10.3 to 9%. The only way to gain investor confidence and to attract investment is to present true, fair, and unbiased financial information by applying accounting rules like conservatism (Hsieh et al., 2019; Lara et al., 2012). This unique context justifies the need for the

research and could contribute to policymaking. According to previous literature, i.e. (Abid et al., 2018), Earnings management is more prevalent in economies, which have weak growth rates, weak protection for investors, abortive judicial system, weak enforcement mechanisms, underdeveloped equity markets, and unadulterated ownership.

This study contributes to literature for earnings management during uncertainty and the role of accounting conservatism. The accounting conservatism as a rational way to solve business uncertainty will offer an alternate explanation of accounting conservatism. It contributes to literature related to accounting conservatism as previous work provides contracting explanations of conservatism (Ball et al., 2000; Watts, 2003a). This work also contributes to the accounting literature by analyzing the relationship between financial reporting and business strategy and earnings management (Bentley et al., 2014; Ittner & Larcker, 2001). This study contributes to the emerging accounting literature related to uncertainty. In opposition to principal-agent theory, the study of decision making under uncertainty analyzes the situation where threats come from unfamiliar sources. Studying financial reporting with uncertainty will be a promising future research direction.

We use the Modified Jones model (Dechow et al., 1995) and Dechow and Dichev (2002) to estimate earnings management. Management literature documents that firms with varied business strategy face different levels of uncertainty (Miller & Friesen, 1982; March, 1991; Miles & Snow, 2007). In accounting literature, a dichotomous measure based on business strategy is applied as a proxy for uncertainty (Hsieh et al., 2019). This strategy identifies firms as a prospector or as a defender. Prospectors are those companies that actively look for new business opportunities by focusing on innovation and invest substantially in R&D while "Defenders" are those firms whose goal is an efficient provision of current products and to develop expertise in a very narrow area. Prospector firms face higher level of uncertainty than to defenders, and Khan & Watts (2009) model is applied to measure accounting conservatism.

Following the literature, we analyze (i) link between earnings management and firm-level uncertainty (ii) association between accounting conservatism and earnings management (iii) impact of accounting conservatism on earnings management during firm-level uncertainty (iii) finally, relationship between accounting conservatism and firm value, as proxied by an accounting-based measure (ROA) and a market based measure (Tobin's). Our theoretical predictions are supported by empirical results. First, Prospector firms have a positive and significant relationship with earnings management. Secondly, we find, firms that are more conservative are less involved in earnings management. Thirdly, we document negative and statistically significant effects on interaction terms of uncertainty and conservatism showing that conservative firms are less involved in earnings management during uncertainty. Lastly, our results are positive and significant for accounting conservatism on firm value during uncertainty. Our results are robust after applying two different measures of earnings management and also after addressing endogeneity issue and applying generalized method of moments (GMM) approach.

Section 2 is for literature review and hypothesis development, Section 3 discusses variables and material, Section 4 for empirical specification Section 5 for Empirical Estimations, and Section 6 concludes the study with recommendations and limitations.

2. Literature review

Schipper (1989) defined earnings management as an intervention by management to obtain some personal benefits. Literature of economics and finance documents that managerial decision making related to reporting of earnings under uncertainty is different from decision making under risk (Heinsalu, 2011). In risk, all potential consequences are known at the beginning of issue whereas under uncertainty possibility of all outcomes is not known. Knight (1971) suggested that risk is different from uncertainty. The critical difference is that decision making process is different under risk and uncertainty. For risk, decision-maker has maximum information about all possible outcomes, which facilitates to take the best solution while for uncertainty, there is lack of information.

According to (Miles & Snow, 2007), firms that adopt different business strategies face different levels of uncertainty. Literature documents that innovative firms (prospectors) engage more in earnings management than non-innovative (defenders) firms. Prospectors or innovative firms may need more funds for new projects. The requirement of such capital put pressure on management to manage earnings to meet the requirements of analysts (Fuller & Jensen, 2002; Osma & Young, 2009). Literature (Ali et al., 2012) indicate that market participants undervalue R&D expenses. Therefore, firms may engage in earnings management to attract more capital (Cohen et al., 2008). Recently Bens et al. (2018) and Hansen et al. (2018) report a positive association between earnings management and companies to engage in research and development. In line with these studies, this paper analyzes the earnings management for prospector firms. However, this stream of literature is not without controversy as a few studies shows opposite results by concluding that prospectors are less likely to engage in earnings management because prospector firms are in the startup phase and they have minimal emphasis on profit (Quinn & Cameron, 1983). Second, according to Graham et al. (2005), the motivation to engage in earnings management is often for capital raising. If a firm already has enough resources, either from the capital venture or from other profit earning products then there is less pressure to smooth or manage earnings. Based on the above-cited literature, following hypothesis is formulated.

H_1: For Prospectors, Earnings management will be higher during uncertainty.

A few studies have studied the relationship between conservative accounting and earnings management. A question related to conservative accounting and earnings management is how accounting conservatism affects earnings management is still unanswered (Ruch & Taylor, 2015). Conservatism in accounting is the tendency of an accountant to report a high degree of verification of good news. Bad news is incorporated in a timelier manner as compared to the good news. Conservatism does not arise due to accounting standards, but it is also due to incentives for management to postpone bad news for some later time. Accounting conservatism is defined as accounting policies and procedures that result in the lesser accounting value of assets as compared to the economic value of assets.

Since, at the earlier level of accounting theory, accounting conservatism attracted several researchers. However, there are a diversified number of opinions about conservatism even today. Many prominent researchers, including Hatfield and Paton, criticized accounting conservatism (Chatfield, 1996). Some of the views against the use of conservatism because 1) conservatism does not show consistency as in one period it shows higher level of income, and in another, it shows decrease in income 2). Along with other problems, conservatism being as arbitrary gives too much power to managers about reporting (Goh & Li, 2011).

