UNIVERSITY OF WAIKATO

Hamilton
New Zealand

Is there a Trade-Off between Accrual-Based and Real Earnings Management? Evidence from Equity Compensation and Market Pricing

Leon Li

Working Paper in Economics 24/17

October 2017

Leon Li
School of Accounting, Finance
and Economics
University of Waikato
Private Bag 3105
Hamilton 3240, New Zealand

Phone: +64 (0)7 856 2889 Extn 5650

Email: leonli@waikato.ac.nz

Abstract

Recent studies indicate a trade-off relation between accrual-based and real earnings management strategies. This paper studies the relation by examining the impact of the equity compensation of chief executive officers (CEOs) on earnings management and the market pricing of the two types of earnings management. Moreover, this study proposes a "within-group difference" approach for both the explained and explanatory variables to mitigate the over-parameter problem in the conventional fixed effects regression model for panel data. Our empirical results show that CEO equity compensation is positively associated with both accrual-based and real earnings management. Moreover, the reward of the joint effect of accrual-based and real earnings management is positive in terms of stock returns and stronger than a stand-alone strategy. Overall, our results indicate that the relation between accrual-based and real earnings management for firms is complementary rather than a trade-off.

Keywords

earnings management equity
equity compensation
market pricing

JEL Classification

M41; G30

Data Availability

Data analyzed in the study are collected from the public sources.

1. Introduction

This study investigates the relation between accrual-based and real earnings management strategies. Prior studies have invariably documented a trade-off relation between them. Our study extends this research by examining the effect of chief executive officer (CEO) equity incentives on earnings management and the market pricing of the two types of earnings management. We provide evidence that CEOs' equity compensation encourages them to leverage both accrual-based and real earnings management strategies and the simultaneous utilization of accrual-based and real earnings management is associated with higher gains in terms of stock returns than the individual strategies. Our findings indicate that firms may concurrently employ both earnings management strategies rather than tradeoff between them.

As well documented in the literature, earnings management is prevalent among business organizations (Graham *et al.* 2005). First, accrual-based earnings management by corporate managers is due to inherent flexibility in generally accepted accounting principles (GAAP). Accounting discretions embedded in GAAP offer opportunities for corporate managers to adjust income numbers (either upward or downward). In addition to applying different accounting methods to record accounting numbers, corporate managers can adopt a real earnings management strategy to change the timing or structure of an operation, investment, or financing transaction to alter their companies' performance outcomes.

Our research question is whether there is a trade-off relation between the two earnings management strategies. To answer this, our empirical analysis encompasses two tests, for the determinants and consequences of earnings management. Specifically, we first consider CEO equity incentives as a determinant of earnings management. This test is based on the assumption that the stock price is a function of an accounting performance measure and that corporate managers can manipulate accounting performance to maximize the value of their equity-based compensation. In the second set of analyses, we analyze the market pricing of earnings management strategies (that is, the consequences of earnings management). As documented in the literature, market participants tend to reward accrual-based earnings management with positive stock returns (for example, Healy and Palepu 1993, Subramanyam 1996, Barth *et al.* 1999, Dechow and Skinner 2000, Kirschenheiter and Melumad 2002, Beaver 2002 and Myers *et al.* 2007). Recent studies further show the tendency of firms to employ real activities manipulation to substitute for accrual-based earnings management (for example, Cohen *et al.* 2008, Cohen and Zarowin 2010 and Ipino and Parbonetti 2017). This test investigates whether market investors positively or negatively price earnings management into share prices.

Our study contributes to the literature in several ways. Dechow *et al.* (2010) outline two strands of research on earnings management strategies, concerning their determinants and consequences. This study contributes to this literature by providing empirical evidence on the impact of CEO incentive compensation on earnings management and on the market pricing

of two earnings management strategies. Secondly, we document that CEO equity compensation is positively associated with both accrual-based and real earnings management. In addition, the interaction term between accrual-based and real earnings management is positively associated with stock returns. These findings provide additional insight into the trade-off relation between accrual-based and real earnings management strategies (for example, Cohen *et al.* 2008, Cohen and Zarowin 2010 and Zang 2012). Thirdly, our empirical results show that, individually, accrual-based earnings management and real earnings management are negatively and positively associated with stock returns, respectively. This finding supports the pattern of a shift from accrual-based to real earnings management in firms, as demonstrated in early studies (for example, Cohen *et al.* 2008 and Durnev *et al.* 2015).

