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MANAGERIAL OVERCONFIDENCE AND EARNINGS MANAGEMENT

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Abstract

Overconfident executives tend to make their firms' financing and investment decisions irrationally. Thus, we predict that overconfident managers will be prone to have earnings management behavior. We analyze whether executive overconfidence affects earnings management, including accrual-based and real earnings management. Using quantile regression model and ordinary least squares model, the evidences indicate that managerial overconfidence is positively associated with accrual-based earnings management based on the 744 public listed companies from 2006 through 2012 in Taiwan. However, according to the results of quantile regression under different quantile, real earnings management and accrual-based earnings management has substitute relationship (negative association) in the lower overconfident quantile and has complementary relationship (positive association) in the higher overconfident quantile. The results support that managers with more overconfidence are inclined to use both kinds of earnings management compared with less overconfidence managers.

Keywords: Managerial overconfidence, Real earnings management, Accrual-based earnings management

Introduction

This study investigates whether and how managerial overconfidence affects firm's earnings management behavior. We use two kinds of earnings management measurement methods including real earnings management and accrual-based earnings management and especially focus on whether there exists complementary (or substitute) relationship between these two methods of earnings management in the different quantile level of managerial overconfidence.

Overconfident managers tend to make their firms' financing and also investment decisions aggressively and even irrationally based on prior research. Their aggressive or irrational managerial behaviors includes overestimating future investment projects (Heaton, 2002; Malmendier and Tate, 2005a, 2005b, 2008, 2011, 2015), lower dividend payout (Deshmukh, Goel and Howe, 2013), higher frequency of management forecast (Hribar and Yang, 2016; Libby and Rennekamp, 2012). More specifically, earnings management is viewed as playing a very important role in corporate decision (e.g., Xie, Davidson, and DaDalt, 2003; Cornett, Marcus, and Tehranian, 2008; Adam, Fernando, and Golubeva, 2015).

Investigating the effects of overconfidence on corporate policies, especially in accounting policies, is also important because overconfidence can induce decisions that destroy firm value. For example, Roll (1986) argues that managerial overconfidence (or hubris explains the reason why firms engage in value-destroying mergers or acquisitions. Similarly, distortions in other investment, financing, or accounting policies can be costly (Malmendier and Tate,2005, 2008; Ben-David, Graham, and Harvey, 2010).

Recently, a stream of accounting research focuses on the impact of overconfidence on the likelihood of AAER (Schard and Zechman, 2011), and financial restatement (Presley and Abbott, 2013). Since earnings management has become one of the most important issues in accounting theory and corporate governance, therefore whether overconfidence interacts with earnings management deserves further investigation. As such, extending this line of research, the purpose of this research is to investigate the effects of firm's managerial overconfidence on earnings management. We hypothesize that if overconfident managers overestimate future returns from their firms' project, they are likely to have earnings management behavior.

In this paper, we examine how manager's overconfidence affects both real and accrual-based earnings management activities. Our tests are based on a sample of 20,832 firm-years over 2006-2012 from public listed companies in Taiwan that have the available data needed to carry out our tests. Our primary measure of overconfidence is based on the managers' holding of shares following Malmendier and Tate (2005b).

The empirical results show that managerial overconfidence is negatively correlated with the real earnings management, meaning that overconfident managers seem to have less earnings management behavior.

However, managerial overconfidence is positively and significantly correlated with the accrual-based earnings management, supporting those overconfident managers may still manage earnings using some other method. Therefore, in order to clarify the relationship between accrual-based and real earnings management, we further investigate the interaction of accrual- based and real earnings management under different quantiles. The evidence show that when using absolute value of discretionary accruals as a proxy of earnings management, real earnings management and accrual-based earnings management has negative association (substitute relationship) in the lower overconfident quantile of 0.1 and even 0.5 but has positive association (complementary relationship) in the higher overconfident quantile of 0.9, 0.95, and 0.99.

The remainder of this paper is organized as follows. Section 2 reviews related literature and *develops hypotheses. Section 3 describes empirical design including empirical models, measures of overconfidence and earnings management, and description of data and sample. Section 4 analyzes the empirical results and provides sensitivity analysis. Section 5 concludes the paper.*

Literature Review and Hypotheses

Overconfidence and other self-serving biases have received significant attention for many decades in the social and experimental literatures (for example, Miller and Ross 1975; Svenson 1981; Alicke 1985). Based on prior research of behavioral finance, overconfidence refers to the tendency of people to overestimate their know- ledge and information accuracy. Overestimation of their ability leads to erroneous decisions and over-optimism. For example, older managers tend to be more conservative (Bertrand and Schoar, 2002).

Ahmed and Duellman (2013) investigate the relation between managerial overconfidence and accounting conservatism. Hsieh, Bedard, and Johnstone (2014) investigate the relation between CEO overconfidence and earnings management during shifting regulatory regimes. Hribar and Yang (2016) found that overconfidence managers increased optimism in voluntary disclosure, leading to overestimation of manager expectations and greater earnings management. Schrand and Zechman (2012) argue that managerial overconfidence increases the likelihood of manipulating financial reporting fraud and has unrealistic beliefs about future performance.