According to Lara et al. (2012), high conservative companies are less involved in earnings management in US firms and reported a negative relationship between earnings management and accounting conservatism. Similarly, Chenet et al. (2007) and Abed et al. (2012) analyzed association between accounting conservatism and earnings management and reported a negative link between conservatism and discretionary earnings management. Haque et al. (2016) investigated nonfinancial firms listed on Pakistan Stock Exchange (PSE) for period 1999–2013 and reported a negative association between conservatism and earnings management.

While studies by Lobo et al. (2008), Kwon et al. (2006) show a positive affinity between conservatism and earnings management. Gao (2013) document that conservatism facilitates contracting efficiency and hence, curbs managers' incentives for inflating earnings. As a result more conservative firms are more likely to involve in earnings management. However, Jackson & Liu (2010) investigate the allowance for doubtful accounts and reported that conservatism is positively linked with earnings management. Empirical findings of Kwon et al. (2006) also reported a positive association between earnings management and conservatism for high tech firms. Based on the above-mixed findings following hypotheses are formulated.

H2: Accounting conservatism results in a lower level of earnings management.

H3: For Prospectors**,** accounting conservatism results in a lower level of earnings management during uncertainty.

The association between conservative reporting and firm value has mixed results and remained controversial as few studies suggest that conservatism improves firm value by restricting opportunistic behavior of managers (Watts, 2003a; Watts, 2003b; LaFond and Watts, 2008; Kim et al., 2011; LaFond and Roychowdhury, 2008) while few studies contradict this viewpoint and argue that conservatism could distort firm value by destroying information and allocation of resources. (FASB, 2010; Gigler et al., 2009). Due to contracting explanation of accounting conservatism, (Watts and Zimmerman, 1990; Basu, 1997; Kothari et al., 2010), it is hypothesized that conservatism increase the firm worth by 1) improving firm's capacity to borrow 2) decreasing managerial opportunistic behavior. Prior studies (Ahmed et al., 2002; Zhang, 2008) suggest that conservative reporting facilitates the decrease in borrowing cost by reducing interest expense. Besides, according to Kaplan and Zingales (1997), conservative reporting reduces financial constraints for firms by fixing the wedge among internal and external funds cost and also empowers firms to invest in more profitable projects. Hence, firm's underinvestment will decrease because of increase in borrowing capacity. The positive net present value (NPV) generated by all those marginal and profitable projects accumulate to the equity which improved firm value. According to Watts (2003a), LaFond and Watts (2008) and LaFond and Roychowdhury (2008) accounting conservatism also restrict opportunistic behavior of managers. Ball (2001) and LaFond and Roychowdhury (2008) report that managers may have benefits or incentives to overstate earnings and net assets and they may expand size of firm beyond its optimal capacity and may also continue to invest in less profitable projects. Accounting conservatism as it imposes limits on the verifiability threshold for profit and losses imposes limits on managers to overstate the company's financial output and overinvest. This role of conservative reporting, in turn, enhances the value of the firm.

H4: For Prospectors**,** Higher level of conservatism during uncertainty results in a higher value of firms.

3. Material and methods

The data set of this study is the 557 listed companies of Pakistan Stock Exchange (PSX) 2005–2018. The focal point of the study is that nonfinancial listed companies as the financial sector work under a different regulatory environment and estimation of earning management for financial companies are quite challenging (Tsipouridou & Spathis, 2012). The companies that were not listed or not remained operational throughout period of study were excluded. Only those companies are selected which have financial data of all variables. After applying these filtration techniques, the initial sample has 394 non-financial companies from 14 different industries from 2005–2018 with 5670 firm-year observations. The data has been gathered from Pakistan Stock Exchange, annual reports of respective companies, business recorder, and State Bank of Pakistan.

First level screening of data has observed a few outliers which could influence the generalizability of results. Hence, data was trimmed by applying z-score, which excludes further 34 companies with extreme values reducing the sample to 366 nonfinancial firms. The sample size is 68% of population of firms listed on the PSX. Furthermore, year 2005 was taken as a lag year to estimate some variables i.e. accruals for EM (earnings management); hence for subsequent analysis, a total of 5354 firm-year observations of 362 companies and for uncertainty 3749 firm-year observations for 13 years were used.

3.1. Measuring earnings management

Modified Jones model (1995) by Dechow et al. (1995) is the commonly used model in previous studies. To check our hypotheses, two different models are applied 1) modified Jones (1991) model, and (2) Dechow and Dichev (2002) for robustness of our findings. According to Dechow et al. (2010) "the use of these models has become the accepted methodology in accounting to capture discretion". Accruals for earnings management can be calculated by using both time series data and cross-sectional. We applied cross-sectional approach as the literature suggests this model is better than time series approach because it is re-estimated for every year and hence, it cleansed economic changes which might have an effect on expected accruals (Subramanyam, 1996).

3.1.1. Modified Jones model (Dechowetal., 1995)

Modified Jones mode l (Dechowetal., 1995)is the commonly used model in previous studies as this model disintegrates accruals as discretionary and non discretionary. Dechow et al. (1995) suggested this method after adjusting for change in sales and receivable. This model reduces measurement error for discretionary accruals when discretion is applied over sale.

$$TACC_{it} = \partial_0 + \partial_1(\Delta sales_{it} - \Delta \mathrm{Re}c_{it}) + \partial_2 PPE_{it} + \partial_3 ROA_{it} + \partial_4 SG_{it} + \varepsilon \quad (1)$$

Following Collins & Hribar (2000) cash flow approach is applied to measure accruals and calculated as the difference between earnings before extraordinary items and operating cash flows taken from the statement of cash flows. $\Delta sales_{it}$ shows the change in sales, $\Delta \mathrm{Re}c_{it}$ is for the change in accounts receivable, and PPE_{it} is for the gross property, plant, and equipment. According to Kothari et

al. (2005) and Collins et al. (2012), ROA_{it} and SG_{it} are used as additional explanatory variables to control the effect of performance and firm growth. All variables are lagged by total assets.