The remainder of this paper is organized as follows. Section 2 describes the measurement of the variables. Section 3 develops the research methodology. Section 4 presents the sample, variables, and empirical models. Section 5 discusses the empirical results. Finally, Section 6 concludes the paper.

2. Measurement of Variables

2.1 Accrual-based Earnings Management

Following prior studies (for example, Cheng and Warfield 2005 Bergstresser and Philippon 2006 and Larcker *et al.* 2007), we adopt the following modified Jones's model proposed by Kothari *et al.* (2005) to calculate discretionary accruals:

$$\frac{TA_{i,t}}{A_{i,t-1}} = \beta_{1,t}\frac{1}{A_{i,t-1}} + \beta_{2,t}\frac{\Delta SALE_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}} + \beta_{3,t}\frac{PPE_{i,t}}{A_{i,t-1}} + \beta_{4,t}ROA_{i,t-1} + \mu_{i,t} \quad (1)$$

where, for firm i and year t, TA represents total accruals; A stands for the value of total assets; $\Delta SALE$ is the change in net sales; ΔREC denotes the change in net accounts receivable; PPE is gross property, plant, and equipment; and ROA is the rate of return on assets. We estimate the equation by year–industry, using two-digit Standard Industrial Classification (SIC) codes and at least 10 observations (Klein 2002). The residuals from the equation (that is, $\mu_{i,t}$) are discretionary accruals (DA) or abnormal levels of total accruals. Moreover, we follow Hribar and Nichols (2007) and employ the absolute value (unsigned) of discretionary accruals, $|DA|$, to measure the degree of accrual-based earnings management (AEM).

2.2 Real Earnings Management

Following prior studies (for example, Roychowdhury 2006, Cohen *et al.* 2008, Cohen and Zarowin 2010), we consider three real activities manipulations for real earnings management:

$$\frac{OCF_{i,t}}{A_{i,t-1}} = \beta_{1,t}\frac{1}{A_{i,t-1}} + \beta_{2,t}\frac{SALE_{i,t}}{A_{i,t-1}} + \beta_{3,t}\frac{\Delta SALE_{i,t}}{A_{i,t-1}} + \mu_{i,t} \quad (2)$$

$$\frac{PROD_{i,t}}{A_{i,t-1}} = \beta_{1,t}\frac{1}{A_{i,t-1}} + \beta_{2,t}\frac{SALE_{i,t}}{A_{i,t-1}} + \beta_{3,t}\frac{\Delta SALE_{i,t}}{A_{i,t-1}} + \beta_{4,t}\frac{\Delta SALE_{i,t-1}}{A_{i,t-1}} + \mu_{i,t} \quad (3)$$

$$\frac{DISEXP_{i,t}}{A_{i,t-1}} = \beta_{1,t}\frac{1}{A_{i,t-1}} + \beta_{2,t}\frac{SALE_{i,t-1}}{A_{i,t-1}} + \mu_{i,t} \quad (4)$$

where *OCF* is operating cash flow, *PROD* is product costs, *DISEXP* is discretionary expenses, *SALE* is net sales, and *A* stands for the value of total assets. Similarly, the regression residuals (that is, $\mu_{i,t}$) from equations (2) to (4) represent abnormal levels of operating cash flow, production costs, and discretionary expenses, respectively. To capture the total effects of the three real earnings management activities, we follow Cohen *et al.* (2008) and Chi *et al.* (2011) and combine the three individual regression residuals to compute a single measure for real earnings management, *REM*, where *REM* = residuals from equation (2) + residuals from equation (3) – residuals from equation (4).[1]

2.3 CEO Equity Compensation and Market Pricing

A CEO's compensation includes different components based on salary, bonus, and equity-based incentive rewards (stock options plus restricted shares). The value of equity-based compensation is closely related to firm performance as evaluated by market participants. Many studies have thoroughly documented that managers leverage earnings management strategies to affect stock prices and thus increase their wealth (for example, Sloan 1996, Teoh *et al.* 1998a, 1998b and Beneish and Vargus 2002).