Prior research has found that there are certain relationship between real earnings management and accrual-based earnings management. For example, Kim, Wang, and Zhang (2016) examines the association between chief executive officer (CEO) overconfidence and future stock price crash risk. Enomoto, Kimura, and Yamaguchi (2015) show that managers in countries with stronger investor protection tend to engage in real earnings management instead of accrual-based earnings management. Alhadab, Clacher, and Keasey (2015) find that IPO firms experience a higher probability of IPO failure and lower survival rates in the post-IPO period when greater real earnings management takes place during the IPO as compared to accrual earnings management. Li and Hung (2013) claim that there is moderating effects of family control on the relation between managerial overconfidence and earnings management. Braam, Nandy, Weitzel, and Lodh (2015) examines whether the trade-off between real and accrual-based management strategies differs between firms with and without political connections.

Based on these above prior research, the following hypotheses are developed.

H1a: Managerial overconfidence is associated with accrual-based earnings management.

H1b: Managerial overconfidence is associated with real earnings management.

H2: Under different quantile level of managerial overconfidence, real earnings management and accrual-based earnings management has substitute or complementary relationship.

Data and Methodology

Sample Selection and Variable Definitions

Our sample period is from 2006 to 2012. The source of stock price and accounting variable is taken from Taiwan Economic Journal (TEJ). Our sample covers firms using calendar year and excludes those firms in the financial related industry or with insufficient data. Consequently, the final sample consists of 20,832 observations from 744 public listed companies. Table 1 includes definitions of all variables.

Quantile Regression

Quantile Regression as introduced by Koenker and Bassett (1978) seeks to complement classical linear regression analysis. Quantile regression model is to investigate whether the explanatory variables have different effects on the conditional distribution of the explanatory variables under different quantiles. Given regression parameter, quantile regression model is robust and is not easily affected by outlier or extreme value. We use quantile regression model as shown in Koenker and Hallock (2001) in the research.

Measurement of Real Earnings Management

Following the strategy of measuring real earnings management by Roychowdhury (2006) and also Cohen, Deyand, and Lys (2008), we consider three types of real activities as proxies including sales manipulation, reduction of discretionary expenses and overproduction. Then, following the regression model of Cohen et al. (2008), we use year-specific and industry- specific differentiation to calculate abnormal cash flows from operation, abnormal production costs and abnormal ruling costs based on residual values. The empirical models are shown as follows.

Table 1. Definition of Variables

Variable	Code	Definition
Real Earnings Management	REM	An composite indicator consists of sales manipulation, reduction of discretionary expenses and overproduction
Discretionary Accruals	DA	Discretionary Accruals are calculated following Kothari et al.(2005)
Absolute Discretionary Accruals	|DA|	Absolute value of discretionary accruals
Managerial Overconfidence	OC	Indicator variable equal to one if the manager of the firm increasingly purchases his own firm's stock over the past 4 quarters and zero otherwise.
Firm Size	Size	The natural logarithm of firm's asset
Return on Assets	ROA	The ratio of return after tax on total assets
Debt Ratio	LEV	The ratio of total debt on total assets
Market to Book Ratio	MB	The ratio of market value on book value
Ratio of Outside Director	Outside	The ratio of outside director in the board
Shareholding of Institution Investor	INSR	The ratio of shareholding owned by institution investor
Board Size	Bsize	Indicator variable equal to one if the size of the board is greater than the median of all sample firm and zero otherwise.
Shareholding of Board of Directors	Hold	The ratio of shareholding owned by board of directors

(Editor's Note: the following sections are in single column format to allow for easier reading).

Calculating abnormal cash flow from operating activities

$$\frac{CFO_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1\left(\frac{1}{A_{i,t-1}}\right) + \alpha_2\left(\frac{S_{i,t}}{A_{i,t-1}}\right) + \alpha_3\left(\frac{\Delta S_{i,t}}{A_{i,t-1}}\right) + \varepsilon_{i,t} \quad (1)$$

$$\frac{C\ddot{F}O_{i,t}}{A_{i,t-1}} = \hat{\alpha}_0 + \hat{\alpha}_1\left(\frac{1}{A_{i,t-1}}\right) + \hat{\alpha}_2\left(\frac{S_{i,t}}{A_{i,t-1}}\right) + \hat{\alpha}_3\left(\frac{\Delta S_{i,t}}{A_{i,t-1}}\right) \quad (2)$$

$$Abn\_CFO_{i,t} = \frac{CFO_{i,t}}{A_{i,t-1}} - \frac{\ddot{CFO}_{i,t}}{A_{i,t-1}} \quad (3)$$

Where $CFO_{i,t}$ is the cash flows from operating activities of current year; $A_{i,t-1}$ is the total asset of previous year; $S_{i,t}$ is net income of current year; $\Delta S_{i,t}$ is the current year's net income minus the prior year's net income; $\varepsilon_{i,t}$ is the residual term. And finally, $Abn\_CFO_{i,t}$ is the abnormal cash flow from operating activities.