3.1.2. Dechow and Dichev (2002) approach

Another measure of earnings management Dechow and Dichev (2002) approach is applied as this measure is a function of past, present, and future cash flows given their purpose to alter the timing of cash flow recognition in earnings

$$\Delta wc = \partial_0 + \partial_1 CFO_{t-1} + \partial_2 CFO_t + \partial_3 CFO_{t+1} + \varepsilon_{it} \tag{2}$$

where $\Delta wc = w_{t-1} - w_t$

$\triangle$ wc is change in working capital, $\triangle AR$ stands for change accounts receivable, $\triangle AP$ is for change accounts payable, and $\triangle TP$ shows a change in taxes payables.

3.2. Measurement of uncertainty

According to management literature, Miller & Friesen (1982); March (1991); firms who adopt different/business strategies face different levels of uncertainty. This paper applies Bentley, Omer et al. (2013) business strategy, as a dichotomous empirical measure of uncertainty. This strategy is based on the earlier work of Ittner et al. (1997) and Simons (1987). The rationale of applying Bentley, Omer et al. (2013) business strategy as proxy of uncertainty is that it is based on publicly disclosed accounting information. This strategy identifies firms as a prospector or as a defender. This apply Ittner et al. (1997)business strategy score as a proxy of uncertainty. Business strategy score is a sum of six variables (Table 1) calculated as an average of rolling five year window. These six variables are calculated for firm-year and then ranked into quintiles for each year and sector. The observation which is on the highest quintile, given a score of five and observation which is on lowest quintiles, has a score of one. The business strategy of a firm is calculated as the sum of all six variables, for which 30 is maximum value and 6 is lowest value. The higher score is representing prospector-oriented strategy, and the lower score is representing defender type strategy. Further, a dummy variable is created which is equal to 1 if score is higher than 18 and represents prospector firm and 0 otherwise.

3.3. Measuring accounting conservatismKhan and Watts (2009) Model (C score and G score)

To measure conservatism, this study applies Khan and Watts (2009) model that is based on the actual model of the Basu (1997)

$$E_{it} / P_{it} = \beta o + \beta_1 D_{it} + \beta_2 R_{it} + \beta_3 D_{it} R + \varepsilon_{it} \tag{3}$$

where:

$E_{it} / P_{iyt} =$ Earnings per share scaled by the share price at the beginning of the period

D_{it} = Indicator variable that takes a value of one ifR_{it} is negative and zero otherwise

R_{it} Rate of return (cumulative, 12 months)

$\boldsymbol{\beta}_2$ represents timeliness measurement for good news and $\boldsymbol{\beta}_3$represent the measurement of bad news timeliness. Khan & Watts (2009) referred to good news timelines as G-score and bad news timelines measurement as C-score.

$$G\_Score = \beta_2 = \mu_{1t} + \mu_{2t} SIZE_{it} + \mu_{3t} MTB_{it} + \mu_{4t} LEV_{it} \quad (4)$$

$$C\_Score = \beta_3 = \lambda_{1t} + \lambda_{2t} SIZE_{it} + \lambda_{3t} MTB_{it} + \lambda_{4t} LEV_{it} \quad (5)$$

where SIZE is log (Total Assets), MktB for market to book ratio estimated as equity market value divided by equity book value and LEV is leverage and is calculated as total debts (long term + short term) divided by total assets. Equations (4) and (5) are firm-year timelines estimations of G-Score and C-Score respectively. Equation (4) and (5) are not regression models; we put these values in equation (3) to estimate the annual cross-sectional regression model. The following annual cross-sectional model is used to estimate bad news timelines (c-score) and good news timelines (G-score).

$$E_{it} / P_{it} = \beta_0 + \beta_1 D_i + R_i(\mu_1 + \mu_2 SIZE_i + \mu_3 MTB_i + \mu_4 LEV_i) + D_i R_i(\lambda_1 + \lambda_2 SIZE_i + \lambda_3 MTB_i + \lambda_4 LEV_i) + (\delta_1 SIZE_i + \delta_2 MTB_i + \delta_3 LEV_i + \delta_4 D_i SIZE_i + \delta_5 D_i MTB_i + \delta_6 D_i LEV_i + \varepsilon_{it} \quad (6)$$

4. Econometric specifications

The analysis of study goes on the following levels. At the first level it analyzes earnings management and uncertainty at firm-level. Secondly, it investigates the impact of conservatism on earnings management (EM) of sample companies. Thirdly, it examines the moderating role of accounting conservatism to mitigate earnings manipulation during firm-level uncertainty. At final level, this study analyzes the impact of conservatism on firm value during uncertainty.