In our research, we define equity compensation as the total value of restricted stock granted and the total value of stock options granted. To control for the potential heteroskedasticity problem with the level variable, we define equity compensation (*EQCOM*) as the total value of stock-based compensation (restricted stock and stock options) divided by total compensation (that is, stock-based/total).

To assess the pricing of earnings management, we regress the stock returns on the levels of accrual-based earnings management (*AEM*) and real earnings management (*REM*), as defined in the previous section. The annual stock return (*RETURN*) is calculated as the compounded monthly stock return for a 12-month period (Subramanyam 1996).

[1] We multiply the residuals from equations (2) and (4) by -1 so that the higher the amount, the more likely the firm is cutting discretionary expenditures to manage reported earnings. We do not multiply the residuals from equation (3) by -1 because high production costs are an indicator of overproduction to reduce the cost of goods sold.

3. Research Methodology

3.1 Econometric Model

Let (y_{it}, x_{it}), for firm i and period t, i = 1, 2, …, N and t = 1, 2, …, T, be a sample population where x_{it} is a K×1 vector of explanatory variables for y_{it}, the explained variable. The conventional ordinary least squares OLS model is defined as

$$y_{it} = a + x_{it}' \cdot b + u_{it} \tag{5}$$

where a and b (a K×1 vector) are unknown parameters to be estimated.

Since our data have a panel structure, we use the fixed effects model, expressed as

$$y_{it} = a_i + x_{it}' \cdot b + u_{it} \tag{6}$$

where a_i (i = 1, 2, …, N) and b (K×1 vector) are unknown parameters to be estimated.

Comparison of equations (6) and (5) reveals the key feature of the fixed effect model: the firm-varying intercept term a_i (i = 1, 2,…, N), for capturing heterogeneity among firms.[2] Moreover, the OLS model could be considered as a special case of the fixed effect model with the restriction of $a_1 = a_2 = a_N = a$. Petersen (2009) further indicates that the OLS estimation results could be biased for panel structure data. However, the fixed effect model with firm-varying intercept terms might suffer from the over-parameter problem. Since our focus is on the relation between y_{it} and x_{it} (i.e., the b parameters), we calculate the "*within-group* difference" for both the explained variable (y_{it}) and the explanatory variables (x_{it}) and redefine equation (6) as follows:

$$y_{it}^* = x_{it}^{*\prime} \cdot b + u_{it}^* \tag{7}$$

where * denotes variables whose values are deviated from the group mean, that is, $y_{it}^* = y_{it} - \bar{y}_i$, $x_{it}^* = x_{it} - \bar{x}_i$, and $u_{it}^* = u_{it} - \bar{u}_i$, and $\bar{y}_i$, $\bar{x}_i$, and $\bar{u}_i$ are the means of y, x, and u of firm i, respectively. Notably, equation (7) successfully mitigates the over-parameter problem involved in equation (6) by excluding firm-varying intercept terms, that is, a_i (i = 1, 2, …, N), from the parameter estimation.

[2] An alternative method to control the panel structure in data is to run cross-sectional regression for every period. However, it will significantly reduce the number of sample.

3.2 Empirical Models

Our empirical analysis encompasses two empirical tests on earnings management. First, we examine the impact of CEO equity compensation on earnings management. To investigate this research issue, we consider the regression in which the independent variable is CEO equity compensation and the dependent variable is earnings management. To mitigate the omitted-variable problem, we include several potential determining factors for earnings management in the regression. The empirical model for our first test is

$$AEM_{i,t} \text{ (or } REM_{i,t}) = \alpha_i + \beta_1 EQCOM_{i,t} + \beta_2 BTM_{i,t} + \beta_3 OCF_{i,t} + \beta_4 LEV_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 SALES_{i,t} + \mu_{i,t} \quad (8)$$

where *AEM* stands for accrual-based earnings management, *REM* represents real earnings management, and *EQCOM* is equity-based compensation (see Section 2 for the measurement of the three variables). It should be noted that our regression includes a set of control variables that includes the book-to-market ratio (*BTM*, a proxy for growth opportunities), operating cash flow (*OCF*), leverage (*LEV*), and firm size (*SIZE*). Prior studies have found associations between these control variables and earnings management (for example, Myers *et al.* 2003, Cheng and Warfield 2005, Bergstresser and Philippon 2006 and Larcker *et al.* 2007). See Table 1 for detailed variable definitions.