Calculating abnormal production costs

$$\frac{COGS_{i,t}}{A_{i,t-1}} = \beta_0 + \beta_1\left(\frac{1}{A_{i,t-1}}\right) + \beta_2\left(\frac{S_{i,t}}{A_{i,t-1}}\right) + \varepsilon_{i,t} \quad (4)$$

Where $COGS_{i,t}$ is cost of goods sold of current year; $A_{i,t-1}$ is the total asset of previous year; $S_{i,t}$ is net income of current year; $\varepsilon_{i,t}$ is the residual term.

$$\frac{\Delta INV_{i,t}}{A_{i,t-1}} = \beta_0 + \beta_1\left(\frac{1}{A_{i,t-1}}\right) + \beta_2\left(\frac{\Delta S_{i,t}}{A_{i,t-1}}\right) + \beta_3\left(\frac{\Delta S_{i,t-1}}{A_{i,t-1}}\right) + \varepsilon_{i,t} \quad (5)$$

Where $\Delta INV_{i,t}$ is the current year's ending inventory minus the prior year's ending inventory; $A_{i,t-1}$ is the total asset of previous year; $\Delta S_{i,t}$ is the current year's net income minus the prior year's net income; $\varepsilon_{i,t}$ is the residual term. Because the production cost is the sum of the cost of goods sold (3.4) and the number of changes in inventory (3.5), hence, $Abn\_PROD_{i,t}$ is the abnormal production cost.

$$\frac{PROD_{i,t}}{A_{i,t-1}} = \beta_0 + \beta_1\left(\frac{1}{A_{i,t-1}}\right) + \beta_2\left(\frac{S_{i,t}}{A_{i,t-1}}\right) + \beta_3\left(\frac{\Delta S_{i,t}}{A_{i,t-1}}\right) + \beta_4\left(\frac{\Delta S_{i,t-1}}{A_{i,t-1}}\right) + \varepsilon_{i,t} \quad (6)$$

$$\frac{\ddot{PROD}_{i,t}}{A_{i,t-1}} = \hat{\beta}_0 + \hat{\beta}_1\left(\frac{1}{A_{i,t-1}}\right) + \hat{\beta}_2\left(\frac{S_{i,t}}{A_{i,t-1}}\right) + \hat{\beta}_3\left(\frac{\Delta S_{i,t}}{A_{i,t-1}}\right) + \hat{\beta}_4\left(\frac{\Delta S_{i,t-1}}{A_{i,t-1}}\right) \quad (7)$$

$$Abn\_PROD_{i,t} = \frac{PROD_{i,t}}{A_{i,t-1}} - \frac{\ddot{PROD}_{i,t}}{A_{i,t-1}} \quad (8)$$

Where $PROD_{i,t}$ is the sum of the cost of goods sold and the number of changes in inventory; $A_{i,t-1}$ is the total asset of previous year; $S_{i,t}$ is net income of current year; $\Delta S_{i,t}$ is the current year's net income minus the prior year's net income; $\varepsilon_{i,t}$ is the residual term.

Calculating abnormal discretionary expenses

$$\frac{Disexp_{i,t}}{A_{i,t-1}} = \gamma_0 + \gamma_1\left(\frac{1}{A_{i,t-1}}\right) + \gamma_2\left(\frac{S_{i,t-1}}{A_{i,t-1}}\right) + \varepsilon_{i,t} \quad (9)$$

$$\frac{Di\hat{s}exp_{i,t}}{A_{i,t-1}} = \hat{\gamma}_0 + \hat{\gamma}_1\left(\frac{1}{A_{i,t-1}}\right) + \hat{\gamma}_2\left(\frac{S_{i,t-1}}{A_{i,t-1}}\right) \quad (10)$$

$$Abn\_Disexp_{i,t} = \frac{Disexp_{i,t}}{A_{i,t-1}} - \frac{\widehat{Disexp}_{i,t}}{A_{i,t-1}} \tag{11}$$

Where $Disexp_{i,t}$ is the sum of research and development costs, advertising costs, sales and management costs; $A_{i,t-1}$ is the total asset of previous year; $S_{i,t}$ is net income of current year; is the residual term.

Calculating real earnings management index

Following Roychowdhury (2006) and Cohen et al. (2008), we consider that the sign of the impact direction about abnormal cash flow from operating activities, abnormal production costs, and abnormal discretionary expenses on earnings management is different. The measurement of real earnings management (*REM*) is measured as follows.

$$REM = (-1)Abn_{CFO_{i,t}} + Abn_{PROD_{i,t}} + (-1)Abn\_Disexp_{i,t} \tag{12}$$

Where REM is real earnings management, $Abn\_CFO_{i,t}$ is abnormal cash flow from operating activities, $Abn\_PROD_{i,t}$ is abnormal production costs, $Abn\_Disexp_{i,t}$ is abnormal discretionary expenses.