To test the first hypotheses (H_1), we develop and apply regression models and also control for variables that can have a possible infernal impact on earnings management.Firstly, the following model has been estimated to analyze the comprehensive relationship of firm-level uncertainty and discretionary earnings management

$$EM_{it} = \beta o + \beta_1 Uncertaint y_{it} + \beta_2 \sum Control_{it} + industry\_FE + Year\_FE + \varepsilon_{it} \quad (7)$$

EM_{it} is earnings management for firm i in a year t which is estimated by applying the models modified Jones (Dechow et al., 1995) and Dechow and Dichev (2002). Uncertainty is a dummy variable which is equal to 1 when a firm is prospector and otherwise 0. Control is for control variables which include: *Size, Market Leverage, PrtB*. Firm's performance is measured by *ROA* and is calculated by net income by total assets *cycle* measured by receivables in days plus inventory in days less payable in days, all at the start of the year longer the firm operating cycle more chance to manage earnings measured by Dechow (1994).To test hypotheses 2, the impact of accounting conservatism on earnings management practices following model has been applied

$$EM_{it} = \beta o + \beta_1 AcctConv_{it} + \beta_4 \sum Control_{it} + industry\_FE + Year\_FE + \varepsilon_{it} \quad (8)$$

AcctConv is accounting conservatism measured by applying Khan & Watts model (Thijssen & Iatridis, 2016; Khurana & Wang, 2019; Khalil et al., 2019; Lobo et al., 2019). EM and Control are the same as in model-1 expect that this model includes more variables to control information asymmetry as it has an impact on accounting conservatism. Information asymmetry is measured by spread calculated as a difference of bid and asks prices. According to LaFond & Watts (2008) and Khan & Watts (2009) risk also have an impact on accounting conservatism. Thus, to control the impact of risk, RISK is incorporated as a control variable and is measured as daily adjusted market returns named as volatility.

At the third stage, Hypotheses 3, analyze the relationship between uncertainty and EM and the role of accounting conservatism to reduce earnings management. For this purpose, following the regression model has been constructed;

$$EM_{it} = \beta o + \beta_1 AcctConv_{it} + \beta_2 Uncerta\,\text{int}\, y_{it} + \beta_3 AcctConv_{it} * Uncerta\,\text{int}\, y_{it} + \beta_4 \sum Control_{it} + industry\_FE + Year\_FE + \varepsilon_{it} \quad (9)$$

Finally, following Hsieh et al. (2019)more conservatism should result in higher firm value, the firm value of conservative firm during uncertainty is measured by the below regression equation;

$$FV_{it} = \beta o + \beta_1 AcctConv_{it} + \beta_2 Uncerta\,\text{int}\, y_{it} + \beta_3 AcctConv_{it} * Uncerta\,\text{int}\, y_{it} + \beta_4 \sum Control_{it} + industry\_FE + Year\_FE + \varepsilon_{it} \quad (10)$$

FV_{it} is firm value, measured by both accounting proxy *(ROA)* and market proxy (Tobin's q). Control is control variables which includes: *Size* is equity' book value (expected sign Positive) to control form firm size in relative sector, Market *Leverage* is book value of debt scaled by assets market worth.(expected sign Positive), *PrTB* is Price to book ratio is per share market value scaled byper share book value and per share book value is total assets minus total liabilities divided by outstanding shares, firm performance measured by *ROA* and is obtained as net income divided by total assets (expected sign both positive and negative) *cycle* measured by receivables in days plus inventory in days less payable in days, all at the start of the year longer the firm operating cycle more chance to manage earnings measured by Dechow (1994) (expected sign Positive). Sales are log of total sales revenue, SalesGrow is for growth in sales. Volatility is standard deviation (SD) of market-adjusted daily stock returns. (expected sign Positive). Spread is average of daily spread measured as midpoint of bid and ask price (expected sign Positive). MktCap is Calculated as logarithm of market capitalization. MktShare is percentage of company's sales divided by industry sales.

5. Empirical estimations

Table1 shows the descriptive statistics. The sample consists of 5354 firm-year observations over the period 2005 to 2018. The mean, SD (standard deviation), mean, minimum and maximum values are reported.

Table 1. Descriptive statistics.

Variables	Obs	Min	Mean	Median	Max	SD
EM_{it}	4279	−0.6851	0.691	−0.4436	23.782	4.36
$Uncertanity_{it}$	5503	−4.605	1.768	1	8.165	1.766
$AcctConv_{it}$	5214	−7.604	−0.738	−0.5244	7.636	1.730
$Size_{it}$	5207	1.7019	2.44	2.625	3.008	0.42093
$MktLev_{it}$	4020	4.605	2.269	1.189	12.494	2.345
$PrtB_{it}$	4892	1.609	11.632	13.053	20.055	4.045
$Cycle_{it}$	3751	13.63	4.912	4.481	20.565	4.298
$SaleGrow_{it}$	3112	−2.30	12.345	9.878	20.895	4.127
$Sales_{it}$	4892	−1.58	10.235	13.964	12.389	5.217
$Spread_{it}$	4715	−2.30	3.001	2.830	8.979	1.485
ROA_{it}	5308	7621.43	22.1903	2.895	95274.4	1331.384
$Volatility_{it}$	5354	−4.6051	1.7686	8.45	8.1657	1.7669
$MktCap_{it}$	4480	−0.6851	12.7846	13.665	23.7821	4.3605
$MktShare_{it}$	5216	1.0986	10.1940	11.565	18.3825	3.8383

Note: EM for earnings management. Uncertainty is a dummy variable. AcctConv for accounting conservatism calculated by Khan & Watts approach, SIZE total equity of firms. PrtB is price to book ratio. Cycle for operating cycle estimated as days receivable + days inventory−days payable, SalesGrow for growth in sales and measured as change in annual sales scaled by last year's sales, Sales is natural log of annual sales, Spread is annual average of daily spread scaled as midpoint of bid and ask, ROA isnet income divided by total assets, Volatility for return volatility and defined as daily stock returns Standard deviation, MktCap for market capitalization proxied as natural logarithm of market capitalization, MktShare for for market share and is calculated as percentage of company's sales divided by industry sales.