In addition to the test on the impact of CEO equity-based compensation on earnings management, we explore how the stock market prices earnings management. The empirical analysis is based on a regression in which the independent variable is earnings management and the dependent variable is the stock return. Again, we include several potential determining factors for stock returns in the regression. Specifically, we include the size factor, the value factor, the market factor, the leverage factor, and the momentum factor. The empirical model we estimate is

$$RETURN_{i,t} = \alpha_i + \beta_1 AEM_{i,t} + \beta_2 REM_{i,t} + \beta_3 AEM_{i,t} \times REM_{i,t} + \beta_4 SMB_{i,t} + \beta_5 HML_{i,t} + \beta_6 MKT_{i,t} + \beta_7 MOM_{i,t} + \mu_{i,t} \quad (9)$$

where *RETURN* denotes the annual excess returns of the individual stock; *AEM* and *REM* are accrual-based and real earnings management, respectively; *SMB* (small minus big) denotes the difference between the return on a portfolio of small stocks and that on a portfolio of large stocks; *HML* (high minus low) denotes the difference between the return on a portfolio of high book-to-market stocks and that on a portfolio of low book-to-market; and *MOM* is the difference between the return on a portfolio of high-performance stocks and that on a portfolio of low-performance stocks. Note that we include *AEM*, *REM*, and their interaction term *AEM* × *REM* to investigate whether the stock market attaches value to firms leveraging a stand-alone accrual-based or real earnings management strategy versus firms simultaneously leveraging both accrual-based and real earnings management strategies.

Table 1: Descriptive Statistics of Variables

Panel A: Test for the Impact of Equity Compensation on Earnings Management

Variable	Mean	Standard Dev.	Q1	Median	Q3
Dependent variable					
AEM	0.1154	0.1263	0.0271	0.0659	0.1577
REM	0.4204	1.4735	-0.1919	0.3083	0.9791
Independent variables					
EQCOM	0.5786	0.2353	0.4489	0.6420	0.7557
BTM	0.4825	1.6460	0.2785	0.4547	0.6981
OCF	0.1019	0.2413	0.0619	0.1002	0.1477
SIZE	0.5336	0.2759	0.3680	0.5241	0.6691
LEV	7.6312	1.6402	6.4716	7.5379	8.7333
SALES	0.1044	0.7522	-0.0118	0.0730	0.1645

Panel B: Test for the Market Pricing of Earnings Management

Variable	Mean	Standard Dev.	Q1	Median	Q3
Dependent variable					
RETURN	-0.0167	0.0428	-0.0167	0.0048	0.0221
Independent variables					
AEM	0.1154	0.1263	0.0271	0.0659	0.1577
REM	0.4204	1.4735	-0.1919	0.3083	0.9791
SMB	-0.0026	0.0182	-0.0026	0.0043	0.0148
HML	-0.0041	0.0054	-0.0041	0.0007	0.0068
MKT	-0.0058	0.0061	-0.0058	-0.0003	0.0056
MOM	-0.0054	0.0220	-0.0054	0.0050	0.0159

Variable definitions:

AEM	=	Absolute value of residuals from equation (1)
REM	=	– Residuals from equation (2) + Residuals from equation (3) – Residuals from equation (4)
EQCOM	=	Value of restricted stock and stock options granted to the CEO divided by total compensation
BTM	=	Book value of common equity divided by market value of equity
OCF	=	Net cash flows from operations divided by total assets
SIZE	=	Natural logarithm of book value of total asset
LEV	=	Total liabilities divided by total assets
SALES	=	Growth of net sale = ($SALES_{i,t} - SALES_{i,t-1}$)/$SALES_{i,t}$
RETURN	=	Annual return of individual stock minus risk-free rate
SMB	=	Stock return of small-size firms minus return of large-size firms
HML	=	Stock return of firms with high book-to-market ratio minus return of firms with low book-to-market ratio
MKT	=	Market returns from the CRSP value-weighted market index minus risk-free rate
MOM	=	Stock return of high-performance firms minus return of low-performance firms