Calculating discretionary accruals

Following Kothari et al. (2005), we use discretionary accruals (DA) as the proxy of earnings management (Jones 1991; Defond and Jiambalvo 1994; Subramanyam 1996; Becker et al. 1998; Francis et al. 1999). We estimate discretionary accruals using cross-sectional data with same year and same industry. The estimating model is as follow.

$$\frac{TA_{i,t}}{A_{i,t-1}} = \alpha_0 + \hat{\delta}_1\left(\frac{1}{A_{i,t-1}}\right) + \alpha_2\left[\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}}\right] + \alpha_3\left(\frac{PPE_{i,t}}{A_{i,t-1}}\right)$$
$$+\alpha_4 ROA_{i,t-1} + \varepsilon_{i,t} \tag{13}$$

Where $TA_{i,t}$ is total accruals, $A_{i,t}$ is asset, $\Delta REV_{i,t}$ is change in sales, $\Delta REC_{i,t}$ is change in account receivable, $PPE_{i,t}$ is property, plant and equipment, $ROE_{i,t}$ is return on assets, $\varepsilon_{i,t}$ is the residual term.

First, we use ordinary least squares method to estimate the normal level of company's $\hat{\alpha}_0$, $\hat{\alpha}_1$, $\hat{\alpha}_2$,$\hat{\alpha}_3$, and $\hat{\alpha}_4$ from same industry (according to TEJ classification). Then, using specific firm's $\left(\frac{1}{A_{i,t-1}}\right)$, $\left[\frac{\Delta REV_{i,t}-\Delta REC_{i,t}}{A_{i,t-1}}\right]$, $\left(\frac{PPE_{i,t}}{A_{i,t-1}}\right)$, and $ROA_{i,t-1}$ to calculate equation (13) in order to compute the perdition normal level of non-discretionary accruals as shown in equation (14).

$$\frac{NDA_{i,t}}{A_{i,t-1}} = \hat{\alpha}_0 + \hat{\alpha}_1\left(\frac{1}{A_{i,t-1}}\right) + \hat{\alpha}_2\left[\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}}\right] + \hat{\alpha}_3\left(\frac{PPE_{i,t}}{A_{i,t-1}}\right) + \hat{\alpha}_4 ROA_{i,t-1} \tag{14}$$

Where $NDA_{i,t}$ is non-discretionary accruals. Finally, the difference between the actual total accruals and the estimated non-discretionary accruals results in the discretionary accruals as shown in equation (17).

$$\frac{DA_{i,t}}{A_{i,t-1}}=\frac{TA_{i,t}}{A_{i,t-1}}-\frac{NDA_{i,t}}{A_{i,t-1}} \qquad (15)$$

Measuring Overconfidence

Following Malmendier and Tate (2005b), managerial overconfidence is defined that whether manager increasingly purchases his own firm's stock over the past 4 quarters. OC is an indicator variable equals to one if manager increasingly purchases his own firm's stock over the past 4 quarters and zero otherwise.

Empirical Models

In order to test whether real earnings management and accrual-based earnings management are affected by the managerial overconfidence, and also whether there is substitute or complementary relationship between real earnings management and accrual- based earnings management under different quantile level of managerial overconfidence. The empirical model are as follows.

$$\begin{aligned} REM_{i,t} = {} & \beta_0 + \beta_1 OC_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 Lev_{i,t} \\ & + \beta_5 MB_{i,t} + \beta_6 Outside_{i,t} + \beta_7 INSR_{i,t} + \beta_8 Bsize_{i,t} \\ & + \beta_9 Hold_{i,t} + \varepsilon_{i,t} \qquad (16) \end{aligned}$$

$$\begin{aligned} DA_{i,t} = {} & \beta_0 + \beta_1 OC_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 Lev_{i,t} \\ & + \beta_5 MB_{i,t} + \beta_6 Outside_{i,t} + \beta_7 INSR_{i,t} + \beta_8 Bsize_{i,t} \\ & + \beta_9 Hold_{i,t} + \varepsilon_{i,t} \qquad (17) \end{aligned}$$

$$\begin{aligned} \left|DA_{i,t}\right| = {} & \beta_0 + \beta_1 OC_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 Lev_{i,t} \\ & + \beta_5 MB_{i,t} + \beta_6 Outside_{i,t} + \beta_7 INSR_{i,t} + \beta_8 Bsize_{i,t} \\ & + \beta_9 Hold_{i,t} + \varepsilon_{i,t} \qquad (18) \end{aligned}$$

$$\begin{aligned} REM_{i,t} = {} & \beta_0 + \beta_1 DA_{i,t} + \beta_2 OC_{i,t} + \beta_3 (DA_{i,t} * OC_{i,t}) + \beta_4 Size_{i,t} \\ & + \beta_5 ROA_{i,t} + \beta_6 Lev_{i,t} + \beta_7 MB_{i,t} + \beta_8 Outside_{i,t} \\ & + \beta_9 INSR_{i,t} + \beta_{10} Bsize_{i,t} + \beta_{11} Hold_{i,t} + \varepsilon_{i,t} \qquad (19) \end{aligned}$$

Empirical Findings

Descriptive Statistics

Table 2. shows the descriptive statistics of variables used in this study.