Empirical results of the regression model for hypotheses 1 are reported in Table 2 where col(1) reports regression output with book value accounting measures, and col(2) includes market measure variables for M1 and M2 where M1 is for the modified model, and M2 is for Dechow and Dichev(2002) approach. Uncertainty is a dummy variable and is calculated by applying Bentley, Omer et al. (2013) approach.Earnings management (EM) shows a positive and significant link with uncertainty0.05 and 0.01 significance level respectively for both EM models which support hypotheses 1 indicating that firm facing uncertainty have greater chances to engage in earnings management. SIZE is negative and significant for M1 (col(2)). ROA is significantly negative for both models by showing that more profitable firms are less suspect to involve in earnings management. MktLEV is positive and significant indicating higher level of leverage is linked to earnings management as supported by previous studies (Hsieh et al., 2019). The cycle shows positive and significant relationship means larger firms operating cycle higher are chances to engage in earnings management as predicted and supported by studies of (Khan & Watts, 2009; Zang, 2011).

Table 2. Regression output of H_1 earnings management and uncertainty.

Variables	EM			
	M1-Modified Jones Model		M2-Dechow and Dichev approach	
	col(1)	col(2)	col(1)	col(2)
$Uncertainty_{it}$	0.4895***	0.134**	0.130***	0.134***
	(0.038)	(.1717)	(0.080)	(0.0785)
ROA_{it}	−0.133***	−0.382***	−0.051***	−0.1620054***
	(0.001)	(0.0051)	(0.006)	(0.0732)
$Size_{it}$	0.1336	0.264***	3.5423***	0.634
	(0.150)	(0.532)	(0.678)	(0.368)
$Cycle_{it}$	0.67481***	0.0051	0.180	0.9299***
	(0.024)	(0.0156)	(0.014)	(0.0078)
$SaleGrow_{it}$	−0.0105***	−0.1028***	0.007	0.192**
	(0.003)	(0.0470)	(0.007)	(0.734)
$PrtB_{it}$		0.733***		−0.433***
		(0.0916)		(0.020)
$MktLEV_{it}$		0.790***		0.1722***
		(0.0540)		(0.262)
$MktShare_{it}$		−0.0070		−0.149
		(0.0358)		(0.144)
$MktCap_{it}$		0.0047		0.0020
		(0.0124)		(0.0064)
Observations	3749	3749	3235	3235

Note: ***significance at 0.01, **significance at 0.05, *significance at 0.1. Standard errors reported in parantheses.

Table 3 reports the output from models 2. The findings reported in Table 3 are according to our predictions. In Table 3, col(1) reports regression output with book value accounting measures, and col(2) includes market measure variables in addition to book value accounting measures for M1 and M2.Empirical findings are based on the results reported in col(2) for M1 and M2 as it includes all book-based and market-based measures. M1 is for modified model and M2 is for Dechow and Dichev (2002) approach. Accounting conservatism measured by Khan & Watts model is associated with lower earnings management. Specifically, we find that conservatism is related to lower level of accruals, as measured by our *Modified jones model (1995)* (*AcctConv* = −0.023), and Dechow and Dichev (2002) approach (AcctConv = −0.0862) earnings management proxies, indicating that accounting conservatism facilitate to reduce earnings management by 2% in M1 and by 8% in M2.Overall, empirical results are supported by the arguments of Watts (2003) and Guay and Verrecchia (2006) that conservatism decreases the opportunities for earnings management. Most of the control variables are statistically significant and have signs as predicted. Only Mktshare is statistically insignificant. Spread is significant in both models M1 and M2 but it is positively related to M1 and is negative in M2.

Table 3. Regression output of H_2: earnings management and accounting conservatism.

Variables	EM			
	M1-Modified Jones Model		M2-Dechow and Dichev approach	
	col(1)	col(2)	col(1)	col(2)
$AcctConv_{it}$	−0.1368***	−0.0231***	−0.0302*	−0.0862**
	(0.336)	(0.0073)	(0.0182)	(0.001)
$SIZE_{it}$	1.318**	3.7076***	0.3199	0.1917*
	(0.5960)	(0.015)	(0.3282)	(0.6736)
$SaleGrow_{it}$	0.6511	3.7545***	−0.0866	0.1336
	(0.0442)	(7.56)	(0.00834)	(0.1508)
ROA_{it}	−0.0107**	1.6413	−0.0177***	−0.0133***
	(0.0047)	(2.512)	(0.0024)	(0.0011)
$Cycle_{it}$	0.0194*	0.0862***	0.0320***	0.0976**
	(0.0146)	(0.2663)	(0.0083)	(0.0394)
$PrtB_{it}$		−0.787***		−0.115
		(.094)		(0.143)
$Spread_{it}$		0.3041***		0.0143**
		(.0640)		(0.0177)
$MktLEV_{it}$		0.852***		0.865**
		(0.008)		(0.823)
$MktCap_{it}$		−0.4431***		−0.0105**
		(0.008)		(0.00365)
$MktShare_{it}$		−0.0290		−7.633
		(0.0205)		(15.025)
Observations	4383	4383	4068	4068

Note: ***significance at 0.01; **significance at 0.05;*significance at 0.1. Standard errors reported in parantheses.

Empirical results of the regression model for hypotheses 3 are reported in Table 4 where col(1) reports regression output with book value accounting measures and col(2) includes market measure variables for M1 and M2.M1 is for modified model and M2 is for Dechow and Dichev (2002) approach. Uncertainty is a dummy variable and is calculated by applying Bentley, Omer et al. (2013) approach. Earnings management (EM) shows a positive and significant with uncertainty at 0.05 and 0.01significance level respectively for both EM models which supports hypotheses 1 indicating that firm facing uncertainty have greater chances to engage in earnings management by 0.213. Our findings are same as documented in literature Fuller and Jensen (2010), Ali et al. (2012), Bens et al. (2018) and Hansen et al. (2018). SIZE is negative and significant at 0.01 for M1 (col(2)). ROA is negatively significant for both models by showing that more profitable firms are less suspect to involve in earnings management. MktLEV is positive and significant indicating higher level of leverage is linked to earnings management as supported by previous studies (Hsieh et al., 2019). Cycle shows positive and significant relationship means larger firms operating cycle higher are chances to engage in earnings management as predicted and supported by studies of (Khan & Watts, 2009; Zang, 2011).