4. Data, Empirical Results and Interpretations

4.1 Data

Our sample consists of U.S. non-financial firms with the required data for our empirical analysis available from Compustat and ExecuComp for the period from 2005 to 2014. We exclude financial firms (SIC codes 6000–6999), since discretionary accruals are not an appropriate proxy for earnings management in these firms. The final sample consists of 6,097 firm–year observations from 1,089 unique firms.

Panel A of Table 1 presents descriptive statistics of the variables for equation (8), the test for the impact of equity compensation on earnings management. The mean and median of *AEM* (accrual-based real earnings) equal 0.1154 and 0.0659, respectively, and the mean and median of *REM* (real earnings management) are 0.4204 and 0.3083, respectively. In view of the distributions of *AEM* and *REM*, it is an expected result that the mean is greater than the median. The mean (median) of *EQCOM* equals 0.5786 (0.6420), which indicates that, on average, the CEOs in our sample receive more than 50 percent of their total pay in the form of equity compensation. Panel B presents descriptive statistics of the variables for equation (9), the test for the market pricing of earnings management. As shown in the table, the mean of *RETURN* is -0.0167 (median = 0.0048, standard deviation = 0.0428).

4.2 Impact of CEO Equity Compensation on Earnings Management

Panel A of Table 2 presents the estimated coefficient for equation (8) when *AEM* is the dependent variable. The coefficient of *EQCOM* equals 0.0160 (p-value = 0.0296). Next, we use *REM* as the dependent variable and rerun equation (8). The results are listed in Panel B. Again, the coefficient of *EQCOM* is positive and significant (coefficient = 0.2059, p-value = 0.0000).

4.3 Market Pricing of Earnings Management

Table 3 presents the empirical results of equation (9). Importantly, apart from including two individual types of earnings management (i.e., *AEM* and *REM*), we consider the interaction term *AEM* × *REM* to capture the joint effect. First, the coefficient of *AEM* is significantly negative. By contrast, the coefficient of *REM* is significantly positive. Moreover, the coefficient of the interaction term *AEM* × *REM* is significantly positive and its magnitude (0.0139) is considerably larger than that of the *REM* coefficient (0.0055).

4.4 Implications and Discussions

These findings have several implications. First, the positive coefficients of *EQCOM* reported in Table 2 suggest that higher CEO equity compensation is associated with more accrual-based and real earnings management, which is consistent with early studies. Next, as shown in Table 3, we find that real earnings management has a positive impact on stock returns, while the relation between accrual-based earnings management and stock returns is negative.

These findings provide evidence that real earnings management is rewarded by an increase in stock returns, whereas accrual-based earnings management is penalized by a decrease in stock returns. Early studies (for example, Ewert and Wagenhofer 2005, Cohen *et al.* 2008 and Durnev *et al.* 2015) demonstrate a shift from accrual-based to real earnings management for firms. Our findings could provide alternative support for the argument.

Table 2: The Impact of Equity Compensation on Earnings Management

$$AEM_{i,t} \text{ (or } REM_{i,t}) = \alpha_i + \beta_1 EQCOM_{i,t} + \beta_2 BTM_{i,t} + \beta_3 OCF_{i,t} + \beta_4 LEV_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 SALES_{i,t} + \mu_{i,t}$$

Panel A: Accrual-Based Earnings Management (*AEM*)

Variables	Coefficient	Stand Error	*t*-Statistic	P-value
Intercept	0.0000	0.0011	0.0000	1.0000
EQCOM	0.0160**	0.0073	2.1764	0.0296
BTM	0.0000	0.0000	0.5057	0.6131
OCF	0.0127*	0.0077	1.6540	0.0982
SIZE	0.0367***	0.0116	3.1625	0.0016
LEV	0.0077*	0.0041	1.8788	0.0603
SALES	-0.0003	0.0016	-0.2095	0.8341
RSS (Residual Sum of Square)		80.30		
F-statistic (p-value)		3.33 (0.0028)		