Table 2. Descriptive Statistics

Variable	Mean	Median	Standard deviation	Min	Max
REM	0	0.121	1.775	-21	18.19
DA	0	0	0.052	-0.97	1.15
lDAl	0.033	0.022	0.04	0	1.15
OC	0.04	0	0.196	0	1
Size	15.257	15.06	1.299	12.09	21.26
ROA	0.014	0.013	0.028	-0.55	0.717
LEV	0.357	0.351	0.157	0.006	0.97
MB	1.693	1.32	1.45	0.17	46.41
Outside	0.368	0.375	0.168	0	1
INSR	0.338	0.298	0.214	0	0.98
Bsize	0.453	0	0.498	0	1
Hold	0.217	0.189	0.124	0	0.789

Table 3. OLS And Quantile Regression Results of Real Earnings Management Model

$$REM_{i,t} = \beta_0 + \beta_1 OC_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 Lev_{i,t} + \beta_5 MB_{i,t} + \beta_6 Outside_{i,t} + \beta_7 INSR_{i,t} + \beta_8 Bsize_{i,t} + \beta_9 Hold_{i,t} + \varepsilon_{i,t}$$

Panel A: lower quantile

Variable	OLS	Quantile Regression (Lower Quantile)			
		q(0.01)	q(0.05)	q(0.10)	q(0.05)
Constant	0.465**	-10.9***	-5.36***	-2.9***	0.143
	(0.013)	(0.000)	(0.000)	(0.000)	(0.349)
OC	-0.042	-0.239	-0.108	0.032	0.027
	(0.500)	(0.523)	(0.490)	(0.814)	(0.538)
Size	-0.019	0.482***	0.265***	0.159***	0.023**
	(0.122)	(0.000)	(0.000)	(0.000)	(0.018)
ROA	-2.01***	-1.471	-0.941	-0.648	-3.69***
	(0.000)	(0.451)	(0.558)	(0.466)	(0.000)
Lev	0.99***	-2.096**	-1.16***	-0.481*	0.48***
	(0.000)	(0.019)	(0.000)	(0.007)	(0.000)
MB	-0.15***	-0.81***	-0.58***	-0.42***	-0.18***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Outside	-0.45***	2.375**	-0.044	-0.86***	-0.51***
	(0.000)	(0.017)	(0.869)	(0.000)	(0.000)
INSR	-0.48***	-0.309	-0.534	-0.594**	-0.32***

	(0.000)	(0.620)	(0.129)	(0.002)	(0.000)
Bsize	-0.062**	-0.354	-0.007	0.087*	0.052**
	(0.013)	(0.180)	(0.932)	(0.076)	(0.010)
Hold	0.55***	0.628	0.881**	0.257	0.206**
	(0.000)	(0.616)	(0.026)	(0.303)	(0.033)
Adjust R^2	0.04	0.057	0.05	0.046	0.027
Panel B: higher quantile					
Variable	OLS	Quantile Regression (Lower Quantile)			
		q(0.99)	q(0.95)	q(0.90)	q(0.05)
Constant	0.465**	10.1***	5.49***	3.68***	0.143
	(0.013)	(0.000)	(0.000)	(0.000)	(0.349)
OC	-0.042	-0.74***	-0.202**	-0.091	0.027
	(0.500)	(0.000)	(0.037)	(0.206)	(0.538)
Size	-0.019	-0.50***	-0.26***	-0.17***	0.023**
	(0.122)	(0.000)	(0.000)	(0.000)	(0.018)
ROA	-2.00***	4.09***	-0.375	-2.413**	-3.69***
	(0.000)	(0.000)	(0.581)	(0.016)	(0.000)
Lev	0.99***	5.6***	2.93***	2.05***	0.48***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
MB	-0.15***	0.077	0.015	-0.05***	-0.18***
	(0.000)	(0.278)	(0.675)	(0.000)	(0.000)
Outside	-0.45***	-1.02***	-0.51***	-0.43***	-0.51***
	(0.000)	(0.008)	(0.000)	(0.000)	(0.000)
INSR	-0.48***	-0.579	-0.022	0.038	-0.32***
	(0.000)	(0.326)	(0.873)	(0.727)	(0.000)
Bsize	-0.062**	-0.66***	-0.37***	-0.19***	0.052**
	(0.013)	(0.000)	(0.000)	(0.000)	(0.010)
Hold	0.55***	3.78***	0.73***	0.82***	0.206**
	(0.000)	(0.002)	(0.004)	(0.000)	(0.033)
Adjust R^2	0.04	0.137	0.07	0.038	0.027

1. In parentheses is the p-value.
2. *, **, ***, indicate statistical significance at the 0.1, 0.05, and 0.01 level, respectively.