Table 4: Regression Output of H_3: accounting conservatism, earnings management and uncertainty.

Variables	EM			
	M1-Modified Jones Model		M2-Dechow and Dichev approach	
	Col(1)	Col(2)	Col(1)	Col(2)
AcctConv_{it}	-0.3034^{**}	-0.2451^{***}	-0.037	-0.258^{***}
	(0.1125)	(0.005)	(0.045)	(0.007)
Uncertainty_{it}	0.1720	0.9408^{***}	1.239^{***}	6.1185^{***}
	(0.1628)	(0.129)	(0.0777)	(0.159)
AcctConv	-0.1826	-0.0330^{**}	-0.010	-0.5191^{**}
$*\ \text{Uncertainty}_{it}$	(0.1628)	(0.015)	(0.048)	(0.194)
SIZE_{it}	0.2659^{**}	1.1671^{**}	0.3831^{*}	3.0389^{***}
	(0.5957)	(0.504)	(0.2979)	(0.622)
Sales_{it}	0.4951^{***}	0.065	0.0212	0.713^{***}
	(0.066)	(0.041)	(0.0335)	(0.086)
SaleGrow_{it}	0.0731^{*}	0.0525^{**}	0.046^{**}	0.0083
	(0.044)	(0.0242)	(0.0222)	(0.0513)
Cycle_{it}	0.016	0.0230^{**}	0.021^{**}	0.0072
	(0.014)	(0.008)	(0.0076)	(0.016)
ROA_{it}	-0.097	-0.142^{***}	-0.142^{***}	-0.008^{*}
	(0.004)	(0.0025)	(0.0022)	(0.005)
PrtB_{it}		-0.127		-0.195^{***}
		(0.059)		(0.073)
MktLEV_{it}		0.496^{**}		0.583^{*}
		(0.271)		(0.058)
MktShare_{it}		-0.3531^{**}		-0.165^{**}
		(0.008)		(0.065)
Spread_{it}		0.2098^{***}		0.0073^{**}
		(0.041)		(0.036)
Volatility_{it}		-0.1484^{***}		-0.4478^{***}
		(0.045)		(0.097)
Observations	3749	3749	2833	2833

Note: *** significance at 0.01, ** significance at 0.05, * significance at 0.1. Standard errors reported in parantheses.

Table 5 reports the empirical results of hypotheses H4, where dependent variable is firm value and accounting conservatism, uncertainty, Col(1) and Col(2) is same as in previous tables. As prospector firms face greater uncertainty, conservative financial reporting result in higher value of firm. This hypothesis is examined by analyzing firm value of prospector firms. Where, firm value is proxied by both market based measure (tobin'q) and accounting based measure (ROA). Accounting conservatism is estimated by applying Khan & Watts model. Uncertainty is a dummy variable that takes value of 1 when sum of ratios (Appendix, Table1) is greater than 18 and 0 otherwise. Empirical findings are reported in Table 5, which shows positive and significant relationship between accounting conservatism and firm value at 0.01 for model 1 and at 0.05 for model 2 indicating that conservative firms reports higher value of firm. The interaction term of uncertainty and accounting conservatism have significantly positive association with firm value at 0.05 for both models M1 and

M2 suggesting that prospector firms adapting conservative reporting have higher firms value. This observation provides further insights for adopting conservative financial reporting. As for as control variables are concerned, SIZE, MktLEV and PrtB are significant at 0.01, 0.1 and 0.01 respectively. Overall, findings reported in Table 5 support argument that conservative reporting for firms facing uncertainty will result in greater firm value.

Table 5. Regression Output of H_4: accounting conservatism and firm value.

Variables	Firm Value			
	ROA		Tobin's Q	
	col(1)	col(2)	col(1)	col(2)
AcctConv_{it}	0.9903^{**}	1.260^{***}	0.2948^{*}	0.0138^{**}
	(0.5510)	(0.247)	(0.2278)	(0.012)
Uncertainty_{it}	-2.810^{**}	-3.0847^{***}	-0.6592^{**}	-0.0542^{**}
	(0.8910)	(0.880)	(0.3846)	(0.027)
AcctConv	0.9429^{*}	0.3123^{**}	0.2923	0.0203^{**}
$*\ \text{Uncertainty}_{it}$	(0.5884)	(0.228)	(0.2439)	(0.01404)
SIZE_{it}	0.8411^{***}	-0.9680^{***}	-0.2244^{***}	-3.4505^{***}
	(.3918)	(3.884)	(0.4696)	(0.123)
SaleGrow_{it}	0.1929	0.0703	0.1159	1.0040^{***}
	(.2541)	(0.067)	(0.1116)	(0.002)
Cycle_{it}	−0.319	−0.1328	-0.521^{*}	-0.5744^{***}
	(0.0857)	(0.087)	(0.0374)	(0.013)
MLEV_{it}		0.112^{*}		0.104^{***}
		(0.301)		(0.009)
PrtB_{it}		0.930^{***}		-0.334^{*}
		(0.452)		(0.002)
Spread_{it}		0.0918		0.0015
		(0.201)		(0.006)
Volatility_{it}		−0.1328		-0.1626^{***}
		(0.087)		(0.008)
Observations	3749		3749	

Note: ***significance at 0.01,**significance at 0.05, *significance at 0.1. Standard errors reported in parantheses.