Panel B: Real Earnings Management (*REM*)

Variables	Coefficient	Stand Error	*t*-Statistic	P-value
Intercept	0.0000	0.0007	0.0004	0.9964
EQCOM	0.2059***	0.0465	4.4231	0.0000
BTM	0.0000	0.0000	-1.2110	0.2259
OCF	0.5590***	0.0447	12.5075	0.0000
SIZE	-0.2802***	0.0653	-4.2886	0.0000
LEV	-0.0259	0.0250	-1.0350	0.3007
SALES	0.0143	0.0090	1.5871	0.1125
RSS (Residual Sum of Square)		3367.26		
F-statistic (p-value)		41.25 (0.0000)		

Notes

The ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

AEM is accrual-based earnings management; *REM* is real earnings management; *EQCOM* is equity-based compensation; *BTM* is book-to-market ratio; *OCF* is operation cash flow; *SIZE* is firm size; *LEV* is leverage; *SALES* is growth rate of sales.

Please refer to Table 1 for detail definition and basic statistics of variables.

Table 3: The Market Pricing of Earnings Management

$$RETURN_{i,t} = \alpha_i + \beta_1 AEM_{i,t} + \beta_2 REM_{i,t} + \beta_3 AEM_{i,t} \times REM_{i,t} + \beta_4 SMB_{i,t} + \beta_5 HML_{i,t} + \beta_6 MKT_{i,t} + \beta_7 MOM_{i,t} + \mu_{i,t}$$

Variables	Coefficient	Stand Error	t-Statistic	P-value
Intercept	0.0000	0.0004	0.0000	1.0000
AEM	-0.0080**	0.0040	-1.9822	0.0476
REM	0.0055***	0.0006	8.5807	0.0000
AEM × *REM*	0.0139*	0.0083	1.6761	0.0938
SMB	0.3346***	0.0928	3.6047	0.0003
HML	-0.0039	0.0722	-0.0540	0.9596
MKT	1.2566***	0.0309	40.6230	0.0000
MOM	-0.0963***	0.0271	-3.5574	0.0004
RSS (Residual Sum of Square)		3.36		
F-statistic		474.26 (0.0000)		

Notes

The ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

RETURN is annual stock return; *AEM* is accrual-based earnings management; *REM* is real earnings management; *SMB* (small minus big) is the difference between the return on a portfolio of small stocks and that on a portfolio of large stocks; *HML* (high minus low) is the difference between the return on a portfolio of high book-to-market stocks and that on a portfolio of low book-to-market stocks; *MOM* is the difference between the return on a portfolio of high-performance stocks and that on a portfolio of low-performance stocks.

Please refer to Table 1 for detail definitions and basic statistics of variables.

Most importantly, the interaction term of accrual-based and real earnings management is positively associated with stock returns and the magnitude of its estimated coefficient is much larger than those for the individual types of earnings management (see Table 3). Overall, our results indicate that equity compensation motivates CEOs to leverage both accrual-based and real earnings management simultaneously. Firms simultaneously adopting accrual-based and real earnings managements enjoy higher stock returns than firms adopting either accrual-based or real earnings management alone. These findings imply that accrual-based and real earnings management are not trade-offs but, rather, complementary for firms.

5. Summary and Conclusions

The relation between accrual-based and real earnings management has been widely investigated. Using the work of Dechow *et al.* (2010) as a research framework, our study contributes to this line of research by examining the impact of CEO equity compensation on earnings management and the market pricing of the two types of earnings management. We provide evidence that the relation between the two types of earnings management is complementary and not a trade-off for firms. Specifically, using a within-group difference technique for both the explained and explanatory variables to mitigate the over-parameter

problem involved in the conventional fixed effects regression model for panel data, our new insights indicate that equity compensation motivates corporate executives to manage earnings and that the market rewards firms for simultaneously leveraging accrual-based and real earnings management strategies. However, when firms adopt either accrual-based or real earnings management as a stand-alone strategy, the rewards in terms of stock returns are lower and even negative.

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