Empirical Results

Table 3. shows OLS and Quantile regression results of real earnings management model. Panel A is for lower quantile and Panel B for higher quantile. Using OLS model, the association between overconfidence and real earnings management is not significant. The results indicate that H1a

is not supported. However, in the higher overconfidence quantile (0.99 and 0.95), the coefficients of OC are both negative and significant, meaning that overconfident manager may not use real earnings management as a tool to manage earnings.

Table 4. shows OLS and Quantile regression results of accrual-based earnings management model. Using OLS model, the coefficients of OC are both positive and significant, meaning that H1b is supported. Table 5. shows OLS and Quantile regression results of absolute accrual-based earnings management model. Using OLS model, the association between overconfidence and absolute accrual-based earnings management is not significant.

Finally, Table 6. shows Complementary and substitute effects of overconfidence on real earnings management using OLS and quantile regression. Both in the OLS model and the quantile regression model, accruals -based earnings management (DA) is positively associated with earnings management, indicating that there may be a complementary relationship between these two different approaches. However, the coefficient of absolute DA (|DA|) is negatively associated with earnings management in the lower (0.1 and 0.5) quantile, meaning that there may be substitute relationship between them. Also, there is significantly positive association in the higher quantile of 0.9, 0.95, and 0.99, meaning that there may be complementary relationship between them.

Concluding Remarks

This study investigates whether and how managerial overconfidence affects firm's earnings management behavior. The empirical results show that managerial overconfidence is negatively correlated with the real earnings management, meaning that overconfident managers seem to have less earnings management behavior.

However, managerial overconfidence is positively and significantly correlated with the accrual- based earnings management, supporting those overconfident managers may still manage earnings using some other method. Therefore, in order to clarify the relationship between accrual-based and real earnings management, we further investigate the interaction of accrual-based and real earnings management under different quantiles.

The evidence shows that when using absolute value of discretionary accruals as a proxy of earnings management, real earnings management and accrual-based earnings management has negative association (substitute relationship) in the lower overconfident quantile of 0.1 and even 0.5 but has positive association (complementary relationship) in the higher overconfident quantile of 0.9, 0.95, and 0.99.

The main contribution of this paper is to distinguish that whether and how managerial overconfidence affects earnings management. We use both two different measure of earnings management and distinguish how earnings management method is used in different status. This paper complements research on managers' earnings management behavior.

Table 4. OLS and Quantile regression results of discretionary accruals model

$$DA_{i,t} = \beta_0 + \beta_1 OC_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 Lev_{i,t} + \beta_5 MB_{i,t} + \beta_6 Outside_{i,t} + \beta_7 INSR_{i,t} + \beta_8 Bsize_{i,t} + \beta_9 Hold_{i,t} + \varepsilon_{i,t}$$

Panel A: lower quantile

Variable	OLS	Quantile Regression (Lower Quantile)			
		q(0.01)	q(0.05)	q(0.10)	q(0.05)
Constant	-0.002	-0.34***	-0.13***	-0.08***	0.001
	(0.638)	(0.000)	(0.000)	(0.000)	(0.762)
OC	0.002**	0.005	0.002	0.002	0.003***
	(0.031)	(0.694)	(0.482)	(0.267)	(0.001)
Size	0.000	0.018***	0.007***	0.004***	0.000
	(0.4)	(0.000)	(0.000)	(0.000)	(0.304)
ROA	0.625***	0.523***	0.559***	0.531***	0.494***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Lev	0.020***	-0.12***	-0.05***	-0.03***	0.0137
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
MB	-0.01***	-0.009*	-0.01***	-0.01***	-0.01***
	(0.000)	(0.072)	(0.000)	(0.000)	(0.000)
Outside	-0.01***	-0.023	-0.02***	-0.02***	-0.01***
	(0.000)	(0.155)	(0.000)	(0.000)	(0.000)
INSR	-0.01***	-0.05***	-0.03***	-0.02***	-0.01***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)
Bsize	-0.001	0.012**	0.01***	0.01***	-0.001
	(0.403)	(0.031)	(0.003)	(0.000)	(0.332)
Hold	0.004	0.007	-0.006	-0.002	0.005*
	(0.18)	(0.745)	(0.531)	(0.785)	(0.055)
Adjust R^2	0.099	0.083	57	0.046	0.037