6. Issue of endogeneity

In our econometric model there is an endogeneity issue since it isn't clear whether the causality originates from independent to dependent variable or the other way around. To address this issue, we apply the "Arellano-Bover/Blundell-Bond linear dynamic panel data estimation", an estimation technique with system GMM. This technique incorporates the lagged values of the dependent variable as instruments in the level equation and resolves the problem of misspecification. The validity of instruments is indicated by AR(1) and AR(2) and Hansen test, two serial correlation tests. Tables 6–9 report explanatory variables after applying system GMM and output show that all variables maintain their significance and directionality in comparison with OLS regression model.

Table 6. GMM Output of H_1 earnings management and uncertainty.

Variables	EM			
	M1-Modified Jones Model		M2-Dechow and Dichev approach	
	Col(1)	Col(2)	Col(1)	Col(2)
Lag M1	0.070*	0.095**		
	(0.084)	(0.026)		
Lag M2			0.106***	0.102**
			(0.013)	(0.017)
$Uncertainty_{it}$	2.160***	0.964***	1.394***	1.230***
	(1.009)	(.481)	(0.237)	(0.161)
ROA_{it}	−0.009	−0.031	−0.012 **	−0.009**
	(0.026)	(0.0127)	(0.004)	(0.003)
$Size_{it}$	6.621 *	7.358***	0.207**	0.812 ***
	(1.883)	(2.230)	(0.255)	(0.563)
$Cycle_{it}$	0.155**	0.048	0.014**	0.001
	(0.065)	(0.0369)	(0.006)	(0.011)
		0.070		0.480
		(0.067)		(0.574)
$PrtB_{it}$		0.208		0.041
		(0.1394)		(0.052)
$MktLEV_{it}$		−0.045		−0.077***
		(0.2272)		(0.062)
$MktShare_{it}$		−0.110		−0.031
		(0.215)		(0.065)
$MktCap_{it}$		0.031		0.002
		(0.027)		(0.007)
Wald Chi^2	108.89***	133.11***	127.18***	132.69***
Arella-Bond test AR(1)	−6.17***	−6.52***	−6.09***	−6.01***
Arella-Bond test AR(2)	−3.10***	−2.93***	−3.18***	−3.27***
Sargan test (Chi square)	514.61***	576.46***	538.06***	533.68***
Observations	3749	3749	3235	3235

Note: Dependent variable is earnings management. Robust standard errors are reported in parentheses. *** significance at 0.01, ** significance at 0.05, * significance at 0.1. col(1) for book value accounting measures and col(2) for both book and market based ratios.

Table 7. GMM Output of H_2 earnings management and accounting conservatism.

Variables	EM			
	M1-Modified Jones Model		M2-Dechow and Dichev approach	
	Col (1)	Col (2)	Col (1)	Col (2)
Lag M1	−0.216***	−0.132**		
	(0.024)	(0.211)		
Lag M2			−0.325***	−0.722**
			(0.233)	(0.677)
$AcctConv_{it}$	−0.123***	−0.224***	−0.198	−0.032***
	(0.06)	(0.085)	(0.059) ***	(0.029)
$SIZE_{it}$	1.93**	1.38**	0.596**	0.867
	(0.708)	(0.601)	(0.090)	(0.901)
$SaleGrow_{it}$	0.001	0.104	0.185	0.109
	(0.139)	(0.012)	(0.571)	(0.016)
$Cycle_{it}$	0.0106**	0.009**	0.015**	0.014*
	(0.031)	(0 .039)	(0.010)	(0.012)
ROA_{it}	−0.002**	−0.008**	−0.006**	−0.011**
	(0.004)	(0.008)	(0.008)	(0.003)
$PrtB_{it}$		0.074		0.038 *
		(0.185)		(0.072)
$MktLEV_{it}$		−0.094		−0.093
		(0.211)		(0.095)
$MktShare_{it}$		0.267**		0.024 **
		(0 .225)		(0.081)
$Spread_{it}$		−0.255***		−0.099 ***
		(0.002)		(0.029)
Wald Chi^2	352.48^{***}	126.34^{***}	272.26^{***}	43.88^{***}
Arella-Bond test AR(1)	-6.99^{***}	-2.56^{***}	-4.42^{***}	-2.81^{***}
Arella-Bond test AR(2)	0.66^{***}	-1.46^{***}	-1.79^{***}	-0.40^{***}
Sargan test (Chi square)	331.38^{***}	327.54^{***}	354.72^{***}	430.33^{***}
Observations	3749	3749	2833	2833

Note: Dependent variable is earnings management. Robust standard errors are reported in parentheses. *** significance at 0.01, ** significance at 0.05, * significance at 0.1. col(1) for book value accounting measures and col(2) for both book and market based ratios.

Table 8. GMM output of H_3: accounting conservatism, earnings management and uncertainty.

Variables	EM			
	M1-Modified Jones Model		M2-Dechow and Dichev approach	
	Col (1)	Col (2)	Col (1)	Col (2)
Lag M1	−0.216***	−0.234**		
	(0.153)	(0.418)		
Lag M2			−0.136***	−0.148**
			(0.014)	(0.032)
$AcctConv_{it}$	−0.178 ***	−0.205***	−0.012***	−0.001***
	(0.124)	(0.135)	(0.028)	(0.031)
$Uncertainty_{it}$	0.559**	0.263 ***	−1.410**	1.329***
	(0.516)	(0.546)	(0.251)	(0.207)
AcctConv	−0.103 **	−0.029**	−0.018 **	−0.045***
$*\ Uncertainty_{it}$	(0.140)	(0.142)	(0.044)	(0.040)
$SIZE_{it}$	2.52*	2.486***	0.205*	1.634***
	(0.836)	(0.567)	(0.251)	(0.911)
$Sales_{it}$	0.512	0.821	0.106	0.321
	(0.549)	(0.133)	(0.013)	(0.098)
$SaleGrow_{it}$	0.104	0.765	0.674	0.347
	(0.012)	(0.876)	(0.036)	(0.013)
$Cycle_{it}$	0.032**	0.020**	0.014 *	0.015*
	(0.019)	(.022)	(0.006)	(0.008)
ROA_{it}	−0.005 ***	−0.012**	−0.012***	−0.006***
	(0.012)	(0.010)	(0.004)	(0.004)
$PrtB_{it}$		-0.461		−0.042
		(0.181)		(0.058)
$MktLEV_{it}$		-0.123		−0.085
		(0.251)		(0.089)
$MktShare_{it}$		0.218		0.100
		(0.243)		(0.078)
$Spread_{it}$		0.054 **		0.052**
		(0.095)		(0.028)
$Volatility_{it}$		0.480		0.010
		(0.574)		(0.011)
Wald Chi^2	295.04***	176.9***	150.65***	170.34***
Arella-Bond test AR(1)	−6.97***	−2.60***	−4.45***	−3.35***
Arella-Bond test AR(2)	1.20***	−1.19***	−1.76***	−0.26***
Sargan test (Chi square)	486.37***	139.35***	353.34***	300.41***
Observations	3749	3749	2833	2833

Note: Dependent variable is earnings management. Robust standard errors are reported in parentheses.*** significance at 0.01, ** significance at 0.05, * significance at 0.1 col(1) for book value accounting measures and col(2) for both book and market based ratios.

Table 9. GMM output of H_4: accounting conservatism and firm value.

Variables	Firm Value			
	ROA		Tobin's Q	
	Col (1)	Col (2)	Col (1)	Col (2)
Lag ROA	0.875***	0.367**		
	(0.013)	(0.286)		
Lag Tobin's Q			0.135***	0.923**
			(0.133)	(0.834)
$AcctConv_{it}$	0.278***	0.245***	0.794**	0.338***
	(0.134)	(0.195)	(0.465)	(0.629)
$Uncertainty_{it}$	−0.659**	−0.243***	−0.219***	−0.233***
	(0.416)	(0.986)	(4.101)	(4.378)
$AcctConv * Uncertainty_{it}$	0.123**	0.789**	1.215**	0.977*
	(0.180)	(0.232)	(0.721)	(0.841)
$SIZE_{it}$	2.62*	2.356***	3.83*	4.1728**
	(0.136)	(0.597)	(3.359)	(3.670)
$SaleGrow_{it}$	0.347 **	0 .241	1.230*	2.341**
	(0.198)	(0 .121)	(0.581)	(0.673)
$Cycle_{it}$	0.592	0.801	0.001	−0.089
	(0.589)	(0.123)	(0.067)	(0.088)
$PrtB_{it}$		−0.265		−3.348
		(0.475)		(0.902)
$MktLEV_{it}$		0.121**		0.155**
		(0.452)		(1.555)
$Spread_{it}$		0.112**		4.525***
		(0.513)		(1.360)
$Volatility_{it}$		0.224		0.0320
		(0.345)		(0.161)
Wald Chi^2	106.2***	441.22***	36.58 ***	31.23***
Arella-Bond test AR(1)	−7.03***	−1.74***	−2.44***	−2.12***
Arella-Bond test AR(2)	0.48***	0.61***	−1.70***	−0.66***
Sargan test (Chi square)	265.75***	100.84***	740.40***	248.74***
Observations	3749	3749	3749	3749

Note: Dependent variable is firm value. Robust standard errors are reported in parentheses. *** significance at 0.01, ** significance at 0.05, * significance at 0.1. col(1) for book value accounting measures and col(2) for both book and market based ratios.

7. Conclusion

Our paper provides empirical evidence on the impact of uncertainty on earnings management and the moderating role of accounting conservatism. The association between uncertainty and earnings management is measured by using proxies for uncertainty (Bentley et al., 2013) prospector-defender business strategy), earnings management (Modified Jones model (Dechow et al., 1995) Dechow and Dichev (2002) approach) and conservatism (Khan & watts model). Empirical estimations confirm the

hypothesis that during uncertainty firms involve in more earnings management, but accounting conservatism reduces earnings management during uncertainty and improves the firm value. We document a positive and significant effect of uncertainty on earnings management and negative relationship between earnings management and accounting conservatism as supported by literature (Ball & Shivakumar, 2006; LaFond & Watts, 2008; Lara et al., 2012; Haque et al., 2016).

The findings of this study contribute to the literature of accounting by providing and additional insight into the understanding of earnings management activity during uncertainty concerning the accounting conservatism. These findings will be useful to market participants by explicitly documenting the relationship between accounting conservatism and the extent of earnings management during uncertainty.

Our empirical findings have implications for both academic and practitioners. Our study provides counter-arguments to the decision by the policymakers about removal of conservatism from the conceptual framework. Although all organization face uncertainty, level of uncertainty vary across firms. When firms face high uncertainty conservative financial reporting will facilitate managers to make the right decisions.

Due to its certain limitations, this research also opens new research horizons for future researchers. The scope of this paper is limited to only conditional conservatism, and accrual earnings management. Future research could be conducted on the role of unconditional conservatism and real earnings management during uncertainty by taking another proxy of uncertainty. Second, Future research may also examine what is the net effect of accounting conservatism on the trade-off between accrual earnings management and real earnings management. Third, whether benefits of accounting conservatism (low accrual EM (earnings management) may not be outweighed by its costs (greater real earnings management).This study is using data of one country which may influence generalizability of the findings. A cross country might be conducted to overcome the issue of generalizability.

Conflict of interest

The authors declare no conflicts of interest in this paper.

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