Panel B: higher quantile

Variable	OLS	Quantile Regression (Lower Quantile)			
		q(0.99)	q(0.95)	q(0.90)	q(0.05)
Constant	-0.002	0.190***	0.142***	0.094***	0.001
	(0.638)	(0.000)	(0.000)	(0.000)	(0.762)
OC	0.002**	-0.002	0.005*	0.003	0.003***
	(0.031)	(0.780)	(0.050)	(0.147)	(0.001)
Size	0.000	-0.01***	-0.01***	-0.01***	0.000
	(0.400)	(0.000)	(0.000)	(0.000)	(0.304)
ROA	0.625***	0.962***	0.734***	0.667***	0.494***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Lev	0.02***	0.153***	0.088***	0.067***	0.013***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
MB	-0.01***	0.012***	0.003**	0.000	-0.01***
	(0.000)	(0.000)	(0.017)	(0.934)	(0.000)
Outside	-0.01***	0.000	-0.005	0.003	-0.01***
	(0.000)	(0.984)	(0.328)	(0.411)	(0.000)
INSR	-0.01***	-0.002	0.010**	0.002	-0.01***
	(0.000)	(0.903)	(0.043)	(0.597)	(0.001)
Bsize	-0.001	-0.02***	-0.01***	-0.01***	-0.001
	(0.403)	(0.000)	(0.000)	(0.000)	(0.332)
Hold	0.004	0.033**	-0.007	0.003	0.005*
	(0.18)	(0.026)	(0.367)	(0.585)	(0.055)
Adjust R^2	0.099	0.168	0.109	0.079	0.037

1. In parentheses is the p-value.
2. *, **, ***, indicate statistical significance at the 0.1, 0.05, and 0.01 level, respectively.

Table 5. OLS and quantile regression results of absolute value of discretionary accruals model

$$|DA_{i,t}| = \beta_0 + \beta_1 OC_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 Lev_{i,t} + \beta_5 MB_{i,t} + \beta_6 Outside_{i,t} + \beta_7 INSR_{i,t} + \beta_8 Bsize_{i,t} + \beta_9 Hold_{i,t} + \varepsilon_{i,t}$$

Panel A: lower quantile

Variable	OLS	Quantile Regression (Lower Quantile)			
		q(0.01)	q(0.05)	q(0.10)	q(0.05)
Constant	0.063***	0.001	0.003**	0.006***	0.040***
	(0.000)	(0.126)	(0.013)	(0.000)	(0.000)
OC	-0.001	0.000	0.000	-0.001	-0.001
	(0.405)	(0.777)	(0.316)	(0.170)	(0.316)
Size	-0.01***	0.000	0.000*	0.000***	-0.01***
	(0.000)	(0.227)	(0.070)	(0.002)	(0.000)
ROA	0.080***	0.000	-0.007	-0.007	-0.003
	(0.000)	(0.959)	(0.214)	(0.354)	(0.835)
Lev	0.034***	0.000	0.002***	0.003***	0.018***
	(0.000)	(0.645)	(0.000)	(0.000)	(0.000)
MB	0.002***	0.000	0.000	0.000***	0.001***
	(0.000)	(0.638)	(0.107)	(0.004)	(0.000)
Outside	0.006***	0.000	0.001***	0.001**	0.007***
	(0.001)	(0.909)	(0.004)	(0.033)	(0.000)
INSR	0.004**	0.000	0.001	0.001	0.004***
	(0.022)	(0.253)	(0.251)	(0.329)	(0.002)
Bsize	-0.01***	0.000	0.000	0.000	-0.01***
	(0.000)	(0.850)	(0.182)	(0.175)	(0.000)
Hold	0.003	0.000	0.000	-0.001	0.002
	(0.294)	(0.365)	(0.680)	(0.418)	(0.256)
Adjust R^2	0.035	0.001	0.001	0.001	0.011

Panel B: higher quantile

Variable	OLS	Quantile Regression (Lower Quantile)			
		q(0.99)	q(0.95)	q(0.90)	q(0.05)
Constant	0.063***	0.44***	0.208***	0.150***	0.04***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
OC	-0.001	-0.017*	0.002	0.003	-0.001
	(0.405)	(0.055)	(0.768)	(0.410)	(0.316)
Size	-0.01***	- 0.02***	-0.01***	-0.01***	-0.01***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.080***	0.045	-0.037	-0.017	-0.003
	(0.000)	(0.134)	(0.261)	(0.513)	(0.835)
Lev	0.03***	0.15***	0.09***	0.07***	0.02***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
MB	0.01***	0.01***	0.01***	0.005***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Outside	0.01***	-0.03**	0.014	0.011***	0.007***
	(0.001)	(0.031)	(0.103)	(0.009)	(0.000)
INSR	0.004**	0.028	0.025***	0.019***	0.004***
	(0.022)	(0.361)	(0.000)	(0.000)	(0.002)

Bsize	-0.01***	-0.02**	-0.01***	-0.01***	-0.01***
	(0.000)	(0.014)	(0.000)	(0.000)	(0.000)
Hold	0.003	0.003	0.000	-0.001	0.002
	(0.294)	(0.925)	(0.967)	(0.797)	(0.256)
Adjust R^2	0.035	0.076	0.051	0.043	0.011

1. In parentheses is the p-value.
2. *, **, ***, indicate statistical significance at the 0.1, 0.05, and 0.01 level, respectively.

Table 6. Complementary and substitute effects of over-confidence on real earnings management using OLS and quantile regression

$$REM_{i,t} = \beta_0 + \beta_1 DA_{i,t} + \beta_2 OC_{i,t} + \beta_3 (DA_{i,t} * OC_{i,t}) + \beta_4 Size_{i,t} + \beta_5 ROA_{i,t} + \beta_6 Lev_{i,t} + \beta_7 MB_{i,t} + \beta_8 Outside_{i,t} + \beta_9 INSR_{i,t} + \beta_{10} Bsize_{i,t} + \beta_{11} Hold_{i,t} + \varepsilon_{i,t}$$

Panel A: discretionary accruals model in lower quantile

Variable	OLS	q(0.01)	q(0.05)	q(0.10)	q(0.05)
Constant	0.51***	-9.53***	-4.28***	-2.3***	0.103
	(0.002)	(0.000)	(0.000)	(0.000)	(0.432)
DA	18.1***	15.26***	18.28***	18.1***	18.9***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
OC	-0.100*	0.043	0.003	-0.108	-0.052
	(0.059)	(0.940)	(0.984)	(0.191)	(0.208)
DA*OC	2.50**	8.32***	1.411	3.272**	-0.246
	(0.037)	(0.000)	(0.627)	(0.036)	(0.879)
control variables			Omitted		
Adjust R^2	0.292	0.133	0.151	0.162	0.193

Panel B: discretionary accruals model in higher quantile

Variable	OLS	q(0.99)	q(0.95)	q(0.90)	q(0.05)
Constant	0.51***	8.82***	3.91***	2.81***	0.103
	(0.002)	(0.000)	(0.000)	(0.000)	(0.432)
DA	18.1***	20.32***	18.9***	18.8***	18.9***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
OC	-0.10*	-0.73***	-0.181**	-0.150**	-0.052
	(0.059)	(0.000)	(0.047)	(0.023)	-0.208
DA*OC	2.5**	-2.17	0.899	0.899	-0.246
	(0.037)	(0.534)	(0.320)	(0.717)	(0.879)
control variables			omitted		
Adjust R^2	0.035	0.076	0.051	0.043	0.193

1. In parentheses is the p-value.
2. *, **, ***, indicate statistical significance at the 0.1, 0.05, and 0.01 level, respectively.

Table 6. (Continued)

$$REM_{i,t} = \beta_0 + \beta_1|DA_{i,t}| + \beta_2 OC_{i,t} + \beta_3(|DA_{i,t}| * OC_{i,t}) + \beta_4 Size_{i,t} + \beta_5 ROA_{i,t} + \beta_6 Lev_{i,t} + \beta_7 MB_{i,t} + \beta_8 Outside_{i,t} + \beta_9 INSR_{i,t} + \beta_{10} Bsize_{i,t} + \beta_{11} Hold_{i,t} + \varepsilon_{i,t}$$

Panel C: absolute discretionary accruals model in lower quantile

Variable	OLS	q(0.01)	q(0.05)	q(0.10)	q(0.05)
Constant	0.48**	-6.32***	-3.07***	-1.72***	0.215
	(0.011)	(0.000)	(0.000)	(0.000)	(0.169)
|DA|	-0.153	-29.7***	-22.8***	-19.6***	-1.99***
	(0.625)	(0.001)	(0.000)	(0.000)	(0.001)
OC	0.071	0.332	0.63***	0.29***	0.046
	(0.401)	(0.606)	(0.000)	(0.001)	(0.446)
|DA|*OC	-3.76**	-18.26*	-19.3***	-9.78***	-1.395
	(0.048)	(0.097)	(0.001)	(0.000)	(0.595)
control variables			omitted		
Adjust R^2	0.04	0.152	0.128	0.114	0.027

Panel D: absolute discretionary accruals model in higher quantile

Variable	OLS	q(0.99)	q(0.95)	q(0.90)	q(0.05)
Constant	0.48**	6.65***	3.09***	2.05***	0.215
	(0.011)	(0.000)	(0.000)	(0.000)	(0.169)
|DA|	-0.153	44.3***	24.2***	19.5***	-1.9***
	(0.625)	(0.000)	(0.000)	(0.000)	(0.001)
OC	0.071	-0.096	-0.156	-0.079	0.046
	(0.401)	(0.690)	(0.167)	(0.282)	(0.446)
|DA|*OC	-3.76**	-23.8***	-1.725	-2.857	-1.395
	(0.048)	(0.005)	(0.710)	(0.317)	(0.595)
control variables			omitted		
Adjust R^2	0.04	0.270	0.172	0.128	0.027

1. In parentheses is the p-value.
2. *, **, ***, indicate statistical significance at the 0.1, 0.05, and 0.01 level, respectively.

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